Designation: D1129 – 13

Standard Terminology Relating to Water[1]

This standard is issued under the fixed designation D1129; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

absolute filter rating, *n*—particle size above which 100 % of particles that are trapped on or within the filter medium. **D6161**

absorbance, *n*—logarithm to the base 10 of the reciprocal of the transmittance (T). $A = \log_{10} (1/ T) = –\log_{10} T$. **D4691**

absorption, *n*—release for desorption holding of a substance within a solid by cohesive or capillary forces. **D6161**

absorptivity, *n*—absorbance (A) divided by the product of the sample path length (b) and the concentration (c). $a = A/bc$. **D4691**

accelerated erosion, *n*—erosion at a rate greater than geologic or natural erosion. **D4410**

Discussion—Accelerated erosion is usually associated with anthropogenic activities and usually reduces plant cover and increases runoff.

acceptable holding time, *n*—any period of time less than or equal to the maximum holding time. **D4841**

acceptable verification ratio (AVR)—ratio of the difference between measured value of the verification sample and the known value added to the verification sample to the square root of the sum of the squares of their associated combined standard uncertainties. See Eq. 8 in 16.2.13. **D7282**

accretion, *n*—process of sediment accumulation. **D4410**

accumulator, *n*—pulsation dampener installed on the suction and/or discharge lines of pumps, generally plunger type, to minimize pressure surges and provide uniformity of flow. **D6161**

accuracy, *n*—a measure of the degree of conformity of a value generated by a specific procedure to the assumed or accepted true value, and includes both precision and bias.

accuracy, *n*—closeness of agreement between an observed value and an accepted reference value. Where an accepted reference value is not available, accuracy is a description of a measure of the degree of conformity of a value generated by a specific procedure to the assumed or accepted true value, including both precision and bias. **D6161**

accuracy, *n*—measure of the degree of conformity of a single test result generated by a specific procedure to the assumed or accepted true value, and includes both precision and bias. **D2777**

accuracy, *n*—proportion of the observed count to the true density of a sample. **D5392**

accuracy, *n*—refers to how close a measurement is to the true or actual value. (See Terminology D1129.) **D5906**

acid error, *n*—in very acid solutions, the activity of water is reduced (less than unity) causing a non-Nernstian response in glass electrodes. A positive error in the pH reading results. **D4127**

acidity, *n*—the quantitative capacity of aqueous media to react with hydroxyl ions.

acidity, *n*—quantitative capacity of aqueous media to react with hydroxyl ions. **D6161**

acidity, free mineral, *n*—the quantitative capacity of aqueous media to react with hydroxyl ions to pH 4.3.

acidity, theoretical free mineral, *n*—the free mineral acidity that would result from the conversion of the anions of strong acids in solution to their respective free acids.

acoustic path, *n*—straight line between the centers of two acoustic transducers. **D5389**

acoustic path length, *n*—face-to-face distance between transducers on an acoustic path. **D5389**

acoustic transducer, *n*—device that is used to generate acoustic signals when driven by an electric voltage, and conversely, a device that is used to generate an electric voltage when excited by an acoustic signal. **D5389**

acoustic travel time, *n*—time required for an acoustic signal to propagate along an acoustic path, either upstream or downstream. **D5389**

action level, *n*—concentration of the analyte of concern at which some further action is required or suggested. **D6850**

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[1] This terminology is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.02 on Quality Systems, Specification, and Statistics.

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activated carbon, *n*—granulated or powdered activated carbon used to remove tastes, odor, chlorine, chloramines, and some organics from water. A family of carbonaceous substances manufactured by processes that develop adsorptive properties. **D6161**

activity, *n*—thermodynamically effective concentration of a free ion in solution. In dilute solutions, ionic activity and concentration are practically identical, but in solutions of high ionic strength, or in the presence of complexing agents, activity may differ significantly from concentration. Ionic activity, not concentration, determines both the rate and the extent of chemical reactions. **D4127**

activity coefficient, *n*—factor, γ, that relates activity, A, to the concentration, C of a species in solution:

$$A = \gamma C$$

The activity coefficient is dependent on the ionic strength of the solution. Ions of similar size and charge have similar activity coefficients. **D4127**

activity standard, *n*—standardizing solution whose value is reported in terms of ionic activity. If the electrode is calibrated using activity standards, the activity of the free, unbound ion in the sample is determined. **D4127**

adenosine triphosphate—see **ATP**. **D6161**

adsorption, *n*—holding of a substance onto the surface of a solid by chemical surface forces, without forming new chemical bonds. **D6161**

aerobic bacteria, *n*—bacteria that require oxygen for growth. See **bacteria, aerobes**. **D6161**

aerosol, *n*—any solid or liquid particles, with a nominal size range from 10 nm to 100 µm, suspended in a gas (usually air). **D5544**

agglomeration or flocculation, *n*—coalescence of dispersed suspended matter into large flocs or particles that settle rapidly. **D4410**

aggradation, *n*—geologic process by which stream beds, flood plains, and the bottoms of other water bodies are raised in elevation by the deposition of material eroded and transported by water from other areas. **D4410**

aggregate, *n*—granular material such as sand, gravel, or crushed stone. **D6161**

air header, *n*—pipe running within a cassette that distributes the air to the individual modules or aerators. **D6161**

air scour, *v*—distributing air over the entire area at the bottom of a filter media flowing upward or immersed membrane to improve the effectiveness of filtration or backwashing or to permit the use of lower backwash water flow rate, or both. **D6161**

air stripping, *v*—removal of volatile substances from a water solution by passing a gas through the solution. **D6161**

algae, *n*—major group of lower plants, generally aquatic, photosynthetic of extremely varied morphology and physiology, monocellular plants with chlorophyll often masked by a brown or red pigment. **D6161**

alkaline error, *n*—in alkaline solutions, where hydrogen ion activity becomes very small, some glass electrodes respond to other cations, such as sodium. A negative error in the pH reading results. By changing the composition of the glass, the affinity of the glass for sodium ion can be reduced. Such electrodes are known as lithium glass, high-pH, or full-range electrodes. **D4127**

alkalinity, *n*—the quantitative capacity of aqueous media to react with hydrogen ions.

alkalinity, *n*—quantitative capacity of aqueous media to react with hydrogen ions. "M" alkalinity is that which will react with acid as the pH of the sample is reduced to the methylorange endpoint of about 4.5. "P" alkalinity is that which reacts with acid as the pH of the sample is reduced to the phenolphthalein end point of 8.3. "M" is the total alkalinity which is the sum of hydroxide, carbonate, and bicarbonate contents, "P" includes all the hydroxyl and half the carbonate content. **D6161**

alkyl benzene sulfonate (ABS)[2]—generic name applied to the neutralized product resulting from the sulfonation of a branched-chain alkylated benzene. See also Terminology D459. **D2330**

alluvial channel—see **alluvial stream**. **D4410**

alluvial deposit—sediment deposited by the action of moving water. **D4410**

alluvial fans—sediment deposited in the shape of a segment of a cone formed because of a sudden flattening of a stream gradient especially at debouchures of tributaries on main stream flood plains. **D4410**

alluvial stream, *n*—stream whose boundary is composed of appreciable quantities of the sediments transported by the flow and which generally changes its bed forms as the rate of flow changes. **D4410**

alleviation, *n*—process of accumulating sediment deposits at places where the flow is retarded. **D4410**

alluvium, *n*—general term for all fluvial deposits resulting directly or indirectly from the sediment transport of (modern) streams, thus including the sediments laid down in riverbeds, flood plains, lakes, fans, and estuaries. **D4410**

alpha (α), *n*—velocity-head coefficient that adjusts the velocity head computed on basis of the mean velocity to the true velocity head. **D5129**

alpha (α), *n*—velocity-head coefficient that adjusts the velocity head computed on basis of the mean velocity to the true velocity head. It is assumed equal to 1.0 if the cross section is not subdivided. **D5243**

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[2] For a more complete discussion of terms relating to synthetic detergents and their significance, refer to "Syndets and Waste Disposal" by McKinney, R. E., *Sewage and Industrial Wastes*, Vol 29, Part 6, June 1957, pp. 654-666.

alpha (α), *n*—velocity-head coefficient that represents the ratio of the true velocity head to the velocity head computed on the basis of the mean velocity. It is assumed equal to 1.0 if the cross section is not subdivided. For subdivided sections, a is computed as follows: **D5130**

$$\alpha = \frac{\sum \left(\frac{k_i^3}{A_i^2} \right)}{\frac{K_T^3}{A_T^2}}$$

where:

K and A = the conveyance and area of the subsection indicated by the subscript *i* and
K_T *and* A_T = the conveyance and area of the entire cross section.

alpha (α), *n*—dimensionless velocity-head coefficient that represents the ratio of the true velocity head to the velocity head computed on the basis of the mean velocity. It is assumed equal to unity if the cross section is not subdivided. For subdivided sections, a is computed as follows: **D5388**

$$\alpha = \frac{\sum \left(\frac{k_i^3}{a_i^2} \right)}{\frac{K_T^3}{A_T^2}}$$

where:

k and a = the conveyance and area of the subsection indicated by the subscript *i* and
K_T *and* A_T = the conveyance and area of the total cross section indicated by the subscript *T*.

alpha particle (α), *n*—particle consisting of two protons and two neutrons emitted from the nucleus of an atom during radioactive decay. **D7316**

alpha particle detection efficiency, *n—in the measurement of radioactivity*, that fraction of alpha particles emitted by a source which are identified as alpha particles by the counter. **D7283**

alpha-to-beta spillover, *n—in the measurement of radioactivity*, that fraction of alpha particles emitted by a source which are misclassified as beta particles. **D7283**

alum, *n*—aluminum sulfate, $AL_2(SO_4)_3XH_2O$ (X = 14-18), a coagulant. **D6161**

ambient temperature, *n*—temperature of the surroundings, generally assumed to be 20–25°C. **D6161**

American Water Works Association—see **AWWA**. **D6161**

American Water Works Association Research Foundation—see **AWWARF**. **D6161**

amorphous, *adj*—noncrystalline, devoid of regular cohesive structure. **D6161**

amperometric systems, *n*—those instrumental probes that involve the generation of an electrical current from which the final measurement is derived. **D888**

amphoteric, *adv*—capable of acting as an acid or a base. **D6161**

anaerobic bacteria, *n*—bacteria that do not use oxygen. Oxygen is toxic to them. See **bacteria, anaerobes**. **D6161**

analate addition, *n*—variation of the known addition measurement technique in which the sample (analate) is added to a reagent containing the ion being measured. The electrode is placed in the reagent, and the sample concentration is calculated from the change in electrode potential after the addition of the sample. **D4127**

analate subtraction, *n*—variation of the known subtraction measurement technique in which the sample (analate) is added to a reagent containing an ion that reacts with the species being determined. The electrode is placed in the reagent, the change in electrode potential is observed when the sample is added, and the sample concentration calculated. **D4127**

analyte, *n*—a possible sample component whose presence and concentration is of interest.

analyte, *n*—chemical or constituent being determined. **D5463**

analytical column, *n*—chromatography column that contains the stationary phase for separation by ion exchange. The column is packed with anion exchange resin that separates the analytes of interest based on their retention characteristics before detection. **D6994**

analytical column, *n*—column used to separate the anions of interest. **D5996**

analytical column, *n*—ion exchange column used to separate the ions of interest according to their retention characteristics prior to detection. **D6581**

analytical column set, *n*—combination of one or more guard columns, followed by one or more analytical columns used to separate the ions of interest. All of the columns in series then contribute to the overall capacity and resolution of the analytical column set. **D6581**

analytical column set, *n*—combination of one or more guard columns followed by one or more analytical columns. **D5996**

analytical columns, *n*—combination of one or more guard columns followed by one or more separator columns used to separate the ions of interest. It should be remembered that all of the columns in series contribute to the overall capacity of the analytical column set. **D4327**

analytical columns, *n*—combination of one or more guard columns followed by one or more separator columns used to separate the ions of interest. It should be remembered that all of the columns in series contribute to the overall capacity of the analytical column set. **D5542**

analyze, *v*—to determine the relationship of parts or the value of a particular parameter. **D5851**

analyzer—see **monitoring system**. **D3864**

angstrom (A), *n*—unit of length equaling 10^{-10} metres, 10^{-4} umetres, 10^{-8} centimetres, and 3.937 × 10^{-9} in. The symbol is Å, A, or A.U. **D6161**

animal/vegetable-derived oils, *n*—mixture made of mono-, di-, and triglyceride esters of fatty acids and other substances of animal or vegetable origin, or both. **D3326**

anion, *n*—negatively charged ion. **D6161**

anion exchange chromatography, *n*—type of liquid chromatography in which anionic analytes are separated by differential retention on an anion exchange resin and detected by an appropriate detection mechanism. **D6994**

anion-exchange material, *n*—a material capable of the reversible exchange of negatively charged ions.

anion-exchange material, *n*—ion-exchange material capable of the reversible exchange of negatively charged ions. **D2187**

anion-exchange material, *n*—ion-exchange material capable of the reversible exchange of negatively charged ions. **D4548**

anion exchange material, *n*—material capable of the reversible exchange of negatively charged ions. **D6161**

anion exchange membrane, *n*—membrane containing fixed cationic charges and mobile anions that can be exchanged with other anions present in an external fluid in contact with the membrane. **D6161**

anion suppressor device, *n*—device that is placed between the analytical columns and the detector. Its purpose is to inhibit detector response to the ionic constituents in the eluant so as to lower the detector background and at the same time enhance detector response to the ions of interest. **D5996**

anion trap column, *n*—high-capacity, low-pressure anion exchange column used to remove reagent impurities from the eluent stream. The anion trap column is placed between the eluent reservoir and the gradient pump. **D6994**

anionic polyelectrolyte, *n*—usually acrylamide or acrylamide and acrylic copolymers, negatively charged, used for coagulation/flocculation. See **polyelectrolyte**. **D6161**

anisotropic, *adv*—having different optical properties in different optical planes. These planes are referred to as the alpha, beta, and omega axes. **D1245**

anisotropic membrane, *n*—nonuniform structure in cross section; typically the support substructure has pores much larger than the barrier layer. See **asymmetric membranes**. **D6161**

anode, *n*—positive electrode. **D6161**

anthracite, *n*—granular hard coal used as a filtration media, commonly used as the coarser layer in dual and multimedia filters. **D6161**

antidunes, *n*—bed forms that occur at a velocity higher than that velocity that forms dunes and plane beds. Antidunes commonly move upstream, and are accompanied by, and in phase with, waves on the water surface. **D4410**

antifoulant, *n*—see **antiscalant** . **D6161**

antiscalant, *n*—compound added to a water that inhibits the precipitation of sparingly soluble inorganic salts. **D6161**

anti-telescoping device, *n*—plastic or metal device attached to the ends of a spiral wound cartridge to prevent movement of the cartridge leaves in the feed flow direction as a result of high feed flows. **D6161**

approach angle, *n*—angle between the velocity vector of the approaching flow and the centerline of the nozzle. **D6326**

approaching flow, *n*—flow immediately upstream of a nozzles entrance. **D6326**

aquatic free cyanide, *n*—sum of the free cyanide (HCN and CN^-) and cyanide bound in the metal-cyanide complexes that are easily dissociated into free cyanide under the test conditions described in this method. **D7237**

aquifer, *n*—geologic formation containing water, usually able to yield appreciable water. **D6146**

aquifer, *n*—water-bearing geological formation that provides a ground water reservoir. **D6161**

aramid, *n*—fully aromatic polyamide. **D6161**

area (A), *n*—area of a cross section, parts of a cross section, or parts of bridges below the water surface. Subscripts indicate specific areas as follows: **D5129**

A_i = area of subsection *i*,
A_j = area of piers or piles that is submerged,
A_1 = area of total cross-section 1 (see Fig. 1 of D5129), and
A_3 = gross area of Section 3 of D5129.

armoring, *v*—formation of a resistant layer of relatively large particles by erosion of the finer particles. **D4410**

array, *n*—arrangement of devices connected to common feed, product, and reject headers; that is, a 2:1 array. **D6161**

assess, *v*—to determine importance of data. **D5851**

assess, *v*—to determine the significance, value, and importance of the data collected and recorded. **D6145**

assimilable organic carbon, *n*—see **AOC**. **D6161**

asymmetric membrane, *n*—membrane that has a change in pore structure. See **anisotropic membranes**. **D6161**

asymmetry potential, *n*—potential across a glass pH electrode membrane when the inside and outside of the membrane are in contact with solutions of identical pH. This term has also been used to define the observed potential differences between identical electrode pairs placed in identical solutions. **D4127**

atomic absorption, *n*—absorption of electromagnetic radiation by an atom resulting in the elevation of electrons from their ground states to excited states. Atomic absorption spectrophotometry involves the measurement of light absorbed by atoms of interest as a function of the concentration of those atoms in a particular solution. **D4691**

automatic programmable sampler, *n*—portable device designed to collect sequential, discrete water samples representative of the water mixture moving in the river in the vicinity of the sampler at a single point in a cross section. Depending on the make and model of the device, water samples can be collected at equal or variable time intervals. **D5613**

autopsy, *n*—dissection of a membrane module or element to investigate causes of unsatisfactory performance. **D6161**

available cyanide—inorganic cyanides that are free (HCN and CN^-) and metal-cyanide complexes that are easily dissociated into free cyanide ions. Available cyanide does not include the less toxic strong metal-cyanide complexes, cyanides that are not "amenable to chlorination." **D6888**

availability, *n*—on-stream time or rated operating capacity of a water treatment system. **D6161**

a-value, *n*—membrane water permeability coefficient. The coefficient is defined as the amount of water produced per unit area of membrane per unit of net driving pressure (NDP); units of measurement are m3/h/m2/kPa. **D6161**

avulsion, *n*—sudden, natural change of a stream channel, so that the water flows elsewhere than in its previous course. **D4410**

B-value—salt diffusion coefficient, *n*—defined as the amount of salt transferred per unit area of membrane per unit of concentration difference across the membrane. A unit of measurement is m/h or more specifically, $m^3/m^2/h$. **D6161**

back pressure regulator—a device designed to maintain a constant pressure upstream of itself (variable or fixed back pressure regulators are available) to maintain constant flow in analyzers in continual sampling. **D3370**

back titration, *n*—see **titration** . **D4127**

backflush, *n*—temporary reversal of the permeate or retentate flow. **D6161**

background sample, *n*—sample taken from a location on or proximate to the site of interest. This sample is taken to document baseline or historical information. **D5612**

background subtraction count (BSC)—a source count used to determine the background to be subtracted from the sample test source count. **D7282**

backpulse, *n*—pumping treated water with or without added chemicals in the reversed direction from the lumen to the feed side of the membrane (inside out). **D6161**

backwash, *n*—reversing the flow of water with/without air either across or through a medium or membrane. Designed to remove the collected foreign material from the bed or membranes. **D6161**

bacteria, *n*—any of a class of microscopic single-celled organisms reproducing by fission or by spores. Characterized by round, rod-like, spiral, or filamentous bodies, often aggregated into colonies or mobile by means of flagella. Widely dispersed in soil, water, organic matter, and the bodies of plants and animals. Either autotrophic (self-sustaining, self-generative), saprophytic (derives nutrition from nonliving organic material already present in the environment), or parasitic (deriving nutrition from another living organism). Often symbiotic (advantageous) in man, but sometimes pathogenic. **D6161**

bacterial lawn, *n*—confluent growth of bacteria cultured on an agar plate. **D6734**

bactericide, *n*—agent capable of killing bacteria. **D6161**

bacteriostat, *n*—substance that prevents bacterial growth and metabolism but does not necessarily kill them. **D6161**

baffle, *n*—deflector plate in a vessel that disperses the inlet fluid. **D6161**

bag sampler—a sampler that uses a collapsible bag as the sample collection container. **D4410**

bank, *n*—grouping of devices. See **array, block, train**. **D6161**

bar, *n*—section of metallic channel, I-beam, T-beam, pipe, plate, or ball that will reflect sound waves produced by a fathometer. **D6318**

bar, *n*—unit of pressure; 14.50 lbs/in.^{2}, 1.020 kg/cm^2, 0.987 atm, 0.1 MPa. **D6161**

bar-check, *n*—method for calibrating a fathometer by setting a sound or acoustic reflector (bar) below a survey vessel to a known depth below a sounding transducer. **D6318**

bar-check, *n*—method for determining depth below a survey vessel by means of a long, narrow metal bar or beam suspended on a marked line beneath a sounding transducer. **D5073**

bar sweep, *n*—bar or pipes, suspended by wire or cable beneath a floating vessel, used to search for submerged snags or obstructions hazardous to navigation. **D5073**

base flow, *n*—stream flow that is sustained by ground water and other delayed sources. **D4410**

batch, *n*—in the analysis of water, a group of samples to be analyzed, assembled in such a way that all the variables affecting the batch will affect all the samples and standards in the batch in a statistically equivalent manner.

Discussion—Batching is a fundamental quality-control component. With properly constructed batches, the results of quality control elements can be used reliably to identify out-of-control situations in the analytical system and to assign uncertainty to individual results from the batch.

batch, *adj*—in the analysis of water, characterizing standards that are carried through all of the analytical steps attached to the analytical method being employed.

batch, *n*—set (group) of samples analyzed such that results of analysis of the QC samples (laboratory control sample, method blank, matrix spike, and duplicate or matrix spike duplicate) analyzed with the batch are indicative of the quality of the results of analysis of samples in the batch. The number of samples in the batch is defined by the task group responsible for the method. See 6.4 and Explanation 2 in Appendix X1 of Practice D5847. **D5847**

DISCUSSION—When results from tests of any of the QC samples associated with the batch fail to meet the performance criteria, the test method should define the appropriate corrective action. To make such a response valid, the batch shall be constructed in such a way as to assure that all variables affecting the batch will affect all samples in the batch in a statistically equivalent manner.

batch, *n*—set (group) of samples analyzed such that results of analysis of the QC samples analyzed with the batch are indicative of the quality of the results of analysis of samples in the batch. The number of samples in the batch is defined by the task group responsible for the method. **D6850**

DISCUSSION—See Practice D5847 for definition and discussion of batch and batch size.

baseline, *n*—primary reference line for use in measuring azimuth angles and positioning distances. **D5906**

baume scale, Be, *n*—measure of the density of a solution relative to water. **D6161**

$$BE = 145 - \frac{145}{\text{specific gravity*}}$$

United States for densities greater than unity.

$$BE = \frac{140}{\text{specific gravity*}} - 130$$

For densities less than unity.
*at 60°F

beam width, *n*—angle in degrees made by the main lobe of acoustical energy emitted from the radiating face of a transducer. **D5073**

Becke line, *n*—faint, halo-like line that surrounds a crystal when the crystal is mounted in an oil of different refractive index. It increases in intensity as the difference in the refractive index between the crystal and the oil increases. **D1245**

Becquerel, *n*—unit of radioactivity equivalent to one nuclear transformation per second. **D1890**

bed depth, *n*—depth of the filter medium or ion exchange resin in a vessel. **D6161**

bed expansion, *n*—depth increase of filter medium or ion exchange resin that occurs during backwashing. **D6161**

bed-load, *n*—material moving on or near the stream bed by rolling, sliding, and skipping. **D4410**

bed-load discharge, *n*—quantity of bed-load passing a cross section of a stream in a unit of time. **D4410**

bed-load sampler, *n*—device for sampling the bed-load. **D4410**

bed material, *n*—sediment mixture of which the stream bed is composed. **D4410**

bed-material discharge, *n*—that part of the total sediment discharge composed of grain sizes occurring in appreciable quantities in the bed material. **D4410**

bed-material load, *n*—that part of the total load which is composed of particle sizes present in appreciable quantities in the shifting portions of the stream bed. **D4410**

best available technology—see **BAT**. **D6161**

best management practice (BMP), *n*—practice or combination of practices that are determined by state or area-wide planning agencies to be the most effective and practical means of controlling point and nonpoint pollution. **D6145**

beta energy, maximum, *n*—maximum energy of the beta-particle energy spectrum produced during beta decay of a given radioactive species. **D1890**

DISCUSSION—Since a given beta-particle emitter may decay to several different quantum states of the product nucleus, more than one maximum energy may be listed for a given radioactive species.

beta energy, maximum, *n*—the maximum energy of the beta particle energy spectrum produced during beta decay of a given radionuclide.

DISCUSSION—Since a given beta emitter may decay to several different nuclear energy levels of the progeny, more than one maximum energy may be listed for a given radionuclide. **D7283**

beta particle (β), *n*—electron or positron emitted from the nucleus of an atom during radioactive decay. **D7316**

beta particle detection efficiency, *n—in the measurement of radioactivity*, that fraction of beta particles emitted by a source which are identified as beta particles by the counter. **D7283**

beta-to-alpha spillover, *n—in the measurement of radioactivity*, that fraction of beta particles emitted by a source which are misclassified as alpha particles. **D7283**

bias, *n*—the persistent positive or negative deviation of the method average value from the assumed or accepted true value.

bias, *n*—persistent positive or negative deviation of the average value of a test method from the assumed or accepted true value. **D2777**

bias, *n*—persistent positive or negative deviation of the average value of the test method from the assumed or accepted true value. **D5392**

binders, *n*—in reference to cartridge filters, chemicals used to hold, or "bind," short fibers together in a filter. **D6161**

binding, *n*—in surface filtration, a buildup of particulates on the filter, restricting fluid flow through the filter at normal pressures. **D6161**

biochemical oxygen demand (BOD), *n*—the quantity of oxygen consumed in the biological and chemical oxidation of water-borne substances under conditions of test.

biocide, *n*—substance that kills all living organisms. **D6161**

biodegradable plastic, *n*—degradable plastic in which the degradation results from the action of naturally occurring microorganisms such as bacteria, fungi, and algae. **D6888**

biological deposits, *n*—deposits of organisms or the products of their life processes.

biological deposits, *n*—debris left by organisms as a result of their life processes. **D6161**

biological deposits—water-formed deposits of organisms or the products of their life processes. **D887**

biomass, *n*—any material that is or was a living organism or excreted from a microorganism. **D6161**

bioremediation, *n*—biological degradation treatment of waste sludge and soils to breakdown organic and hydrocarbons. **D6161**

biostat, *n*—substance that inhibits biological growth. **D6161**

bipolar membrane, *n*—synthetic membrane containing two oppositely charged ion-exchange layers that are in contact with each other. **D6161**

blackwater, *n*—increase in the depth of flow upstream of a channel obstruction, in this case, a weir or flume. **D5640**

blank, *n*—matrix carried through all or part of the analytical process, where the analyte is not present, or where the analyte response is suppressed.

NOTE 1—A blank must be appropriate to the analytical process it is being used with.

NOTE 2—A blank is typically used to monitor contamination or to establish a baseline for quantitation.

block, *n*—grouping of devices in a single unit having common control. See **array, bank, train**. **D6161**

BOD, *n*—biochemical oxygen demand.

body feed, *v*—continuous addition of filter medium (for example, diatomaceous earth) to sustain the efficacy of the filter. **D6161**

bottom profile, *n*—line trace of the bottom surface beneath a water body. **D5073**

bottomset bed, *n*—fine-grained material (usually silts and clays) slowly deposited on the bed of a quiescent body of water which may in time be buried by foreset beds and topset beds. **D4410**

boulder size (fluvial sediment), *n*—larger than 256 mm in diameter. **D4410**

boundary layer, *n*—relatively thin layer of viscous influence adjacent to the probe (or any solid) surface caused by the requirement that the water velocity must be zero at the wall. **D5089**

boundary layer, *n*—thin layer at the membrane surface where water velocities are significantly less than those in the bulk flow. **D6161**

boundary layer displacement thickness, *n*—boundary layer is a layer of fluid flow adjacent to a solid surface (in this case, the flume throat) in which, owing to viscous friction, the velocity increases from zero at the stationary surface to an essentially frictionless-flow value at the edge of the layer. The displacement thickness is a distance normal to the solid surface that the surface and flow streamlines can be considered to have been displaced by virtue of the boundary-layer formation. **D5390**

boundary layer displacement thickness, *n*—boundary layer is a layer of fluid flow adjacent to a solid surface (in this case, the weir crest and sidewalls) in which, because of viscous friction, the velocity increases from zero at the stationary surface to an essentially frictionless-flow value at the edge of the layer. The displacement thickness is a distance normal to the solid surface that the flow streamlines can be considered to have been displaced by virtue of the boundary-layer information. **D5614**

brackish water, *n*—water that contains dissolved matter at an approximate concentration range from 1000 to 30 000 mg/L.

brackish water, *n*—water with an approximate concentration of total dissolved solids ranging from 500 to 10 000 mg/L. See **high brackish water, potable water, sea water**. **D6161**

braided river, *n*—wide- and shallow-river where the flow passes through a number of small interlaced channels separated by bars or shoals. **D4410**

brackish water reverse osmosis, *n*—see **BWRO**. **D6161**

breakpoint chlorination, *n*—point at which the water chlorine demand is satisfied and any further chlorine is the chlorine residual, the "free" chlorine species. **D6161**

break tank, *n*—storage device used for hydraulic isolation and surge protection. **D6161**

breakthrough volume, *n*—maximum sample volume that can be passed through a concentrator column before the least tightly bound ion of interest is eluted. **D5542**

breakthrough volume, *n*—maximum sample volume that can be passed through a concentrator column before the least tightly bound ion of interest is eluted. All of the columns in series contribute to the overall capacity of the analytical column set. **D5996**

brine, *n*—water that contains dissolved matter at an approximate concentration of more than 30 000 mg/L.

brine, *n*—concentrate (reject) stream from a crossflow membrane device performing desalination. Portion of the feed stream that does not pass through the membrane. **D6161**

brine, *n*—water that contains dissolved matter at an approximate concentration of more than 30 000 mg/L. **D1429**

brine (concentrate) seal, *n*—rubber lip seal on the outside of a spiral wound cartridge that prevents feed by-pass between the cartridge and the inside pressure vessel wall. **D6161**

brine seal carrier, *n*—see **ATD**. **D6161**

brine system staging, *n*—process in which the concentrate, under pressure, of a group of membrane devices is fed directly to another set of membrane devices to improve the efficiency of the water separation. **D6161**

bubble point, *n*—pressure differential at which bubbles first appear on one surface of an immersed porous membrane as gas pressure is applied to the other side. **D6161**

bubble point, *n*—when the pores of a membrane are filled with liquid and air pressure is applied to one side of the membrane, surface tension prevents the liquid in the pores from being blown out by air pressure below a minimum pressure known as the bubble point. **D6908**

bubble point pressure, *n*—pressure differential necessary to displace a liquid held by surface tension forces from the largest equivalent capillaries in a membrane filter. **D6161**

bubble point test, *n*—nondestructive membrane filter test used to assess filter integrity and proper installation. **D6161**

buffer, *n*—substance in solution that accepts hydrogen or hydroxyl ions added to the solution minimizing a change in pH. **D6161**

build, own, operate—see **BOO**. **D6161**

build, own, operate and transfer—see **BOOT**. **D6161**

bundle, *n*—general term for a collection of parallel filaments or fibers. **D6161**

cage, *n*—structural fabrication fitted around the perimeter of the cassette with one or more lifting eye suitable for installing or removing the cassette. The four bottom corners of the cage rest within the frame in the tank. **D6161**

cake layer, *n*—layer comprised of particulate materials residing on the upstream face of a membrane. **D6161**

calcium carbonate equivalents (mg/L as $CaCO_3$) , *n*—method for expressing mg/L as ion in terms of calcium carbonate. Concentration in calcium carbonate equivalents is calculated by multiplying concentration in mg/L of the ion by the equivalent weight of calcium carbonate (50) and dividing by the equivalent weight of the ion. (See Table 1 of Terminology D6161). **D6161**

calcium hypochlorite, *n*—Ca $(HClO)_2$, a disinfection agent. **D6161**

calibration, *n*—in the analysis of water, the analysis of standards to develop a relationship between raw output of an analytical system and analyte concentration.

Discussion—Calibration can be done with traceable or non-traceable standards. Calibration can be done with standards that are processed identically to samples to produce “true” results, unbiased by recovery (of the standard), or calibration can be done with unprocessed standards, typically in situations where recovery is not considered a significant issue.

calibration, *n*—certified evaluation of the accuracy of a measuring instrument as performed by its manufacturer or an independent licensed or accredited third party. **D6104**

calibration, *n*—certified evaluation of the accuracy of a measuring instrument as performed by its manufacturer or an independent licensed or accredited third party. **D6157**

calibration—determining the instrument response to a known amount of radioactive material. **D7282**

calibration blank, *n*—volume of water containing the same acid matrix as the calibration standards. **D1976**

calibration blank, *n*—volume of water containing the same acid matrix as the calibration standards. **D5673**

calibration curve, *n*—plot of the potential (emf) of a given ion-selective electrode cell assembly (ion-selective electrode combined with an identified reference electrode) versus the logarithm of the ionic activity (concentration) of a given species. For uniformity, it is recommended that the potential be plotted on the ordinate (vertical axis) with the more positive potentials at the top of the graph and that pa_A (-log activity of the species measured, *A*) or pc_A (-log concentration of species measured, *A*) be plotted on the abscissa (horizontal axis) with increasing activity to the right. **IUPAC, D4127**

calibration source (CS)—a known quantity of radioactive material, traceable to a national standards body, prepared for the purpose of calibrating nuclear instruments. **D7282**

calibration standard, *n*—solution prepared from the primary dilution standard solution and stock standard solutions of the internal standards and surrogate analytes. The calibration standards are used to calibrate the instrument response with respect to analyte concentration. **D5790**

calibration standard, *n*—solution containing the analyte of interest at a known concentration either purchased from an external source or prepared in-house from materials of known purity or concentration, or both, and used to calibrate the measurement system. **D5847**

calibration standard (CAL), *n*—solution prepared from the primary dilution standard solution and stock standard solutions of the internal standards and surrogate analytes. CAL solutions are used to calibrate the instrument response with respect to analyte concentration. **D5315**

calibration standard (CAL), *n*—solution prepared from the primary dilution standard solution and stock standard solutions of the internal standards and surrogate analytes. **D5475**

Discussion—The CAL solutions are used to calibrate the instrument response with respect to analyte concentration.

calibration standards, *n*—series of known standard solutions used by the analyst for calibration of the instrument (preparation of the analytical curve). **D1976**

calibration standards, *n*—series of known standard solutions used by the analyst for calibration of the instrument (that is, preparation of the analytical curve). **D5673**

calibration stock solution, *n*—solution prepared from the stock standard solution(s) to verify the instrument response with respect to analyte concentration. **D5673**

calibration turbidity standard, *n*—turbidity standard that is traceable and equivalent to the reference turbidity standard to within statistical errors, including commercially prepared 4000 NTU Formazin, stabilized formazin, and styrenedivinylbenzene (SDVB). These standards may be used to calibrate the instrument. **D6698**

Discussion—Calibration standards may be instrument specific.

calibration turbidity standard, *n*—a turbidity standard that is traceable and equivalent to the reference turbidity standard to within statistical errors, including commercially prepared 4000 NTU Formazin, stabilized formazin (see 9.2.3), and styrenedivinylbenzene (SDVB) (see 9.2.4). These standards may be used to calibrate the instrument. **D6855**

Discussion—Calibration standards may be instrument specific.

calibration verification standards, *n*—defined standards used to verify the accuracy of a calibration in the measurement range of interest. These standards may not be used to perform calibrations, only calibration verifications. Included standards are optomechanical light scatter devices, gel-like standards, or any other type of stable liquid standard. **D6698**

Discussion—Calibration verification standards may be instrument specific.

calibration verification standards, *n*—defined standards used to verify the accuracy of a calibration in the measurement range of interest. These standards may not be used to perform calibrations, only calibration verifications. Included standards are optomechanical light scatter devices, gel-like standards, or any other type of stable liquid standard. **D6855**

Discussion—Calibration verification standards may be instrument specific.

calibrations:— **D3864**

laboratory check sample for flow-through systems, n—calibration curve calculated from withdrawn samples or additional standards that may be spiked or diluted and analyzed using the appropriate laboratory analyzer. **D3864**

line sample calibration, n—coincidental comparison of a line sample and adjustment of a continuous analyzer to the compared laboratory analyzer or a second continuous analyzer. **D3864**

multiple standard calibration, n—where the calibration curve is calculated from a series of calibration standards covering the range of the measurements of the sample being analyzed. **D3864**

probe calibration, n—where the probe is removed from the sample stream and exposed to a calibration solution and the analyzer is adjusted to indicate the appropriate value. Alternately, two probes are exposed to the same solution and the on-line analyzer is adjusted to coincide with the pre-calibrated laboratory instrument. **D3864**

reference sample calibration, n—coincidental comparison of a reference sample and adjustment of a continuous analyzer to the compared laboratory analyzer results. **D3864**

capillary ion electrophoresis, *n*—electrophoretic technique in which a UV-absorbing electrolyte is placed in a 50- to 75-µm fused silica capillary. Voltage is applied across the capillary causing electrolyte and anions to migrate towards the anode and through the capillary's UV detector window. Anions are separated based upon the their differential rates of migration in the electrical field. Anion detection and quantitation are based upon the principles of indirect UV detection. **D6508**

carbonate hardness, *n*—hardness in a water caused by carbonates and bicarbonates of calcium and magnesium. The amount of hardness equivalent to the alkalinity formed and deposited when water is boiled. In boilers, carbonate hardness is readily removed by blowdown. **D6161**

carryover, *n*—contamination of a subsequent sample by a previous sample, typically a result of incomplete cleaning of a reused test kit component. **D5463**

cartridge, *n*—see **spiral-wound cartridge**. **D6161**

cassette, *n*—assembly of membrane elements (or modules), membrane aerators, air and permeate manifolds, and hardware in the cage; this is how the membranes are installed or removed from the process tank. **D6161**

catalyst, *n*—substance whose presence initiates or changes the rate of a chemical reaction, but does not itself enter into the reaction. **D6161**

cathode, *n*—negative electrode. **D6161**

cation, *n*—positively charged ion. **D6161**

cation conductivity, *n*—a conductivity measurement performed on water after cations have been exchanged for protons using cation exchange media.

cation conductivity, *n*—parameter obtained by conditioning a sample by passing it through a hydrogen form cation ion exchange resin column and then measuring its electrolytic conductivity, on-line. **D6504**

cation-exchange material, *n*—a material capable of the reversible exchange of positively charged ions.

cation-exchange material, *n*—ion-exchange material capable of the reversible exchange of positively charged ions. **D2187**

cation-exchange material, *n*—ion-exchange material capable of the reversible exchange of positively charged ions. **D4548**

cation exchange material, *n*—material capable of the reversible exchange of positively charged ions. **D6161**

cation exchange membrane, *n*—membrane containing fixed anionic charges and mobile cations that can be exchanged with other cations present in an external fluid in contact with the membrane. **D6161**

cationic polyelectrolyte, *n*—polymer containing positively charged groups used for coagulation/flocculation, usually dimethyl-aminoethyl methacrylate or dimethyl-aminoethyl acrylate. See **polyelectrolyte**. **D6161**

caustic embrittlement, *n*—a form of metal failure that occurs in steam boilers at riveted joints and at tube ends, the cracking being predominantly intercrystalline.

cell, *n*—independently fed chamber formed by two adjacent ion exchange membranes, or by a membrane and an adjacent electrode. **D6807**

cell constant, *n*—ratio of the length of the path, L (cm) and the cross-sectional area of the solution, A (cm^2), between the electrodes of a conductivity/resistivity cell, with units of cm^{-1}. In high-purity water measurements, the cell constant is normally between 0.001 and 0.1 cm^{-1} to prevent electrical interference. This is lower than the 1 cm^{-1} of the standard centimetre cube and is taken into account by direct reading instrument ranges that are matched with specific cell constants. **D5391**

cell monolayer, *n*—single layer of cells grown on a glass or plastic surface to which they are securely attached. **D5244**

cellulose, *n*—amorphous carbohydrate ($C_6H_{10}O_5$) that is the principal constituent of wood and plants. **D6161**

cellulose acetate (CA), *n*—in the broad sense, any of several esters of cellulose and acetic acid. **D6161**

celsius (°C), *n*—designation of the degree on the International Practical Temperature Scale. Formerly called centigrade, °C = °K minus 273.15. K = Kelvin. °C = (°F –32) * 0.556. **D6161**

censored measurement, *n*—measurement that is not reported numerically nor is reported missing but as a nondetect or a less-than, for example, "less than 0.1 ppb." The former means that an algorithm in the measurement system determined that the measurement should not be reported numerically for one of two reasons: either it was considered not sufficiently precise or accurate, or the identification of the analyte was suspect. A reported less-than may have the same meaning, but it also implies (perhaps erroneously) that any concentration greater than or equal to the accompanying value (for example, 0.1 ppb) can be measured and will be reported numerically. **D6091**

censored measurement, *n*—measurement that is not reported numerically nor is reported missing, but is stated as a nondetect or a less-than (for example, "less than 0.1 ppb"). There are two reasons why the measurement may not be reported numerically. Either the measurement was considered insufficiently precise or accurate (these kinds of data should not be censored), or the identification of the analyte was suspect (these kinds of data should be censored). See 6.2.3.1 of Practice D6512. A reported " less than" may have the same meaning as a non-reported measurement, but a reported "less than" also implies (perhaps erroneously) that any concentration greater than or equal to the accompanying value (for example, 0.1 ppb) can be measured, and will be reported numerically. **D6512**

centigrade, *n*—since 1948, now called Celsius, a temperature scale. **D6161**

centroid, *n*—center of mass of the dye response curve calculated as outlined by Parker and Hunt.[3] **D5613**

ceramic membrane, *n*—generally a glass, silica, alumina, or carbon-based membrane. Generally used in micro and ultrafiltration. They tend to withstand high temperatures and wide pH ranges and be more chemically inert than polymeric membranes. **D6161**

certified reference material, *n*—reference material, accompanied by a certificate, one or more of whose property values are certified by a procedure that established its traceability to an accurate realization of the unit in which the property values are expressed and for which each certified value is accompanied by an uncertainty at a stated level of confidence. **ISO Guide 30:1992, D6568**

Discussion—There is significant variation in the overall quality of commercially available Certified Reference Materials and caution should be used when choosing Certified Reference Materials. Use Practice D6362 to provide guidance as to what information needs to be included on certificate of a certified reference material.

chain of custody, *n*—documented accountability of each sample, that is, date, time, and signature of each recipient when the sample changes hands, from the time of collection until the requirement for each sample is terminated. **D4489**

channel, *n*—natural or artificial waterway that periodically or continuously contains moving water. **D4410**

channel-fill deposits, *n*—deposits of sediment within a channel, partly or completely filling the channel. Such materials accumulate where the transporting capacity has been insufficient to remove it as rapidly as it has been delivered. **D4410**

channeling, *v*—unequal flow distribution in the desalination bundle or filter bed. **D6161**

characteristic ion, *n*—usually the primary ion in the mass spectrum used to measure response for quantitation purposes. When there are interferences in the mass chromatogram of a primary ion, a secondary characteristic ion must be used for quantitation. **D4128**

charge-mosaic membranes, *n*—synthetic membranes composed of two-dimensional or three-dimensional alternating cation and anion exchange channels throughout the membrane. **D6161**

check valve, *n*—device (see Fig. 1) mounted atop an open-barrel core sampler. As the sampler moves down through water and sediment, the valve remains open to allow water to flow up through the barrel. When downward motion stops, the valve closes. During retrieval, the valve remains closed and creates suction that holds the core inside the barrel. **D4823**

check valve, *n*—valve that will allow water to pass in one direction but will close and prevent flow in the opposite direction. **D6161**

chelating agent, *n*—sequestering or complexing agent that, in aqueous solution, renders a metallic ion inactive through the formation of an inner ring structure with the ion. **D6161**

chemical, *n*—in the analysis of water, a mono-molecular or mono-elemental material of acceptable purity, manufactured for application in conducting analyses.

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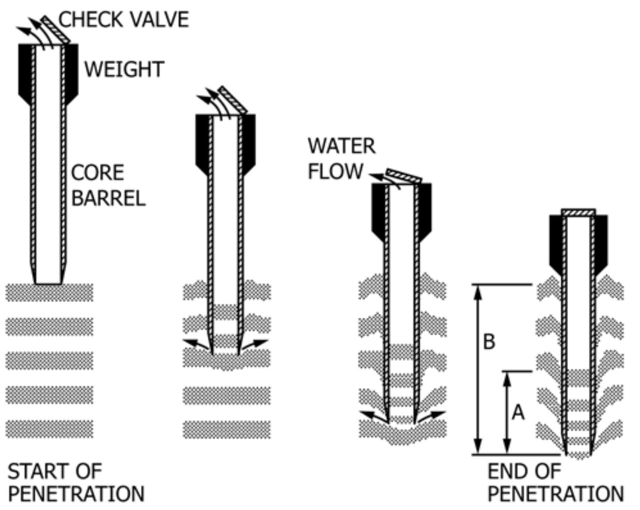
[3] Parker, G. W., and Hunt, G. S., "Initial Assessment of Time-of-Travel Through Gulf Island Pond and the Lower Androscoggin River, Maine," *U.S. Geological Survey Water-Resources Investigations Report 83-4020*, 1983.



NOTE 1—Dark bands represent stiff sediments; light bands represent plastic sediments. As coring proceeds, sediment below the barrel moves laterally away from the cutting edge and plastic sediments inside the barrel are compressed. "A" is the core's length and "B" is the barrel's penetration depth.

NOTE 2—Source: Weaver, P. P. E., and Schultheiss, P. J., "Detection of Repenetration and Sediment Disturbance in Open-Barrel Gravity Cores," *Journal of Sedimentary Petrology*, Vol 53, No. 2, June 1983, pp. 649–654.

FIG. 1 Deformations Caused by Open-Barrel Core Samplers

chemical feed pump, *n*—pump used to meter chemicals, such as chlorine of polyphosphate, into a feed water supply. **D6161**

chemical oxygen demand—see **COD**. **D6161**

chemical suppressor device, *n*—device that is placed between the analytical columns and the detector. Its purpose is to inhibit detector response to the ionic constituents in the eluent, so as to lower the detector background and at the same time enhance detector response to the ions of interest. **D4327**

chemiluminescence, *n*—generation of light by a chemical reaction. **D6592**

chloramines, *n*—combination of chlorine and ammonia in water which has bactericidal qualities for a longer time than does free chlorine. **D6161**

chlorine, *n*—chemical used for its qualities as a bleaching or oxidizing agent and disinfectant in water purification. **D6161**

chlorine demand, *n*—amount of chlorine that must be added to a unit volume of water under specified conditions of pH, temperature, and contact time to completely react with all chlorine-reactable substances in the water. It is defined as the difference between the amount of chlorine applied and the amount of free chlorine remaining at the end of the contact period. **D1291**

chlorine demand, *n*—amount of chlorine used up by reacting with oxidizable substances in water before chlorine residual can be measured. **D6161**

chlorine, combined available, *n*—residual chlorine combined with ammonia nitrogen or nitrogenous compounds.

chlorine, free available, *n*—the hypochlorite ions (OCl −), hypochlorous acid (HOCl) or the combination thereof present in water.

chlorine, free available, *n*—chlorine (Cl_2), hypochlorite ions (OCl^-), hypochlorous acid (HOCl), or the combination thereof present in water. **D6161**

chlorine requirement, *n*—the amount of chlorine required to achieve, under specified conditions, the objectives of chlorination.

chlorine requirement, *n*—amount of chlorine that shall be added to a unit volume of water under specified conditions of pH, temperature, and contact time to achieve the objectives of chlorination. **D1291**

chlorine residual, *n*—the amount of available chlorine present in water at any specified time.

chlorine, residual, *n*—amount of available chlorine present in water at any specified time. **D6161**

chlorine, total available, *n*—sum of free available chlorine plus chloramines present in water. **D6161**

chlorinity, *n*—weight of silver ion (g) required to precipitate completely the halides in 0.3285 kg of water (g/kg). **D1141**

chloroplatinate unit—see **CPU**. **D6161**

chlorosity, *n*—the concentration of the dissolved chloride equivalent in water at 20°C.

citric acid, *n*—$C_3H_4(OH)(CO_2H)_3$, membrane-cleaning chemical. **D6161**

clarifier, *n*—tank in which precipitate settles and supernatant overflows, a liquid-solids separation unit using gravity to remove solids by sedimentation. **D6161**

Clark degree, *n*—number of grains of substance per one British imperial gallon of water expressed CaCO3. Concentration in Clark or English degree is calculated by dividing concentration in calcium carbonate equivalents by 14.3. One grain weighs 1/7000 lb and one imperial gallon of water weighs 10 lbs at 25°C. (See Table 1 of Terminology D6161.) **D6161**

classic gully, *n*—channel that is formed by gully erosion and is not interrupted by mechanical tillage operations to fill the resulting void. Gully depth can exceed 30 m. (See **gully erosion**.) **D4410**

clay size (fluvial sediment), *n*—0.00024 to 0.004 mm in diameter. **D4410**

cleaning-in-place—see **CIP**. **D6161**

clear well, *n*—collection basin that houses filtered or clarified water. **D6161**

Clostridium perfringens, *n*—*in this test method*, *C. perfringens* is defined as an obligate anaerobic gram-positive, spore forming, nonmotile bacillus, 0.9–1.3 by 3.0–9.0 µm in size that ferments sucrose, ferments lactose with stormy gas production, does not ferment cellobiose, and produces acid phosphatase. *C. perfringens* also produces toxins that cause gas gangrene and gastroenteritis. **D5916**

coagulant, *n*—chemical added in water and wastewater applications to cause destablization of suspended particles and subsequent formation of flocs that adsorb, entrap, or otherwise bring together suspended matter that is so fine, it is defined as colloidal. Compounds of iron and aluminum are generally used to form flocs to allow removal of turbidity, bacteria, color, and other finely divided matter from water and waste water. **D6161**

coagulation, *n*—agglomeration of colloidal or finely divided suspended matter caused by the addition to the liquid of an appropriate chemical coagulant, by biological processes, or by other means (see also **agglomeration**). **D4410**

coalescing, *v*—separation of mixtures of immiscible fluids (such as oil and water) based on different specific gravities and surface tensions. Coalescence occurs whenever two or more droplets collide and remain in contact and then become larger by passing through a coalescer. The enlarged drops then separate out of solution more rapidly. **D6161**

cobble size (fluvial sediment), *n*—64 to 256 mm in diameter. **D4410**

co-current flow, *n*—flow pattern through a membrane in which the fluids on the upstream and downstream sides of the membrane move parallel to the membrane surface and in the same directions. (See FIG 1 of Terminology D6161.) **D6161**

chemical oxygen demand (COD), *n*—amount of oxygen required under specified test conditions for the oxidation of water borne organic and inorganic matter. **D6161**

cohesive sediments, *n*—that material whose resistance to initial movement or erosion depends upon the strength of the bond between particles. **D4410**

coliform bacteria, *n*—particular group of bacteria primarily found in human and animal intestines and wastes. **D6161**

coliphage, *n*—bacterial virus capable of plaquing on the wide-range *E. coli* host strain used in this assay. **D6734**

collaborator, *n*—technically competent body (organization or firm, public or private) that undertakes aspects of the manufacture, or characterization, of the (certified) RM on behalf of the RM producer, either on a contractual (as a subcontractor) or voluntary basis. **D6808**

collocated samples, *n*—independent samples collected as close as possible to the same point in space and time and intended to be identical. **D5612**

colloid, *n*—substance of very fine particle size, typically between 0.1 and 0.001 µm in diameter suspended in liquid or dispersed in gas. A system of at least two phases, including a continuous liquid plus solid, liquid or gaseous particles so small that they remain in dispersion for a practicable time. **D6161**

colloidal suspension, *n*—any material in suspension (for example, silica) with a nominal particle size less than 100 nm. **D5544**

colloids (fluvial sediment), *n*—smaller than 0.00024 mm in diameter. **D4410**

colluvial deposits, *n*—that material accumulated along valley margins by mass movements from the adjacent hillsides. **D4410**

colony forming unit (CFU), *n*—unit used in the measure of total bacterial count (TBC). **D6161**

combination electrode, *n*—electrochemical apparatus that incorporates an ion-selective electrode and a reference electrode in a single assembly thereby avoiding the need for a separate reference electrode. **IUPAC, D4127**

combined available chlorine—see **CAC** . **D6161**

combined residual chlorine, *n*—residual consisting of chlorine combined with ammonia nitrogen or nitrogenous compounds. **D1253**

compaction, *n*—in crossflow filtration, the result of applied pressure and temperature compressing a polymeric membrane which may result in a decline in flux. **D6161**

completely mixed (perfectly mixed) flow, *n*—flow through a membrane module in which fluids on both the upstream and downstream sides of the membrane are individually well mixed. (See Fig. 1 of Terminology D6161.) **D6161**

complexometric titration—see **titration** . **D4127**

composite membrane, *n*—membrane having two or more layers with different physical or chemical properties. Membrane manufactured by forming a thin desalinating barrier layer on a porous carrier membrane. **D6161**

composite sample, *n*—a combination of two or more samples.

composite sample, *n*—sample formed by combining two or more individual samples or representative portions of the samples. **D4410**

composite sample—a series of grab samples integrated into a single sample or a sample collected at specific time intervals and integrated into a single sample. The goal of a composite sample is to characterize a process weighted average in proportion to process parameters. **D3370**

compostable plastic, *n*—plastic that undergoes degradation by biological processes during composting to yield CO2, water, inorganic compounds, and biomass at a rate consistent with other known compostable materials and leave no visible, distinguishable or toxic residue. **D6888**

composting, *v*—managed process that controls the biological decomposition and transformation of biodegradable materials into a humus-like substance called compost: the aerobic mesophilic and thermophilic degradation of organic matter to make compost; the transformation of biologically decomposable material through a controlled process of biooxidation that proceed through mesophilic and thermophilic phases and results in the production of carbon dioxide, water, minerals, and stabilized organic matter (compost or humus). **D6888**

Discussion—Composting uses a natural process to stabilize mixed decomposable organic material recovered from municipal solid waste, yard trimmings, biosolids (digested sewage sludge), certain industrial residues, and commercial residues.

compression rate, *n*—rate at which the air is compressed in the sample container and is a function of the speed at which the sampler is lowered in the sampling vertical. **D6326**

concentrate, *n*—stream exiting a crossflow membrane device that has increased concentration of solutes and particles over the feed stream; portion of the feed stream that does not pass through the membrane. The stream in which dissolved solids or particulates, or both, are concentrated in a membrane separation process. **D6161**

concentrate recycle, *n*—technique for improving recovery in which a fraction of the concentrate is recycled through the membrane system. **D6161**

concentrate, reject, or brine, *n*—that portion of feed that does not pass through the membrane. **D5089**

concentrate (reverse osmosis), *n*—the residual portion of an aqueous solution applied to a membrane.

concentration, *n*—actual amount of a substance in a given volume of solution. When measuring ionic concentrations by electrode, a distinction is made between the concentration of the free, unbound ion, and total concentration that includes ions bound to complexing agents. **D4127**

concentration factor (CF), *n*—ratio of the concentration of a component in the retenate (concentrate, brine) to the concentration of the same component in the feed: **D6161**

$$CF = \frac{C_B(\text{brinewater concentration})}{C_F(\text{feedwater concentration})}$$
$$= \frac{1}{1 - \text{concentration}}\,(\text{approximation})$$

concentration of sediment (by mass), *n*—ratio of the mass of dry sediment in a water-sediment mixture to the mass of the mixture. **D4410**

concentration polarization, *n*—increase of the solute concentration over the bulk feed solution that occurs in a thin boundary layer at the feed side of the membrane surface, resulting from the removal of the solvent. Concentration profile that has a higher level of solute nearest to the upstream membrane surface compared with the more-or-less mixed bulk fluid far from the membrane surface. **D6161**

concentration, sediment, *n*—ratio of the mass of dry sediment in a water-sediment mixture to the volume of the water-sediment mixture. Refer to Practice D3977. **D4411**

concentration standard, *n*—standardizing solution whose value is reported in terms of total concentration of the ion of interest. If the electrode is calibrated using pure-concentration standards and measurements made on untreated samples, results must be corrected for the sample ionic strength and the presence of complexing agents. More commonly, a reagent is added to all standards and samples before measurement to fix the ionic strength, thus avoiding the need for correction. **D4127**

concentration (volume), *n*—ratio of the volume of dry sediment to the volume of the water-sediment mixture. **D4410**

concentrator column, *n*—ion exchange column used to concentrate the ions of interest and thereby increase method sensitivity. **D5542**

concentrator column, *n*—ion exchange column used to concentrate the ions of interest and thereby increase method sensitivity. **D5996**

condensation particle counter (CPC), *n*—instrument for detecting very small aerosol particles in a size range from approximately 10 nm to 2 to 3 µm. The CPC cannot differentiate between particles of varying size within this size range; it reports the number of particles with a size greater than that defined by its detection efficiency curve. Detection is independent of particle composition. **D5544**

conductivity, *n*—property of a substance's (in this case, water and dissolved ions) ability to transmit electricity. The inverse of resistivity. Measured by a conductivity meter, and described in microsiemens/cm or micromhos/cm, µS/cm. **D6161**

confirmed identification, *n*—to confirm a tentative identification, both the GC retention time and the mass spectrum of a compound shall uniquely match those of a reference compound as demonstrated by co-injection of the authentic standard with the tentatively identified compound. **D4128**

contaminant, *n*—any foreign substance present that will adversely affect performance or quality. **D6161**

contaminated run-off, *n*—rain water that has collected oily contaminants from the surfaces it came in contact with and may appear in the influent to a separator. Unlike a release, the level of contamination in this case is much lower. **D6104**

contaminated run-off, *n*—rain water that has collected oily contaminants from the surfaces it came in contact with and may appear in the influent to a separator. Unlike a release, the level of contamination in this case is much lower. **D6157**

continuing instrument quality control—measurements taken to ensure that an instrument responds in the same manner subsequent to its calibration. **D7282**

continuous deionization, *n*—deionization process that does not require regular interruptions in service to discharge ionic materials collected from the water being processed. **D6161**

continuous electrodeionization (CEDI) device, *n*—device that removes ionized and ionizable species from liquids using electrically active media and using an electrical potential to influence ion transport in which the ionic transport properties of the active media are a primary sizing parameter. CEDI devices typically comprise semipermeable ion exchange membranes and permanently charged ion exchange media. Examples include continuous deionization, electrodiaresis, and packed-bed or filled-cell electrodialysis. **D6807**

continuous electrodeionization (CEDI) device—a device that removes ionized and ionizable species from liquids using electrically active media and using an electrical potential to influence ion transport, where the ionic transport properties of the active media are a primary sizing parameter. The CEDI devices typically comprise semipermeable ion-exchange membranes and permanently charged ion-exchange media. Examples include continuous deionization, electrodiaresis, and packed-bed or filled-cell electrodialysis. **D6529**

continuous wave system, *n*—electronic positioning system in which the signal transmitted between the transmitter and responder stations travels as a wave having constant frequency and amplitude. **D5906**

contracted weirs, *n*—contractions of thin-plate weirs refer to the widths of weir plate between the notch and the sidewalls of the approach channel. In fully contracted weirs, the ratio of the notch area to the cross-sectional area of the approach channel is small enough for the shape of the channel to have little effect. In suppressed (full-width) rectangular weirs, the contractions are suppressed, and the weir crest extends the full width of the channel. **D5640**

control, *n*—physical properties of a channel that determine the relationship between the stage and discharge of a location in the channel. **D5674**

control analyses, *n*—the determination of specific parameters used as criteria for proper operation of a system.

control block, *n*—group of devices having a common piping and control system. **D6161**

conversion (Y), *n*—product water flow rate divided by feed water flow rate. Also called recovery; given as fraction or decimal. See **recovery**. **D6161**

conversion factors, *n*—see Table 1 of Terminology D6161. **D6161**

conveyance (K), *n*—measure of the carrying capacity of a channel and has dimensions of cubic feet per second or cubic metres per second. Conveyance is computed as follows: **D5130**

$$K = \frac{1.486}{n} AR^{2/3}$$

where:

n = the Manning roughness coefficient,
A = the cross-section area, ft^2 (m^2), and
R = the hydraulic radius, ft (m).
1.486 = 1.00 SI unit

conveyance, (K), *n*—measure of the carrying capacity of a channel cross section, or parts of a cross section, and has units of cubic feet per second or cubic metres per second. Conveyance is computed as follows: **D5129**

$$K = \frac{*1.486}{n} AR^{2/3}$$

where:

n = the Manning roughness coefficient,
A = the cross-section area, ft^2 (m^2),
R = the hydraulic radius, ft (m), and
*in SI units = 1.0

The following subscripts refer to specific conveyances for parts of a cross section:

K_a, K_b = conveyances of parts of the approach section to either side of the projected bottom width of the contracted section (see Fig. 2 of D5129). K_d is always the smaller of the two,
K_d = conveyance at the upstream end of the dikes,
K_i = conveyance of subsection *i*,
K_q = conveyance of the part of the approach section corresponding to the projected bottom-width, and
K_T = total conveyance of cross section.

conveyance (K), *n*—measure of the carrying capacity of a channel and having dimensions of cubic feet per second. **D5243**

DISCUSSION—Conveyance is computed as follows:

$$K = \frac{1.486}{n} R^{2/3}A$$

where:

n = the Manning roughness coefficient,
A = the cross section area, in ft^2 (m^2), and
R = the hydraulic radius, in ft (m).
1.486 = 1.00 SI unit

conveyance (K), *n*—measure of the carrying capacity of a channel without regard to slope and has dimensions of cubic feet per second. Conveyance is computed as follows: **D5388**

$$K = \frac{1.49}{n} AR^{2/3}$$

core, *n*—vertical column of sediment cut from a parent deposit. **D4823**

core catcher, *n*—device (see Fig. 2) that grips and supports the core while the sampler is being pulled from the sediment and hoisted to the water surface. **D4823**

core conveyor, *n*—device (see Fig. 3) for reducing friction between a core and the inside surface of a core barrel. **D4823**

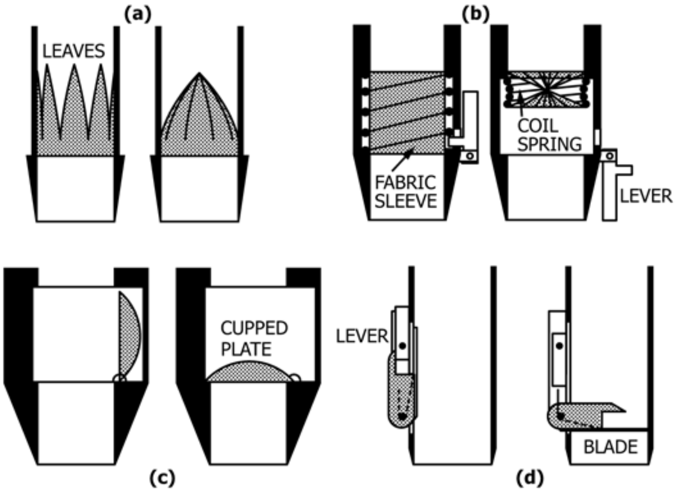
core-barrel liner, *n*—rigid, thin-wall tube mounted inside the barrel of a core sampler. During the core-cutting process, sediment moves up inside the liner. **D4823**

core sampler, *n*—instrument for collecting cores. **D4823**

corrosion, *n*—deterioration of the metal by reaction with its environment. **D4778**

corrosion product sampler, *n*—device used to collect integrated samples of filterable and (as an option) nonfilterable matter. It consists of a flow totalizer that accurately measures the amount of sample passing through the device and a

0.45-µm pore size membrane filter. Adding a second filter for ion exchange resin impregnated membranes allows for collecting nonfilterable matter. **D6301**

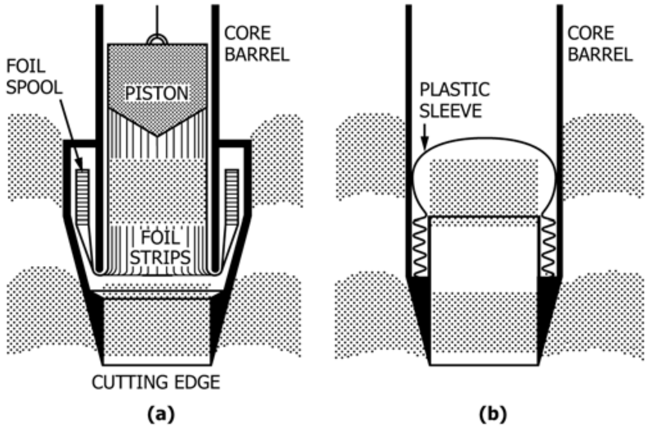


Note 1—(*a*) The leaves separate during penetration and then close during retrieval. Strips of gauze can be woven around the leaves to provide additional support. (See Note 2.) (*b*) The lever trips down during retrieval to release the spring and twist the fabric sleeve shut. (See Note 3.) (*c*) The cupped plate drops during retrieval to block the entrance and support the core. (See Note 2.) (*d*) The lever releases the spring-loaded blade which pivots downward to hold the core. (See Note 2.)

Note 2—Source: Sachs, P. L., and Raymond, S. O., "A New Unattached Sediment Sampler," *Journal of Marine Research*, Vol 23, 1965, pp. 44–53.

Note 3—Source: Bouma, A. H., *Methods for the Study of Sedimentary Structures*, Wiley-Interscience, New York, NY, 1969, pp. 301–378.

FIG. 2 Core Catchers



Note 1—(*a*) Strips of metal foil slide up through the core barrel as the cutting edge advances downward. (See Note 2.) (*b*) The plastic sleeve unfolds from pleats stored near the cutting edge. This sleeve surrounds the core as the barrel moves down. (See Note 3.)

Note 2—Source: Carrigan, P. H., Jr., "Inventory of Radionuclides in Bottom Sediment of the Clinch River Eastern Tennessee," U.S. Geological Survey Professional Paper 433-I, U.S. Government Printing Office, Washington, DC, 1969.

Note 3—Source: Sachs, P. L., and Raymond, S. O., "A New Unattached Sediment Sampler," *Journal of Marine Research*, Vol 23, 1965, pp. 44–53.

FIG. 3 Core Conveyors

corrosion products, *n*—products that result from chemical or electrochemical reaction between a metal and its environment.

corrosion products, *n*—products that result from chemical or electrochemical reaction between a metal and its environment. **D6161**

corrosion products—a result of chemical or electrochemical reaction between a metal and its environment. **D887**

cosine response, *n*—ability of a meter, placed at an angle to the oncoming flow, to sense the component of velocity parallel to its axis. **D5089**

counter background, *n*—in the measurement of radioactivity, the counting rate resulting from factors other than the radioactivity of the sample and reagents used. **D1890**

Discussion—Counter background varies with the location, shielding of the detector, and the electronics; it includes cosmic rays, contaminating radioactivity and electrical noise.

counter beta-particle efficiency, *n*—in the measurement of radioactivity, that fraction of beta particles emitted by a source which is detected by the counter. **D1890**

counter-current flow, *n*—flow through a membrane module in which the fluid on the upstream and downstream sides of the membrane move parallel to the membrane surface but in the opposite direction. (See Fig. 1 of Terminology D6161.) **D6161**

counter efficiency, *n*—in the measurement of radioactivity, that fraction of the disintegrations occurring in a source which is detected by the counter. **D1890**

crest, *n*—bottom of the overflow section or notch of a rectangular weir. **D5242**

crest, *n*—horizontal plane surface of the weir. **D5614**

crest, *n*—in rectangular thin-plate weirs, the horizontal bottom of the overflow section; in broad-crested weirs and flumes, the plane, level floor of the flow section. **D5640**

criterion of detection, *n*—minimum quantity that shall be observed before it can be stated that a substance has been discerned with an acceptable probability that the statement is true (see Practice D4210). **D4841**

critical flow, *n*—open channel flow in which the energy, expressed in terms of depth plus velocity head, is a minimum for a given flow rate and channel. The Froude number is unity at critical flow. **D5614, D4410**

critical flow, *n*—open channel flow in which the energy expressed in terms of depth plus velocity head, is a minimum for a given flowrate and channel. The Froude number is unity at critical flow. **D5390**

critical flow, *n*—open channel flow in which the energy, expressed in terms of depth plus velocity head, is a minimum for a given flow rate and channel. The Froude number is unity at critical flow. **D5614**

critical flow, *n*—open-channel flow in which the energy, expressed in terms of depth plus velocity head, is a minimum for a given flow rate and channel. **D5640**

DISCUSSION—The Froude number is unity at critical flow.

critical level, *n*—with a specified level of confidence (for example, 95 % or 99 %), the lowest result that indicates the presence of an analyte.

DISCUSSION—Specifically, the lowest result that is statistically different from zero. This term originates with the publications of Lloyd Currie (Anal. Chem. 40 (1968) 586; ISO 11843–1:1997). A critical level is dependent on the analyte of interest, the analytical method, and the matrix. The U.S. Environmental Protection Agency's Method Detection Limit (MDL) (Federal Register 40 CFR, Part 136, Appedix B, 7–1–99 edition) is an example of a critical level.

cross flow, *n*—flow through a membrane module in which the fluid on the upstream side of the membrane moves parallel to the membrane surface and the fluid on the downstream side of the membrane moves away from the membrane in the direction normal to the membrane surface. (See Fig. 1 of Terminology D6161.) **D6161**

crossflow membrane filtration, *n*—separation of the components of a fluid by semipermeable membranes through the application of pressure and flow parallel to the membrane surface. Includes the processes of reverse osmosis, utrafiltration, anofiltration, and microfiltration. **D6161**

cross-section area (A), *n*—area of the water below the high-water surface elevations that are computed by assuming a straight-line interpolation between elevations on each bank. The area is computed as the summation of the products of mean depth multiplied by the width between stations of the cross section. **D5130**

cross-section area (A), *n*—area at the water below the water-surface elevation that it computed. The area is computed as the summation of the products of mean depth multiplied by the width between stations of the cross section. **D5388**

cross sectional area (A), *n*—area occupied by the water. **D5243**

cross sections (numbered consecutively in downstream order), *n*—representative of a reach of channel and are positioned as nearly as possible at right angles to the direction of flow. They must be defined by coordinates of horizontal distance and ground elevation. Sufficient ground points must be obtained so that straight-line connection of the coordinates will adequately describe the cross-section geometry. If major breaks in the high-water profile are evident, cross sections should be located at the breaks. **(D5130**

cross sections (numbered consecutively in down-stream order), *n*—The approach section, Section 1, is located one culvert width upstream from the culvert entrance. Cross Sections 2 and 3 are located at the culvert entrance and the culvert outlet, respectively. Subscripts are used with symbols that represent cross sectional properties to indicate the section to which the property applies. For example, A_1 is the area of Section 1. Items that apply to a reach between two sections are identified by subscripts indicating both sections. For example, $h_{f1\text{-}2}$ is the friction loss between Sections 1 and 2. **D5243**

cross sections (numbered consecutively in downstream order), *n*—representative of a reach and channel and are positioned as nearly as possible at right angles to the direction of flow. They must be defined by coordinates of horizontal distance and ground elevation. Sufficient ground points must be obtained so that straight-line connection of the coordinates will adequately describe the cross-section geometry. **D5388**

crud deposition, *n*—deposition on interior surfaces of sample tubing or other hardware of fine insoluble particles of iron oxides and other byproducts of metallic corrosion that are present throughout the system. The term "crud" is generally used for all types of fouling. **D5540**

cryptosporidium, *n*—waterborne protozoan that forms cysts and causes acute gastrointestinal illness in humans. **D6161**

crystal membrane or solid-state electrode membrane—see **membrane**. **D4127**

current efficiency, *n*—ratio, expressed in percent, of the net transfer of ionized and ionizable solutes per unit cell within a CEDI device, expressed in chemical equivalents transferred per unit time, to the number of coulombs transferred from an external DC power source to each electrode pair, expressed in faradays per unit time. Calculation of current efficiency is described in 9.2 of Test Method D6807. **D6807**

current efficiency—the ratio, expressed in percent, of the net transfer of ionized and ionizable solutes per unit cell within a CEDI device, expressed in chemical equivalents transferred per unit time, to the number of coulombs transferred from an external dc power source to each electrode pair, expressed in faradays per unit time. Calculation of current efficiency is described in 9.2. **D6529**

current meter, *n*—instrument used to measure, at a point, velocity of flowing water. **D3858**

current meter, *n*—instrument used to measure the speed or velocity of flowing water at a point. **D4409**

custody, *n*—physical possession or control. A sample is under custody if it is in possession or under control so as to prevent tampering or alteration of its characteristics. **D4840**

cycle time, *n*—interval between repetitive sample introductions in a monitoring system with discrete sampling. **D3864**

Dalton, *n*—arbitrary unit of molecular weight, one twelfth the mass of the nuclide of carbon 12. **D6161**

data acquisition equipment, *n*—see **monitoring system**. **D3864**

data defensibility, *n*—process that provides sufficient assurance, both legal and technical, that assertions made about a sample and its measurable characteristics can be supported to an acceptable level of certainty. See Appendix

X1 of Guide D4840 for a discussion of the elements of a data defensibility process. **D4840**

data quality objectives (DQOs), *n*—statements on the level of uncertainty that a decision maker is willing to accept in the results derived from environmental data (see QAMS-500/80). **D5612**

data traceability, *n*—the ability to verify data by having access to, and documentation of, all prior information used to generate it and needed for its interpretation.

datum, *n*—plane that represents a zero or some defined elevation. **D5413**

datum, *n*—level plane that represents zero elevation. **D5674**

dead end filtration, *n*—process in which water is forced through a media which captures the retained particles on and within it, where the process involves one influent and one effluent stream. **D6161**

dead end flow, *n*—flow through a membrane module in which the only outlet for the upstream fluid is through the membrane. (See Fig. 1 of Terminology D6161.) **D6161**

deaerator, *n*—device to remove air from water. **D6161**

debris, *n*—as applied to geologic debris flows, a mixture of loose, poorly-sorted rock fragments or soil material, or both, potentially ranging from clay to boulder-size particles that may include fragmental organic matter and other exotic detritus. **D4410**

decarbonator, *n*—device to remove carbon dioxide from water. **D6161**

degasification, *n*—process of removing dissolved gasses from water. **D6161**

degradable plastic, *n*—plastic designed to undergo a significant change in its chemical structure under specific environmental conditions, resulting in a loss of some properties that may be measured by standard test methods appropriate to the plastic and the application in a period of time that determines its classification. **D6888**

degradation, *n*—geologic process by which stream beds, flood plains, the bottoms of other water bodies, and other land surfaces are lowered in elevation by the removal of material by fluids. **D4410**

deionization (DI), *n*—removal of ions from a solution by ion exchange. **D6161**

delivery rate, *n*—use **sediment delivery ratio** or sediment yield, whichever is meant. **D4410**

delta, *n*—sediment deposit formed where moving water is slowed by a slower moving body of water. **D4410**

demineralization, *n*—process of removing minerals from water. **D6161**

denitrification, *n*—aqueous nitrate reduction or removal. **D6161**

dense (nonporous) membrane, *n*—membrane with no detectable pores. **D6161**

density, *n*—mass of a substance per unit volume, ρ in kg/L or kg/m^3. Use ρ_s for density of solid particles, ρ_w for water, ρ_d for dry sediment with voids, ρ_{sat} for saturated sediment, ρ_{wet} for wet sediment, and ρ_b for submerged sediment (buoyant weight). **D4410**

density current, *n*—movement of one fluid under, through, or over another fluid of differing density. **D4410**

deposition, *n*—the chemical, mechanical, or biological processes through which sediments accumulate in a resting place. **D4410**

depth (y), *n*—depth of flow at a cross section. Subscripts denote specific cross section depths as follows: **D5129**

y_1 = depth of flow in cross section 1 (approach section) and
y_3 = depth of flow in cross section 3 (contracted section).

depth-integrated sample, *n*—discharge-weighted (velocity-weighted) sample of water-sediment mixture collected at one or more verticals in accordance with the technique of depth integration; the discharge of any property of the sample expressible as a concentration can be obtained as the product of the concentration and the water discharge represented by the sample. **D4410**

depth-integrated sample, *n*—water sample collected in such a manner as to be representative of the water mixture moving in the river in the vicinity of the sampler at a single vertical in a cross section. **D5613**

depth-integrating sediment sampler, *n*—device that collects a representative water-sediment mixture at all points along the sampling vertical. **D4410**

depth-integrating suspended sediment sampler, *n*—instrument capable of collecting a water-sediment mixture isokinetically as the instrument is traversed across the flow; hence, a sampler suitable for performing depth integration. **D4411**

depth integration, *n*—method of sampling at every point throughout a given depth (the sampled depth) whereby the water-sediment mixture is collected isokinetically so that the contribution from each point is proportional to the stream velocity at the point. This process yields a sample with properties that are discharge weighted over the sampled depth. Ordinarily, depth integration is performed by traversing either a depth- or point-integrating sampler vertically at an acceptably slow and constant rate; however, depth integration can also be accomplished with vertical slot samplers. **D4410**

depth-integration, *n*—method of sampling at every point throughout a sampled depth whereby the water-sediment mixture is collected isokinetically to ensure the contribution from each point is proportional to the stream velocity at the point. This method yields a sample that is discharge-weighted over the sampled depth. Ordinarily, depth integration is performed by traversing either a depth- or point-integrating sampler vertically at an acceptably slow and constant rate; however, depth integration can also be accomplished with vertical slot samplers. **D4411**

desalination, *n*—see **demineralization** . **D6161**

desorption, *n*—opposite of absorption. See **absorption**. **D6161**

detection efficiency, *n*—in this test method, detection efficiency represents a curve relating particle size to a counter's ability to detect that size. **D5544**

detection limit, *n*—function of the sensitivity and the signal to noise ratio in the analysis of a specific element for a given set of parameters. The detection limit is determined statistically as some multiple, usually two or three times the standard deviation of the signal to noise ratio. **D4691**

detection limit, *n*—minimum concentration or amount of a substance that can be detected with a known degree of confidence. **D5847**

detection limit (DL) or limit of detection (LD), *n*—numerical value, expressed in physical units or proportion, intended to represent the lowest level of reliable detection (a level which can be discriminated from zero with high probability while simultaneously allowing high probability of nondetection when blank samples are measured. **D6091**

DISCUSSION—In some cases, the discrimination may be from a value other than zero, such as a background level. Note also that a DL also depends on other characteristics of the measurement and detection process, such as described in 1.3.2 of Practice D6091. The IDE is an example of a DL.

detector background, *n—in the measurement of radioactivity*, the counting rate resulting from factors other than the radioactivity of the sample and reagents used.

DISCUSSION—Detector background varies with the location, shielding of the detector, and the electronics; it includes cosmic rays, contaminating radioactivity, and electronic noise. **D7283**

detergent, *n*—cleansing agent; any of numerous synthetic water soluble or liquid-organic preparations that are chemically different from soaps but resemble them in the ability to emulsify oils and hold dirt in suspension. **D6161**

device pressure drop (ΔP), *n*—difference between the feed pressure and the concentrate pressure. **D5090**

dialysis, *n*—separation process dependent on different diffusion rates of solutes across a permeable membrane without an applied hydraulic driving force. It is a process in which transport is driven primarily by concentration differences, rather than by pressure or electrical potential differences, across the thickness of a membrane. **D6161**

dialysis permeability coefficient, *n*—permeability coefficient on a transmembrane driving force expressed in terms of the concentration difference of a given component. **D6161**

diameter, intermediate axis, *n*—diameter of a sediment particle determined by direct measurement of the axis normal to a plane containing the longest and shortest axes. **D5387**

diameter, nominal, *n*—diameter of a sphere of the same volume as the given particle.[4] **D5387**

diameter, sedimentation, *n*—diameter of a hypothetical sphere of the same specific gravity and the same settling velocity as the given particle in the same fluid. **D4410**

diameter, sieve, *n*—size of sieve opening through which a given particle of sediment will just pass. **D5387**

diatom, *n*—single cell marine animal having a coating consisting principally of silica. **D6161**

diatomaceous earth (DE) filtration, *n*—filtration using an amphorous, lightweight siliceous earth medium occurring naturally as the fossil remains of diatoms. **D6161**

differential pressure (ΔP, dP), *n*—difference in pressure between two points. **D6161**

differential titration, *n*—see **titration**. **D4127**

diffusion screen, *n*—fine mesh screen used to filter residue particles of a particular size. **D5544**

diffusion-type probes, *n*—galvanic or polarographic sensors that depend on the continuous influx of oxygen through the membrane to develop the measurement signal. **D5462**

digestion, *n*—treating a sample with the use of heat or elevated pressures, or both, usually in the presence of chemical additives, to bring analytes of interest into solution or to remove interfering matrix components, or both. **D1971**

direct measurement, *n*—determination of sample concentration or activity by directly relating the electrode potential to the level of the species being measured. The level can be read from a calibration curve or the log scale of a selective ion meter. **D4127**

direct-measuring bed-load sampler, *n*—device that physically collects and holds bed load. **D4410**

discharge, *n*—rate of flow expressed in units of volume of water per unit of time. The discharge includes any sediment or other materials that may be dissolved or mixed with it. **D5389**

discharge, *n*—volume of flow of water through a cross section in a unit of time, including any sediment or other solids that may be dissolved in or mixed with the water. **D3858**

discharge, *n*—volume of water flowing through a cross-section in a unit of time, including sediment or other solids that may be dissolved in or mixed with the water; usually cubic feet per second (f^3/s) or metres per second (m/s). **D5674**

discharge (water), *n*—volume of water flowing through a cross-section in a unit of time, including sediment or other solids that may be dissolved in or mixed with the water; usually cubic feet per second (f^3/s), or cubic metres per second (m^3/s). **D5674, D4410**

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[4] Vanoni, V. A., "Sedimentation Engineering," *Manuals and Reports on Engineering Practice*, No. 54, ASCE, 1975.

disinfection, *n*—process of killing organisms in a water supply or distribution system by means of heat, chemicals, or UV light. **D6161**

disinfection by-product, *n*—see **DBP**. **D6161**

dispersed system, *n*—in laboratory analysis of grain sizes, an initial condition whereby the particles begin to settle from a stirred mixture; when stirring stops, each particle settles independently of other particles. **D4410**

dispersion, *n*—three-dimensional process of disseminating the dye within a river's waters. **D5613**

dispersion, *n*—variation of index of refraction with wavelength. **D1245**

dispersion staining, *n*—the color effects produced when a transparent object, immersed in a liquid having a refractive index near that of the object is viewed under the microscope by a transmitted light and precise-aperture control.

dispersion staining, *n*—color effects produced when a transparent object, immersed in a liquid having a refractive index near that of the object is viewed under the microscope by transmitted white light and precise aperture control. **D1245**

dissociation constant, *n*—number indicating the extent to which a substance dissociates in solution. [For a simple two-species complex AB, the constant is given by the product of the molar concentrations of A and of B divided by the molar concentrations of the undissociated species AB. For example, with hydrofluoric acid:

$$([H^+]\,[F^-])/([HF]) = K = 6.7 \times 10^{-4} \text{ at } 25°\text{C}$$

The smaller the value of *K*, the less the complex is dissociated. *K* varies with temperature, ionic strength, and the nature of the solvent. **D4127**

dissolved, *adj*—concentration of elements determined on a filtered fraction of a sample. Samples are filtered through a 0.45-µm membrane filter before acid preservation. **D6800**

dissolved, *adj*—concentration of elements determined on a filtered fraction of a sample. Samples are filtered through a 0.45-µm membrane filter before acid preservation.

dissolved, *adj*—those elements that will pass through a 0.45-µm membrane filter. **D1976**

dissolved, *adj*—those elements that will pass through a 0.45-µm membrane filter. **D5673**

dissolved load, *n*—part of the stream load that is carried as dissolved solids. **D4410**

dissolved matter, *n*—that matter, exclusive of gases, which is dispersed in water to give a single homogeneous liquid phase.

dissolved solids, *n*—mass of constituents in a filtered water sample. For operational purposes, the filter pore is usually 0.00045 mm. **D4410**

dissolved solids, *n*—residual material remaining after filtering the suspended material from a solution and evaporating the solution to a dry state at a specified temperature. That matter, exclusive of gases, which is dissolved in water to give a single homogeneous liquid phase. **D6161**

dissolved solids, *n*—soluble constituents in water. The quantity is determined by evaporating a water sample to visible dryness at a temperature slightly below boiling. The temperature is then raised to 105°C and held for about 2 h. This is followed by cooling in a desiccator and weighing the residue. **D3977**

distillation, *n*—process of condensing steam from boiling water on a cool surface. **D6161**

distillation ratio, % =—

$$\frac{\text{volume of distilled portion of sample}}{\text{total volume of acidified sample}} \times 100$$

D4374

Donnan exclusion, *n*—reduction in concentration of mobile ions within an ion exchange membrane as a result of the presence of fixed ions of the same sign as the mobile ions. **D6161**

downstream, *n*—side of a membrane from which permeate emerges. **D6161**

draft (transducer draft), *n*—vertical distance from the bottom of the transducer to the surface of the water. **D6318**

drainage basin, *n*—see **watershed** . **D4410**

drift, *n*—slow nonrandom change with time in the potential (emf) of an ion-selective electrode cell assembly maintained in a solution of constant composition and temperature. **IUPAC, D4127**

drift, *n*—change in system output, with constant input over a stated time period of unadjusted, continuous operation; usually expressed as percentage of full scale over a 24-h period. **D3864**

span drift, n—drift when the input is at a constant, stated upscale value. **D3864**

zero drift, n—drift when the input is at zero. **D3864**

dunes (stream), *n*—bed forms of coarse sediment, generally transverse to the direction of flow, with a triangular profile having a gentle upstream slope. Dunes advance downstream by the movement of sediment along the upstream slope and by the deposition of sediment on the steep downstream slope. Dunes move downstream at low velocities compared to the stream flow velocity. **D4410**

duplicate sample, *n*—one of two (2) representative portions taken from the same sample or sample source.

D_x, *n*—diameter of the sediment particle that has *x* % of the sample less than this size (diameter is determined by method of analysis; that is, sedimentation, size, nominal, and so forth). **D5387**

DISCUSSION—Example: D_{45} is the diameter that has 45 % of the particles that have diameters finer than the specified diameter. The percent may be by mass, volume, or numbers and is determined from a particle size distribution analysis.

dynamic membrane formation, *n*—process in which an active layer is formed on the membrane surface by the deposition of substances contained in the fluid being treated. **D6161**

dynamic solvent system, *n*—any closed loop system in which the solvent is in motion across the deposit surface. **D5256**

eccentricity (e), *n*—measure of the symmetry of the contraction in relation to the approach channel. **D5129**

E. coli, *n*—one of the members of the coliform bacterium associated with animal and human waste. **D6161**

effluent, *n*—aqueous release from a separator. **D6104**

effluent, *n*—aqueous release from a separator. **D6157**

effluent, *n*—exit stream from a unit/vessel. **D6161**

electrical conductivity, *n*—reciprocal of the a-c resistance in ohms measured between opposite faces of a centimetre cube of an aqueous solution at a specified temperature. **D1125**

DISCUSSION—The unit of electrical conductivity is siemens per centimetre. (The previously used units of mhos/cm are numerically equivalent to S/cm.) The actual resistance of the cell, R_x, is measured in ohms. The conductance, $1/R_x$, is directly proportional to the cross-sectional area, A (in cm 2), and inversely proportional to the length of the path, L (in cm):

$$1/R_x = K \cdot A/L$$

The conductance measured between opposite faces of a centimetre cube, K, is called conductivity. Conductivity values are usually expressed in microsiemens/centimetre or in siemens/centimetre at a specified temperature, normally 25°C.

electrical conductivity, *n*—the reciprocal of the resistance in ohms measured between opposite faces of a centimetre cube of an aqueous solution at a specified temperature.

electrical conductivity, *n*—refer to Test Methods D1125. **D5391**

electrical resistivity, *n*—a-c resistance in ohms measured between opposite faces of a centimetre cube of an aqueous solution at a specified temperature. **D1125**

DISCUSSION—The unit of electrical resistivity is ohm-centimetre. The actual resistance of the cell, R_x, is measured in ohms, and is directly proportional to the length of the path, L (in cm), and inversely proportional to the cross-sectional area, A (in cm^2):

$$R_x = R \cdot L/A$$

The resistance measured between opposite faces of a centimetre cube, R, is called resistivity. Resistivity values are usually expressed in ohm·centimetre, or in megohm · centimetre, at a specified temperature, normally 25°C.

electrical resistivity, *n*—refer to Test Methods D1125. **D5391**

electrodeionization—a process that removes ionized and ionizable species from liquids using electrically active media and using an electrical potential to influence ion transport, where the ionic transport properties of the active media are a primary sizing parameter. Electrodeionization devices typically comprise semi-permeable ion-exchange membranes and permanently charged ion-exchange media (see Test Method D6529). **D1193**

electrode life, *n*—length of time that an electrode functions usefully. Life-time of solid-state and glass electrodes is limited by mechanical failure of the electrode body or chemical attack on the sensing membrane, and can range from a few days, if the electrode is used continuously in hot or abrasive flowing streams, to several years under normal laboratory conditions. The life-time of liquid membrane electrodes is limited by loss of ion exchanger with use, and is generally one to six months. **D4127**

electrode pair, *n*—sensing electrode and a reference electrode; the reference electrode may be separate or combined in one body with the sensing electrode. **D4127**

electrodialysis (ED), *n*—process in which ions are transferred through membranes from a less concentrated to a more concentrated solution using direct current electric power as the driving force. **D6161**

electrodialysis reversal (EDR), *n*—same as ED with the addition of a polarity reversal step added to improve performance. **D6161**

electrolyte, *n*—combination of a UV-absorbing salt and an electroosmotic flow modifier placed inside the capillary, used as a carrier for the analytes, and for detection and quantitation. The UV-absorbing portion of the salt must be anionic and have an electrophoretic mobility similar to the analyte anions of interest. **D6508**

electrolyte, *n*—substance that ionizes in aqueous solution; also, a solution containing ions. Weak electrolytes are only slightly dissociated into ions in solution (acetic acid), and strong electrolytes are highly dissociated (HCl, NaCl). **D4127**

electronic distance measurement (EDM), *n*—measurement of distance using pulsing or phase comparison systems. **D5906**

electronic positioning system (EPS), *n*—system that receives two or more EDM to obtain a position. **D5906**

electronic temperature sensor, *n*—electrical device that converts changes in resistance to a readout calibrated in temperature units. Thermistors and resistance temperature detectors are examples of electronic temperature sensors. **D6764**

electroosmotic flow (EOF), *n*—direction and velocity of electrolyte solution flow within the capillary under an applied electrical potential (voltage); the velocity and direction of flow is determined by electrolyte chemistry, capillary wall chemistry, and applied voltage. **D6508**

electroosmotic flow modifier (OFM), *n*—cationic quaternary amine in the electrolyte that dynamically coats the negatively charged silica wall giving it a net positive charge. This reverses the direction of the electrolyte's natural electroosmotic flow and directs it towards the anode and detector. This modifier augments anion migration and enhances speed of analysis. Its concentration secondarily effects anion selectivity and resolution, (see Fig. 7 of Test Method D6508). **D6508**

electropherogram, *n*—graphical presentation of UV-detector response versus time of analysis; the x axis is migration time, which is used to qualitatively identify the anion, and the y axis is UV response, which can be converted to time corrected peak area for quantitation. **D6508**

electrophoretic mobility, *n*—specific velocity of a charged analyte in the electrolyte under specific electroosmotic flow conditions. The mobility of an analyte is directly related to the analyte's equivalent ionic conductance and applied voltage, and is the primary mechanism of separation. **D6508**

element, *n*—component containing the membrane, generally replaceable, such as a spiral wound cartridge or cassette. **D6161**

elevation, *n*—vertical distance from a datum to a point. **D5413**

elevation, *n*—vertical distance from a datum to a point; also termed stage or gage height. **D5674**

eluant, *n*—ionic mobile phase used to transport the sample through the analytical column. **D5996**

eluant, *n*—ionic mobile phase used to transport the sample through the exchange column. **D5542**

eluant, *n*—ionic mobile phase used to transport the sample through the ion exchange column. **D5257**

eluent, *n*—ionic mobile phase used to transport the sample through the chromatographic system. **D6581**

eluent, *n*—ionic mobile phase used to transport the sample through the system. **D4327**

eluent, *n*—liquid mobile phase used in anion exchange chromatography to transport the sample through the chromatography system. **D6994**

embrittlement cracking—a form of metal failure that occurs in steam boilers at riveted joints and at tube ends, the cracking being predominantly intercrystalline. **D807**

emission intensity, *n*—measure of the amplitude of fluorescence emitted by a sample element. This measurement is correlated with a calibration curve for quantitative analysis. The emission intensity generally is given in units of counts per second (c/s). **D6502**

endotoxins, *n*—substances or by-products usually produced by gram negative micro-organisms that give a positive test for endotoxin in accordance with 13.2 of Guide D5196. **D5196**

endotoxins, *n*—substances or by-products usually produced by gram negative microorganisms that give a positive test for pyrogens, determined in accordance with the limulus lysate test. **D5127**

energy loss (h_f), *n*—loss as a result of boundary friction between two locations. **D5243**

DISCUSSION—Energy loss is computed as follows:

$$h_f = L\left(\frac{Q^2}{K_1K_2}\right)$$

where:

Q = the discharge in ft^3/s (m^3/s) and
L = the culvert length in ft (m).

energy recovery device—see **ERD**. **D6161**

energy recovery turbine—see **ERT**. **D6161**

enhanced surface water treatment rule—see **ESWTR**. **D6161**

enteric virus, *n*—general term denoting a virus that normally enters by the oral route, is capable of multiplying in cells of the alimentary canal and is found in stool specimens. In addition to the enterovirus, included under this general term are such agents as adenovirus, rotavirus, Norwalk virus, astrovirus, and calicivirus. **D5244**

English degree, *n*—number of grains of substance per one British imperial gallon of water. (See Table 1 of Terminology D6161.) **D6161**

enterococci, *n*—gram positive bacteria possessing the enzyme β-D-glucosidase, which cleaves the nutrient indicator and produces fluorescence under a long wavelength (366-nm) ultraviolet (UV) light. **D6503**

Enterococcus, *n*—in this test method, *Enterococcus* species are those bacteria that produce red to maroon colonies with black or reddish-brown precipitate on underside, after incubation on mE agar and subsequent transfer to EIA medium. Enterococci include *E. faecalis*, *E. faecium*, *E. avium*, and their variants. **D5259**

enterovirus, *n*—genus of the family *Picornaviridae*. Members of this genus are 22 to 30 nm in diameter, contain a positive single-stranded RNA, are stable under acid conditions and are resistant to ether. Included in this genus are poliovirus, coxsackievirus, and echovirus. **D5244**

Environmental Protection Agency (EPA) (USA), *n*—see **EPA-Environmental Protection Agency (USA)**. **D6161**

ephemeral gully, *n*—channel that is formed by gully erosion on cropland and that is routinely but temporarily obscured by mechanical operations such as tilling. **D4410**

equal-discharge-increment (EDI) method, *n*—procedure for obtaining the discharge weighted suspended-sediment concentration of flow at a cross section whereby depth integration is performed at the centers of three or more equal flow segments of the cross section. If approximately equal volumes of water-sediment mixture are collected from each flow segment, the samples may be composited for analysis. If unequal volumes are collected, samples from each flow segment must be analyzed separately and the results combined mathematically. **D4410**

equal-width-increment (EWI) method, *n*—procedure of obtaining the discharge weighted suspended-sediment concentration of flow at a cross section by performing depth integration at a series of verticals equally spaced across the cross section and using the same vertical transit rate at all sampling verticals. **D4410**

equilibrium-type probes, *n*—modified polarographic sensing probes that have a negligible influx of oxygen through the membrane except during changes of sample DO concentration. Oxygen consumption and regeneration balance each other within the probes under stable conditions, and the net flux through the membrane is insignificant. **D5462**

equitransference, *n*—equal diffusion rates of the positively and negatively charged ions of an electrolyte across a liquid junction. **D4127**

equitransferent filling solution, *n*—reference electrode-filling solution in which the diffusion rates of negatively and positively charged ions are equal. **D4127**

equivalent diameter, *n*—diameter of a pore or defect calculated from its bubble point using Eq 1 (see 9.3 of Practice D6908). This is not necessarily the same as the physical dimensions of the defect(s). **D6908**

equivalent per million (epm), *n*—a unit chemical equivalent weight of solute per million unit weights of solution.

equivalent per million (epm), *n*—unit chemical equivalent weight of solute per million unit weights of solution. **D1126**

equivalent per million (EPM), *n*—unit chemical equivalent weight of solute per million unit weights of solution. Concentration in equivalents per million is calculated by dividing concentration in ppm by the equivalent weight of the substance or ion. Equivalent weight is the atomic weight of the substance divided by the valence of the substance. **D6161**

equivalent weight, *n*—weight of an ion determined by dividing the sum of the atomic weights of its component atoms by its valence. **D6161**

Escherichia colia, *n*—see **E. coli**. **D6161**

Escherichia coli (E. coli), *n*—species of bacteria that is a member of the total coliform group and known to originate in the feces of warm-blooded animals. **D5392**

evaluate, *v*—to determine significance or worth. **D5851**

evaporation, *n*—process in which a liquid (water) passes from a liquid to a gaseous state. **D6161**

excitation source, *n*—component of the XRF spectrometer, which provides the high energy radiation used to excite the elemental constituents of a sample leading to the subsequent fluorescence which is measured. The excitation source may be an electronic x-ray generating tube or one of a variety of radioisotopes which emit an x-ray line of a suitable energy for the analysis at hand. **D6502**

expansion or contraction loss (ho), *n*—in the reach is computed by multiplying the change in velocity head through the reach by a coefficient. For an expanding reach: **D5388**

$$ho = Ke(h_{v1} - h_{v2})$$

$$ho = Kc(h_{v2} - h_{v1})$$

where:

h_v = velocity head at the respective section and

Ke and Kc = coefficients.

Discussion—The values of the coefficients can range from zero for ideal transitions to 1.0 for *Ke* and 0.5 for *Kc* for abrupt changes.

expiration date, *n*—date applied by the manufacturer after which an accurate result is not ensured by the manufacturer. **D5463**

extinction angle, *n*—angle between the extinction position and some plane, edge, or line in a crystal. **D1245**

extinction position, *n*—position in which an anisotropic crystal, between crossed polars, exhibits complete darkness. **D1245**

extra-cellular polysaccharide, *n*—see **EPS**. **D6161**

extrude, *v*—act of pushing a core from a core barrel or a core-barrel liner. **D4823**

facultative organisms, *n*—microbes capable of adapting to either aerobic or anaerobic environments. **D6161**

Fahrenheit (°F), *n*—designation of a degree on the Fahrenheit temperature scale that is related to the International Practical Temperature Scale. **D6161**

fall (Δh), *n*—drop in the water-surface computed as the difference in the average water-surface elevation at adjacent cross sections. **D5130**

fall (Δh), *n*—drop in the water surface, in ft (m), computed as the difference in the water-surface elevation at adjacent cross sections (see Fig. 1 in Test Method D5388): **D5388**

$$\Delta h = h_1 - h_2$$

fall velocity, *n*—settling rate of a particle in a given medium. **D4410**

false negative, *n*—negative response for a sample that contains the target analyte(s) at or above the stated action level. **D6850**

false positive, *n*—positive response for a sample that contains the target analyte(s) below the stated action level. **D6850**

fathometer, *n*—electronic device for registering depths of water by measuring the time required for the transmission and reflection of sound waves between a sonic transducer and the lake or river bottom. **D6318**

feed, *n*—fluid that enters the device. **D5090**

feed, *n*—input solution to a treatment/purification system or device, including the raw water supply prior to any treatment. The liquid entering the module. **D6161**

feed channel spacer, *n*—plastic netting between membrane leaves which provides the flow channel for the fluid passing over the surface of the membrane and increases the turbulence of the feed-brine stream. **D6161**

feed distributor, *n*—plastic mesh cylinder at the core of the fiber bundle that distributes the feed evenly. **D6161**

feed pretreatment, *n*—process carried out on a crude (raw) feed stream before feeding to a membrane separation system to eliminate objectionable components such as biological agents and colloids that might impede the stable operation of the membrane. **D6161**

feed water, *n*—that water entering a device or process. **D6161**

ferric chloride, *n*—crystalline form of $FeCl_3$ $6H_2O$, a coagulant. **D6161**

ferric sulfate, *n*—$Fe_2(SO_4)_3$-$9H_2O$, a coagulant. **D6161**

ferrous sulfate, *n*—$FeSO_4$-$7H_2O$, a coagulant. **D6161**

fiber bundle, *n*—heart of the permeator consisting of the hollow fiber polymer membrane, epoxy tube sheet, nub and feed distributor. **D6161**

fiberglas reinforced plastic, *n*—see **FRP**. **D6161**

field duplicates, *n*—two separate samples collected at the same time and place under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analysis of field duplicates gives an indication of the precision associated with sample collection, preservation, and storage, as well as with laboratory procedures. **D5790**

field duplicates (FD 1 and FD 2), *n*—two separate samples collected at the same time and placed under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analyses of FD 1 and FD 2 give a measure of the precision associated with sample collection, preservation and storage, as well as with laboratory procedures. **D5175**

field duplicates (FD1 and FD2), *n*—two separate samples collected at the same time, placed under identical circumstances, and treated exactly the same throughout field and laboratory procedures. Analyses of FD1 and FD2 provide a measure of the precision associated with sample collection, preservation, and storage, as well as with laboratory procedures. **D5315**

field duplicates (FD 1 and FD 2), *n*—two separate samples collected at the same time and placed under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analyses of FD 1 and FD 2 provide a measure of the precision associated with sample collection, preservation, and storage, as well as with laboratory procedures. **D5812**

field duplicates (FD1 and FD2), *n*—two separate samples collected at the same time and placed under identical circumstances and treated exactly the same throughout field and laboratory procedures. **D5475**

DISCUSSION—Analyses of FD1 and FD2 give a measure of the precision associated with sample collection, preservation, and storage, as well as with laboratory procedures.

field reagent blank, *n*—reagent water placed in a sample container, taken to the field along with the samples, and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the field reagent blank is to determine if test method analytes or other interferences are present in the field environment. **D5790**

field reagent blank (FRB), *n*—reagent water placed in a sample container in the laboratory and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation, and all analytical procedures. The reagent water must be transferred to an empty, clean sample container in the field. The purpose of the FRB is to determine if analytes or other interferences are present in the field environment. **D5175**

field reagent blank (FRB), *n*—reagent water placed in a sample container in the laboratory and treated in all respects as a sample, including being exposed to sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the FRB is to determine whether method analytes or other interferences are present in the field environment. **D5315**

field reagent blank (FRB), *n*—reagent water placed in a sample container in the laboratory and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation, and all analytical procedures. The reagent water must be transferred to an empty, clean sample container in the field. The purpose of the FRB is to determine whether analytes or other interferences are present in the field environment. **D5812**

field reagent blank (FRB), *n*—water transferred in a bottle from the laboratory and poured at the field site into a sample container in the field and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation, and all analytical procedures. **D5475**

DISCUSSION—The purpose of the FRB is to determine if test method analytes or other interferences are present in the field environment.

figure of merit, *n*—a numerical quantity based on one or more characteristics of a system or device that represents a measure of efficiency or effectiveness. Generally calculated as the square of the efficiency divided by the background. **D7283**

filling solution, *n*—solution inside a sensing or reference electrode that is replenished periodically. Solutions that are permanently sealed within the electrode (like the buffer inside a pH electrode) are usually called internal reference solutions to differentiate them from filling solutions. **D4127**

filter cake, *n*—accumulated particles on a filter surface, usually from a slurry mixture. **D6161**

filterable matter, *n*—also commonly referred to as total dissolved solids. It is that dissolved matter that is capable of passing through a glass fiber filter and dried to constant weight at 180°C, as determined by following the procedures outlined in this test method. **D5907**

filterable matter, *n*—includes all matter that is removed by a 0.45-µm pore size filter. **D6301**

filtrate, *n*—fluid that has passed through a filter. **D4410**

filtrate, *n*—portion of the feed stream which has passed through a filter. **D6161**

filtration, *n*—the process of passing a liquid through a porous medium for the removal of suspended matter. **D4410**

filtration requirement, *n*—maximum suspended solids size (in micrometres) allowed in an injection water to minimize formation plugging. **D4520**

fine-material load, *n*—that part of the total sediment load that is composed of particles of a finer size than the particles present in appreciable quantities in the bed material; normally, the fine-material load consists of material finer than 0.062 mm. **D4410**

finish (usually analytical finish), *n*—analytical methodology used for the measuring step of the analysis. **D5463**

fixed matter, *n*—residues from the ignition of particulate or dissolved matter, or both.

fixed matter, *n*—residues from the ignition of particulate or dissolved matter, or both. **D6161**

flat sheet membrane, *n*—sheet type membrane may be coated onto a fabric substrate. **D6161**

float, *n*—buoyant article capable of staying suspended in or resting on the surface of a fluid; often used to mark the thread or trace of a flow line in a stream and to measure the magnitude of the flow velocity along that line. **D3858**

floc, *n*—loose, open-structured mass produced by the aggregation of minute particles. **D6161**

flocculant, *n*—agent that produces flocs or aggregates from small suspended particles. **D4410**

flocculating agent, *n*—coagulating substance such as alum, ferrous sulfate, or lime which, when added to water, forms a precipitate that expedites the settling of suspended matter. **D4410**

flocculation, *n*—process of agglomerating fine particles into larger groupings called flocs. **D6161**

flocculent, *n*—chemical(s) that, when added to water, form bridges between suspended particles causing them to agglomerate into larger groupings (flocs) that then settle or float by specific gravity differences. **D6161**

flocs or floccules, *n*—masses of solids formed in a liquid by addition of coagulants (flocculants), or through biochemical processes, or by agglomeration of individual particles. **D4410**

flow balancing, *v*—use of an imposed pressure drop (flow balancing tube), to minimize conversion differences of modules operating in parallel. **D6161**

flow balancing tube, *n*—see **flow balancing**. **D6161**

flow duration, *n*—percentage of time during which a specific discharge is equalled or exceeded. **D5613**

flow-proportioned sample, *n*—a sample obtained by collecting an aliquot volume in proportion to the rate of flow of the stream sampled.

flow totalizer, *n*—counter, usually attached to a flow meter, that evaluates the total volume of the fluid that has flowed through over a given time period. **D6104**

flow totalizer, *n*—counter, usually attached to a flow meter, that evaluates the total volume of the fluid that has flowed through over a given time period. **D6157**

flowthrough electrodes, *n*—ion-selective and reference electrodes designed for anaerobic measurements. The two electrodes are connected by plastic tubing to a syringe or peristaltic pump, and the sample is pumped through the electrodes at a constant rate. Ion-selective electrodes can be made in a flow through configuration for the measurement of very small samples (0.2 to 0.3 mL) or samples that must be measured anaerobically. **D4127**

fluorometer, *n*—instrument that measures the luminescence of a fluorescent substance when subjected to a light source of a given wavelength. **D5613**

fluvial sediment, *n*—particles derived from rocks, biological materials, or chemical precipitants, that are transported by, suspended in, or deposited by flowing water. **D4410**

fluvial sediment, *n*—particles that are (a) derived from rocks or biological materials and (b) transported by flowing water. **D3977**

flux, *n*—membrane throughput, usually expressed in volume of permeate per unit time per unit area, such as gallons per day per ft^2 or litres per hour per m^2. Number of moles, volume or mass of a specified component that is passing per unit of time through a unit of membrane surface area normal to the thickness direction. **D6161**

Food and Drug Administration (USA)—see **FDA**. **D6161**

foreset bed, *n*—the advancing and relatively steep frontal slope of a delta, that progressively covers the bottomset bed and in turn is covered by the topset bed. Foreset beds represent the greater part of the volume of a delta. **D4410**

fouling—deposition of organic matter or inorganic matter, or both, on heat transfer surfaces that result in the loss of heat transfer efficiency. **D4778**

fouling—the reduction of flux as a result of a buildup of solids on the surface or within the pores of the membrane, resulting in changed element performance. **D6161**

fouling index (FI)—see **SDI**. **D6161**

free (available) chlorine—chlorine existing as hypochlorous acid or its dissociated ions. Chlorine remaining after the demand has been satisfied. **D6161**

free available chlorine residual, *n*—residual consisting of hypochlorite ions, hypochlorous acid, or a combination thereof. **D1253**

free cyanide—form of cyanide recognized as being bioavailable and toxic. Free cyanide may be present as either molecular HCN or the anion CN- depending on the pH conditions. Refer to Guide D6696 for a more detailed discussion of aqueous cyanide species. **D6994**

free cyanide—refers to those simple cyanides or loosely held complexes of cyanide that diffuse at pH 6, at room temperature. **D4282**

free flow—a condition in which the flowrate is governed by the state of flow at the crest overfall and hence can be determined from a single upstream depth measurement. **D1941**

free mineral acidity—quantitative capacity of aqueous media to react with hydroxyl ions to pH 4.3. **D1782**

free residual chlorine—see **FRC**. **D6161**

freeboard—space above a filter bed in a filtration vessel to allow for expansion of the bed during back washing. **D6161**

French degree—calcium carbonate equivalents expressed in parts per hundred thousand. Concentration in French degree is calculated by dividing concentration in calcium carbonate equivalents by ten. (See Table 1 of Terminology D6161.) **D6161**

friction loss (h_f)—loss as a result of boundary friction in the reach and is equivalent to the following:

$$\Delta h + \Delta h_v - k(\Delta h_v)$$

where:

Δh = the fall in the reach,
Δh_v = the upstream velocity head minus the downstream velocity head,
$(k\Delta h_v)$ = the energy loss due to acceleration or deceleration and to eddies in a contracting or expanding reach, where k is a coefficient for energy losses.

All of the equations presented in this standard are based on the assumption that k is zero for contracting reaches and 0.5 for expanding reaches. **D5130**

friction loss (h_f)—the loss as a result of boundary friction in the reach and is computed as follows: **D5388**

$$h_f = \frac{LQ^2}{K_1 K_2}$$

where:

L = length of reach, feet (metres) and
K = conveyance at the respective section.

friction slope (S_f)—the energy loss, h_f, divided by the length of the reach, L. **D5129**

friction slope (S_f)—the energy loss divided by the length of the reach or:

$$S_f = \frac{h_f}{L}$$

that becomes:

$$S_f = \frac{\Delta h + \Delta h_v}{L}$$

when Δh_v is negative (for a contracting reach), or:

$$S_f = \frac{\Delta h + \frac{\Delta h_v}{2}}{L}$$

when Δh_v is positive (for an expanding reach). **D5130**

Froude number—dimensionless number expressing the ratio of inertial to gravity forces in free-surface flow. It is equal to the average velocity divided by the square root of the product of the average depth and the acceleration as a result of gravity. **D5390**

Froude number—dimensionless number expressing the ratio of inertial to gravity forces in free-surface flow. It is equal to the average velocity divided by the square root of the product of the average depth and the acceleration as a result of gravity. **D5640, D4410**

Froude number—dimensionless number expressing the ratio of inertial to gravity forces in free surface flow. It is equal to the average velocity divided by the square root of the product of the average depth and the acceleration as a result of gravity. **D5614**

Froude number—dimensionless number expressing the ratio of inertial to gravity forces in free-surface flow. It is equal to the average velocity divided by the square root of the product of the average depth and the acceleration as a result of gravity. **D5640**

Froude number (F)—index to the state of flow in a channel. In a rectangular channel, the flow is tranquil or subcritical if the Froude number is less than 1.0 and is rapid or supercritical if it is greater than 1.0. **D5129**

Froude number (F)—index to the state of flow in the channel. In a prismatic channel, the flow is tranquil or subcritical if the Froude number is less than 1.0 and is rapid or supercritical if it is greater than 1.0. The Froude number is computed as follows: **D5130**

$$F = \frac{V}{\sqrt{gd_m}}$$

where:

V = the mean velocity in ft/s (m/s),
d_m = the average depth in the cross section in feet, and
g = the acceleration of gravity in ft/s/s (m/s/s).

Froude number (F)—index to the state of flow in the channel. In a rectangular channel, the flow is subcritical if the Froude number is less than 1.0, and is supercritical if it is greater than 1.0. **D5243**

Discussion—The Froude number is computed as follows:

$$F = \frac{V}{\sqrt{gd_m}}$$

where:

V = the mean velocity in the cross section, ft/s (m/s);
d_m = the average depth in the cross section, in ft (m); and
g = the acceleration due to gravity (32 ft/s^2) (9.8 m/s^2).

Froude number (F)—index to the state of flow in the channel. In a prismatic channel, the flow is tranquil or subcritical if the Froude number is less than unity and a rapid or supercritical if it is greater than unity. The Froude number is computed as follows: **D5388**

$$F = \frac{V}{\sqrt{gd_m}}$$

where:

V = the mean velocity, ft/s (m/s);
d_m = the mean depth in the cross section, ft (m); and
g = the acceleration of gravity, ft/s/s (m/s/s).

full scale—maximum measuring limit of the system for a given range. **D3864**

fungus—primitive plants distinguished from algae by the absence of chlorophyll. **D6161**

gage—generic term that includes water level measuring devices. **D5413**

gage—generic term that includes water level measuring devices. **D5674**

gage datum—datum whose surface is at the zero elevation of all the gages at a gaging station; this datum is often at a known elevation referenced to National Geodetic Vertical Datum of 1929 (NGVD). **D5413**

gage datum—datum whose surface is at the zero elevation of all of the gages at a gaging station. This datum is often at a known elevation referenced to the national geodetic vertical datum (NGVD) of 1929. **D5674**

gage height—height of a water surface above an established or arbitrary datum at a particular gaging station; also termed stage. **D5674, D4410**

gage height—height of a water surface above an established or arbitrary datum at a particular gaging station; also termed stage. **D5413**

gage height—height of a water surface above an established or arbitrary datum at a particular gaging station; also termed stage. **D5674**

gaging station—particular site on a stream, canal, lake, or reservoir at which systematic observations of hydrologic data are obtained. **D5674, D4410**

gallons per day—see **GC** and **GPD** . **D6161**

gallons per day per square foot—see **GFD (GPDSF)**. **D6161**

gaging station—particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained. **D5413**

gaging station—a particular site on a stream, canal, lake, or reservoir at which systematic observations of hydrologic data are obtained. **D5674**

galvanic corrosion—accelerated corrosion of a metal because of an electrical contact with a more noble metal or non metallic conductor in an electrolyte. **D6161**

galvanic systems—sensing probes and measuring instruments that develop an electrical current from two electrodes inside the probe from which the final measurement is derived. **D5462**

gamma ray (γ), *n*—photon emitted from the nucleus of an atom during radioactive decay. **D7316**

gas electrode membrane—see **membrane** . **D4127**

Geiger-Mueller (GM), *n*—a type of radiation detector with sensitivity to γ–rays and α and β particles. **D7316**

gel fouling layer—highly swollen fouling layer comprising a three-dimensional. Possibly network, structure residing at the surface of a membrane. **D6161**

generally regarded as safe—see **GRAS** . **D6161**

geologic erosion—erosion process on a given land form that is not associated with the activities of man. **D4410**

geologic or natural erosion—erosion process on or in a given land form undisturbed by activities of man and his agents. **D4410**

germ tubes—elongated extensions, 3 to 4 µm wide and up to 20 µm in length, which originate from the yeast cell when incubated for 1 to 3 h in serum. There is no constriction of the germ tube at its point of origin; this is a critical diagnostic feature.[5] Similar structures (elongate buds, pseudohyphae) may be produced by *C. albicans* and other yeasts but all have discrete constrictions at the base where the structure is formed at the cell surface.

germ tubes—elongated extensions, 3 to 4 µm wide and up to 20 µm in length, which originate from the yeast cell when incubated for 1 to 3 h in serum. There is no constriction of the germ tube at its point of origin; this is a critical diagnostic feature. Similar structures (elongate buds, pseudohyphae) may be produced by C. albicans and other yeasts but all have discrete constrictions at the base where the structure is formed at the cell surface. **D4249**

German degree—calcium oxide equivalents expressed in parts per hundred thousand. Concentration in German degree is calculated by dividing concentration in calcium carbonate equivalents by 17.86 (See Table 1 of Terminology D6161.) **D6161**

ghosting, *n*—a gas-chromatographic interference, showing as a peak, which appears at the same elution time as a component from previous injection.

ghosting—gas-chromatographic interference, showing as a peak, which appears at the same elution time as a component from previous injection. **D2580**

"ghosting" or memory peaks—an interference, showing as a peak, which appears at the same elution time as the organic component of previous analysis. **D2908**

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[5] Ahearn, D. C., "Effects of Environmental Stress of Aquatic Yeast Populations," Estuarine Microbial Ecology, L. H. Stevenson and R. R. Colwell, eds., University of South Carolina Press, Columbia, SC, 1973, pp. 443-439.

global positioning system (GPS)—a global positioning system (GPS) is a satellite-based EDM system used in determining Cartesian coordinates (x, y, z) of a position by means of radio signals from NAVSTAR satellites. **D5906**

grab sample—a single sample from a process stream (flowing) or from a source of confined geometry (stagnant) withdrawn at a specific time. The goal of withdrawing a grab sample is to obtain a small portion of the process stream or confined geometry source in order to characterize the entire system. **D3370**

graded sediment—in geology, a sediment consisting chiefly of grains of the same size range. In engineering, a sediment having a uniform or equable distribution of particles from coarse to fine. **D4410**

graded stream—stream in which a steady state has been reached such that over a period of time the discharge and sediment load entering the system are balanced by the discharge and sediment load leaving the system. **D4410**

gradient elution—type of elution in which the eluent composition is steadily altered throughout the analysis in order to provide for an adequate separation of the analytes of interest prior to detection. **D6994**

gradient pump—liquid chromatography pump that is capable of performing gradient elutions. **D6994**

grading—the degree of mixing of size classes in sedimentary material. **D4410**

grain—unit of weight, 0.648 g, 0.000 143 lb. **D6161**

grains per U.S. gallon (GPG)—number of grains of substance per one U.S. gallon of water. Concentration in GPG is calculated by dividing concentration in ppm of the ion by 17.1. One grain weighs 1/7000 lb and one U.S. gallon weighs 8.3 lb. **D6161**

Gram's stain—a routine bacterial stain that divides bacteria into two categories, depending on whether they can be decolorized with acetone, alcohol, or aniline oil after staining with one of the rosaniline dyes such as crystal violet, methyl violet, or gentian violet and treating with iodine. Those that resist decolorization remain blue or violet and are designated Gram-positive; those that are decolorized and take up the red counterstain, such as neutral red, safranin, or dilute carbol fuchsin are termed Gram-negative. **D3862**

Gram's stain—a routine bacterial stain that divides bacteria into two categories, depending on whether they can be decolorized with acetone, alcohol, or aniline oil after staining with one of the rosaniline dyes such as crystal violet, methyl violet, or gentian violet and treating with iodine. Those that resist decolorization remain blue or violet and are designated Gram-positive; those that are decolorized and take up the red counterstain, such as neutral red, safranin, or dilute carbol fuchsin are termed Gram-negative. **D3863**

Gran's plots—a method of plotting apparent concentration (as derived from the electrode potential) versus the volume of reagent added to the sample. Gran's plots are especially useful for plotting titrations that would give poor end-point breaks if plotted conventionally. They can also be used to determine concentration by known addition with greater precision than can be obtained by a single addition measurement. **D4127**

granular activated carbon—see **GAC**. **D6161**

graphite furnace—electrothermal graphite device capable of reaching the specified temperatures required by the element being determined. **D3919**

gravel size (fluvial sediment)—between 2.0 and 64 mm in diameter. **D4410**

gravity filter—filter through which water flows through it by gravity. **D6161**

greensand—mineral (glauconite), used as a filtration medium. See **manganese greensand**. **D6161**

gross erosion—total of all sheet, gully, and channel erosion in a watershed. **D4410**

ground water—that part of the subsurface water that is the saturated zone. **D653, D18, D6146**

groundwater—water confined in permeable sand layers between rock or clay; that part of the subsurface water that is in the saturated zone. **D6161**

guard column, *n*—column used before the analytical column to protect it from contaminants, such as particulate matter or ionic species that may chemically foul the resins and degrade their performance. **D5996**

guard column—column used before the analytical column to protect it from contaminants, such as particulates or irreversibly retained material. **D6581**

guard column—column used before the separator column to protect it from contaminants, such as particulate matter or irreversibly retained materials. **D4327**

guard column—column used before the separator column to protect it from contaminants, such as particulate matter or irreversibly retained materials. **D5442**

guard column—short chromatography column that is placed before the analytical column to protect it from particulates and impurities that may cause fouling. **D6994**

halo acetic acids—see **HAA**. **D6161**

halogen—any element of the family of the elements fluorine, chlorine, bromine and iodine (definition for purpose of this standard). **D6161**

hardness—the polyvalent-cation concentration of water (generally calcium and magnesium).

hardness—polyvalent-cation concentration of water (generally calcium and magnesium). Usually expressed as mg/L as $CaCO_3$. **D6161**

head—depth of flow referenced to the floor of the throat measured at an appropriate location upstream of the flume;

this depth plus the velocity head is often termed the total head or total energy head. **D5390**

head—height of a liquid above a specified point, for example, the weir crest. **D5242**

head—height of a liquid above a specified point; that is, the flume crest. **D1941**

head—in this context, the depth of flow referenced to the crest of the weir or flume and measured at a specified location; this depth plus the velocity head are often termed the total head or total energy head. **D6540**

head (h)—static or piezometric head above an arbitrary datum. Subscripts indicate specific heads as follows: **D5129**

h_f = head loss as a result of friction and
h_s = stagnation-surface level at embankment face.

head—in this test method, depth of water above a specified elevation. The measuring head is the depth of flow above the weir crest measured at an appropriate location upstream of the weir; the downstream head is referenced similarly to the crest elevation and measured downstream of the weir. The head plus the corresponding velocity head is often termed the total head or total energy head. **D5614**

head cup—a method occasionally used to achieve constant pressure (see **back pressure regulator**). It incorporates plumbing of the sample to a selected height above the inlet to the analyzer inlet line(s) to achieve the required inlet pressure for the analyzers. It is occasionally used downstream of colorimetric analyzers to increase sample flow past the analyzer. The sample flows to an open cup with an overflow. This fixed head provides the constant pressure, assuming inlet flow to the head cup exceeds outlet flow to the grab sample and analyzers. **D3370**

NOTE 3—Contemporary designs of back pressure regulators provide excellent sensitivity to pressure change and have limited the need for head cups and the concurrent space and maintenance problems as well as sample contamination potential.

head loss—reduction in liquid pressure usually associated with the passage of a solution through a filter media bed. **D6161**

header—see **manifold**. **D6161**

heat flux—heat transfer per unit area per unit time. **D4778**

heavy metals—elements having a high density or specific gravity of approximately 5.0 or higher. A generic term used to describe contaminants such as cadmium, lead, mercury, etc. Most are toxic to humans in low concentration. **D6161**

heteropoly compound—a compound in which groups of different elements are joined together by metal-metal bonds. **D7126**

heterotrophic bacterial counts/100 mL—total number of viable micro-organisms present in the 100-mL sample, excluding anaerobic and microaerophilic bacteria. **D5196**

heterotrophic plate count—see **HPC**. **D6161**

HF—see **hollow fiber (HF) membrane**. **D6161**

high brackish water—water with an approximate concentration of total dissolved solids ranging from 10 000 to 30 000 mg/L. See **brackish water** and **sea water**. **D6161**

high-purity water—highly treated water with attention to microbiological, particle, organics and mineral reduction or elimination. **D6161**

high-purity water, *n*—within the context of this test method, high-purity water is defined as water containing residue after evaporation in the range from 0.1 mg/L to 20 mg/L. **D5544**

high-water marks—evidence of the highest stage reached by a flood. Debris, stains, foam lines, and scour marks are common types of high-water marks. Water-surface slopes are determined by the elevations of these marks. **D5130**

high-water marks—indications of the highest stage reached by water including, but not limited to, debris, stains, foam lines, and scour marks. **D5243**

hollow fiber (HF) membrane—self-supporting membrane fibers that have a hollow bore like a cylinder. In reverse osmosis, the membrane is usually on the outside with the bore conveying the permeate. In ultra and micro filtrations, the membrane may be on the inside or the outside of the fiber. **D6161**

homogeneous membrane—membrane with essentially the same structural and transport properties throughout its thickness. **D6161**

homogeneous water sample, *n*—water in which the alpha and beta activity is uniformly dispersed throughout the volume of water sample and remains so until the measurement is completed or until the sample is evaporated or precipitating reagents are added to the sample. **D7283**

horizontal control—series of connected lines whose azimuths and lengths have been determined by triangulation, trilateration, and traversing. **D5906**

humic acid—variety of water-soluble organic compounds, formed by the decayed vegetable matter, which is leached into a water source by runoff or percolation. Present in most surface and some ground waters. Higher concentrations cause a brownish tint; difficult to remove except by adsorption, ultrafiltration, nanofiltration or reverse osmosis. **D6161**

humidity, absolute—mass of water vapor per unit volume of the atmosphere usually measured as grams per m^3. **D6161**

humidity, relative—ratio of the actual pressure of existing water vapor to the maximum possible (saturation) pressure of water vapor in the atmosphere at the same temperature, expressed as a percentage. **D6161**

hydrated lime—dry calcium hydroxide. **D6161**

hydraulic jump—abrupt transition from supercritical to subcritical flow, accompanied by considerable turbulence or gravity waves, or both. **D1941**

hydraulic jump—abrupt transition from supercritical flow to subcritical or tranquil flow, accompanied by considerable turbulence or gravity waves, or both. **D5390**

hydraulic jump—abrupt transition from supercritical flow to subcritical or tranquil flow. **D5242**

hydraulic jump—abrupt transition from supercritical flow to subcritical or tranquil flow, accompanied by considerable turbulence or gravity waves, or both. **D5614, D4410**

hydraulic jump—abrupt transition from supercritical flow to subcritical or tranquil flow, accompanied by considerable turbulence or gravity waves, or both. **D5614**

hydraulic jump—abrupt transition from supercritical to subcritical or tranquil flow, accompanied by considerable turbulence or gravity waves, or both. **D5640**

hydraulic radius (R)—area of a cross section or subsection divided by the wetted perimeter of that section or subsection. **D5243**

hydraulic radius (R)—defined as the area of a cross section or subsection divided by the corresponding wetted perimeter. **D5130**

hydraulic radius (R)—defined as the area of a cross section or subsection divided by the corresponding wetted perimeter. The wetted perimeter is the distance along the ground surface of a cross section or subsection. **D5388**

hydraulic radius (R)—is equal to the area of a cross section or subsection divided by its wetted perimeter. **D5129**

hydrogen cycle—the operation of a cation-exchange cycle wherein the removal of specified cations from the influent water is accomplished by exchange with an equivalent amount of hydrogen ion from the exchange material.

hydrogen cycle—operation of a cation-exchange cycle wherein the removal of specified cations from influent water is accomplished by exchange with an equivalent amount of hydrogen ion from the exchange material. **D1782**

hydrograph—graphical representation of the discharge, stage, velocity, available power, or other property of stream flow at a point with respect to time. **D6145**

hydrophilic—having an affinity for water. **D6161**

hydrophobic—lacking an affinity to water. **D6161**

hydrostatic sampling—sample introduction technique in which the capillary with electrolyte is immersed in the sample, and both are elevated to a specific height, typically 10 cm, above the receiving electrolyte reservoir for a preset amount of time, typically less than 60 s. Nanolitres of sample are siphoned into the capillary by differential head pressure and gravity. **D6508**

hydroxyl alkalinity—see **alkalinity**. **D6161**

hyperfiltration—separation of dissolved ions from a feed stream as in nanofiltration and reverse osmosis. **D6161**

hysteresis (electrode memory)—hysteresis is said to have occurred if, after the concentration has been changed and restored to its original value, there is a different potential observed. The reproducibility of the electrode will consequently be poor. The systematic error is generally in the direction of the concentration of the solution in which the electrode was previously immersed. **IUPAC, D4127**

IG—see **imperial gallon**. **D6161**

immersed membrane—MF/UF membranes immersed in the water to be filtered, where the transmembrane pressure is applied by suction to the permeate side. **D6161**

imperial gallon (IG)—1.2 times U.S. gallon. **D6161**

independent reference material (IRM)—material of known purity and concentration obtained either from the National Institute of Standards and Technology (NIST) or other reputable supplier. The IRM shall be obtained from a different lot of material than is used for calibration. **D5847**

index of refraction—numerical expression of the ratio of the velocity of light in a vacuum to the velocity of light in a substance. **D1245**

indicator titration—see **titration**. **D4127**

indirect UV detection, *n*—form of UV detection in which the analyte displaces an equivalent net charge amount of the highly UV-absorbing component of the electrolyte causing a net decrease in background absorbance. The magnitude of the decreased absorbance is directly proportional to analyte concentration. Detector output polarity is reversed in order to obtain a positive mV response. **D6508**

influent—oily aqueous input to a separator. **D6104**

influent—oily aqueous input to a separator. **D6157**

injection site—study site in which the tracer is to be introduced into a parcel of river water. This study site is usually a sufficient distance upstream of the study reach such that complete vertical and lateral mixing of the tracer in a parcel of river water has occurred before the water parcel's entry into the study reach. **D5613**

in-line coagulation—filtration process performed by continually adding a coagulant to the raw feedwater and then passing the water through a filter(s) to remove the microfloc which has been formed. **D6161**

inorganic carbon (IC)—carbon in the form of carbon dioxide, carbonate ion, or bicarbonate ion. **D4839**

inorganic carbon (IC)—carbon in the form of carbon dioxide, carbonate ion, or bicarbonate ion. **D5904**

inorganic carbon (IC), *n*—carbon in the form of carbon dioxide, carbonate ion, or bicarbonate ion. **D5997**

inorganic carbon (IC)—carbon in the form of carbon dioxide, carbonate ion, or bicarbonate ion. **D6317**

input—value of the parameter being measured at the inlet to the analyzer. **D3864**

in-situ nephelometer—turbidimeter that determines the turbidity of a sample using a sensor that is placed directly in the sample. This turbidimeter does not require transport of the sample to or from the sensor. **D6698**

instantaneous sampler—suspended-sediment sampler that takes a representative specimen of the water-sediment mixture in a stream at a desired depth and moment of time. **D4410**

instrument check source (ICS)—a radioactive source, not necessarily traceable to a national standards body, that is used to confirm the continuing satisfactory operation of an instrument. **D7282**

instrument contamination check (ICC)—a measurement to determine if a detector is contaminated with radioactivity. **D7282**

instrument performance check (IPC) solution—solution of analytes used to evaluate the performance of the instrument system with respect to test method criteria. **D5812**

instrument performance check solution (IPC), *n*—solution of analytes used to evaluate the performance of the instrument system with respect to test method criteria.

instrument quality control chart—a chart developed to evaluate the response of an instrument to predetermined, statistically based limits. **D7282**

instrument quality tolerance limit—a limit established to evaluate the acceptable response of an instrument. **D7282**

instrumental detection limit (IDL)—concentration equivalent to a signal, which is equal to three times the standard deviation of the blank signal at the selected analytical mass(es). **D5673**

instrumental detection limit, *n*—concentration equivalent to a signal, due to the analyte, that is equal to three times the standard deviation of a series of ten replicate measures of a reagent blank signal at the same wavelength. **D1976**

instrumental probes, *n*—devices used to penetrate and examine a system for the purpose of relaying information on its properties or composition. The term probe is used in these test methods to signify the entire sensor assembly, including electrodes, electrolyte, membrane, materials of fabrications, etc. **D888**

integrated sample, *n*—type of sample collected by concentrating the metal constituents of a water sample using a filter or an ion exchange resin. These samples typically are collected over long time periods (up to several days). The result of analysis of the collection medium yields a single measurement, which, when divided by the total sample volume, is interpreted as the average metals concentration during the time of collection. **D6502**

integrity—measure of the degree to which a membrane system rejects particles of interest. **D6161**

integrity—measure of the degree to which a membrane system rejects particles of interest. Usually expressed as a log reduction value (LRV). **D6908**

interconnector—device to connect adjacent membrane elements in series and to seal the product channel from the feed-brine channel. **D6161**

interference—effect of a matrix component that might cause an analytical bias or that might prevent a successful analysis. **D5463**

interference—undesired output caused by a substance or substances other than the one being measured. The effect of interfering substance(s) on the measured parameter of interest shall be expressed as a percentage change (±) in the measured component as the interference varies from 0 to 100 % of the measuring scale. If the interference is nonlinear, an algebraic expression should be developed (or curve plotted) to show the varying effect. **D3864**

interference check sample (ICSA)—solution containing matrix elements at environmental levels that result in interferences on target low level analytes. The interferences formed in the ICP can be corrected for by use of element-specific correction equations or collision cell technology with quadrupole-based ICP-MS, or high resolution ICP-MS. **D5673**

interference check sample (ICSAB)—ICSA solution spiked with 20 µg/L As and Sb. **D5673**

interfering substance—any species, other than the ion being measured, whose presence in the sample solution affects the measured potential of a cell. Interfering substances fall into two classes: “electrode” interferences and “method” interferences. Examples of the first class would be those substances which give a similar response to the ion being measured and whose presence generally results in an apparent increase in the activity (or concentration) of the ion to be determined (for example, Na^+ for the Ca^{++} electrode), those species which interact with the membrane so as to change its chemical composition (that is, organic solvents for the liquid or poly(vinyl chloride) (PVC) membrane electrodes) or electrolytes present at a high concentration giving rise to appreciable liquid-junction potentials. The second class of interfering substance is that which interacts with the ion being measured so as to decrease its activity or apparent concentration, but where the electrode continues to report the true activity (that is, CN^- present in the measurement of Ag^+). **IUPAC, D4127**

intermediate stock standard solution—diluted solution prepared from one or more of the stock standard solutions. **D6800**

internal filling solution of sensing electrode—in liquid membrane electrodes, an aqueous internal filling solution contacts the internal reference element and the membrane, which is saturated with ion exchanger. The filling solution normally contains a fixed level of chloride and of the ion for which the electrode was designed; the concentration of this ion determines the zero potential point of the electrode. In addition, the filling solution is saturated with silver chloride to prevent the silver chloride of the internal reference element from dissolving. **D4127**

internal reference electrode—reference electrode that is contained inside an ion-selective electrode assembly. Comment: The system frequently consists of a silver-silver chloride electrode in contact with an appropriate solution containing chloride and a fixed concentration of the ion for which the membrane is selective. **IUPAC, D4127**

internal standard, *n*—a material present in or added to samples in known amount to serve as a reference measurement.

internal standard—material present in or added to samples in known amount to serve as a reference measurement. **D2580**

internal standard—material present in or added to samples in known amount to serve as a reference measurement. **D2908**

internal standard—pure analyte(s) added to a solution in known amount(s) and used to measure the relative responses of other analytes and surrogates that are components of the same solution. The internal standard must be an analyte that is not a sample component. **D5315**

internal standard—pure analyte(s) added in known amount(s) to a solution. This is used to measure the relative instrument response to the other analytes that are components of the same solution. The internal standards must be analytes that are not a sample component. **D5673**

internal standard—pure analyte added to a solution in a known amount, that is used to measure the relative responses of other test method analytes and surrogates that are components of the same solution. The internal standard must be an analyte that is not a sample component. **D5790**

internal standard—pure analyte(s) added to a solution in known amount(s) and used to measure the relative responses of other method analytes and surrogates that are components of the same solution. **D5317**

DISCUSSION—The internal standard shall be an analyte that is not a sample component.

internal standard—pure analyte(s) added to a solution in known amount(s) and used to measure the relative responses of other test method analytes and surrogates that are components of the same solution. **D5475**

DISCUSSION—The internal standard shall be an analyte that is not a sample component.

ion—charged portion of matter of atomic or molecular dimensions. **D6161**

ion chromatography—form of liquid chromatography in which ionic constituents are separated by ion exchange followed by a suitable detection means. **D5442**

ion chromatography—form of liquid chromatography in which ionic constituents are separated by ion exchange followed by a suitable detection means. **D4327**

ion chromatography, *n*—form of liquid chromatography in which ionic constituents are separated by ion exchange followed by a suitable detection means. **D5996**

ion chromatography—form of liquid chromatography in which ionic constituents are separated by ion exchange then detected by an appropriate detection means, typically conductance. **D6581**

ion exchange, *n*—a reversible process by which ions are interchanged between an insoluble material and a liquid with no substantial structural changes of the material.

ion exchange—reversible process by which ions are interchanged between a solid and a liquid with no substantial structural changes in the solid; ions removed from a liquid by chemical bonding to the media. **D6161**

ion-exchange capacity (volume basis), *n*—the number of milliequivalents of exchangeable ions per millilitre of backwashed and settled bed of ion-exchange material in its standard form.

ion-exchange capacity (volume basis)—number of milliequivalents of exchangeable ions per millilitre of backwashed and settled bed of ion-exchange material in its standard form. **D6161**

ion-exchange capacity (weight basis), *n*—the number of milliequivalents of exchangeable ions per dry gram of ion-exchange material in its standard form.

ion-exchange capacity (weight basis)—number of milliequivalents of exchangeable ions per dry gram of ion-exchange material in its standard form. **D6161**

ion-exchange material, *n*—a water insoluble material that has the ability to exchange reversibly certain ions in its structure, or attached to its surface as functional groups, with ions in a surrounding medium.

ion-exchange material—insoluble material that has the ability to exchange reversibly certain ions in its structure or attached to its surface as functional groups with ions in a surrounding medium. **D4548**

ion-exchange material—water insoluble material that has the ability to reversibly exchange ions in its structure, or attached to its surface as functional groups, with ions in a surrounding medium. **D6161**

ion-exchange membrane, *n*—an ion-exchange material in a form suitable for use as a barrier between two fluids.

ion-exchange membrane—ion-exchange material in a form suitable for use as a barrier between two fluids. **D6161**

ion-exchange particle, *n*—an ion-exchange material in the form of spheroids or granules with an average diameter less than 10 mm.

ion-exchange particle—ion-exchange material in the form of spheroids or granules. **D6161**

ion-exchange resin, *n*—a synthetic, organic-ion-exchange material.

ion-exchange resin—organic ion-exchange material substrate, usually synthetic. **D6161**

ion-exchange resin, *n*—synthetic organic ion-exchange material. **D4548**

ion-exchange resin—synthetic organic ion-exchange material. **D2187**

ion-selective electrode—electrochemical sensors, the potentials of which are linearly dependent on the logarithm of the activity of a given ion in solution. Such devices are distinct from systems that involve redox reactions.

DISCUSSION—The term *ion-specific electrode* is not recommended. The term *specific* implies that the electrode does not respond to additional ions. Since no electrode is truly specific for one ion, the term *ion-selective* is recommended as more appropriate. *Selective ion-sensitive electrode* is a little-used term to describe an ion-selective electrode. **IUPAC, D4127**

ionic strength—measure of the overall electrolytic potential of a solution, the strength of a solution based on both the concentrations and valencies of the ions present. **D6161**

ionic strength—weighted concentration of ions in solution, computed by multiplying the concentration (c) of each and every ion in solution by the corresponding square of the charge (Z) on the ion, summing and dividing by 2: ionic strength = $(1/2)\Sigma Z^2C$. Conductivity measurements give a rough estimate of ionic strength. The ionic strength (and to a lesser extent, the concentration of nonionic dissolved species) largely determines the activity coefficient of each ion in the solution. **D4127**

ionic-strength adjustment buffer—pH buffered solution of high ionic strength added to samples and calibration solutions before measurement in order to achieve identical ionic strength and hydrogen ion activity. In addition, complexing agents and other components are often added to minimize the effects of certain interferences. **IUPAC, D4127**

ionization—disassociation of molecules into charged particles (ions). **D6161**

isokinetic—condition of sampling, whereby liquid moves with no acceleration as it leaves the ambient flow and enters the sampler nozzle. **D4411**

isokinetic—conditions under which the direction and speed of the flowing water/sediment mixture are unchanged upon entering the nozzle of a suspended-sediment sampler. **D6326**

isokinetic sampling—to sample in such a way that the water-sediment mixture moves with no change in velocity as it leaves the ambient flow and enters the sampler intake. **D4410**

isokinetic sampling (representative sampling)—condition wherein the sample entering the port (tip) of the sampling nozzle has the same as the velocity vector (velocity and direction) as the stream being sampled. Isokinetic sampling ensures a representative sample of dissolved chemicals, solids, particles, chemicals absorbed on solid particles, and in the case of saturated and wet steam, water droplets are obtained. **D1066**

isopotential point—for a cell containing an ion-selective electrode and a reference electrode there is often a particular activity of the ion concerned for which the potential of the cell is independent of temperature. That activity, and the corresponding potential, define the isopotential point. The identity of the reference electrode, and the composition of the filling solution of the measuring electrode, must be specified. **IUPAC, D4127**

isotropic—having the same optical properties in all directions. **D1245**

jackson turbidity unit, JTU—unit of measure used with the jackson candle turbidimeter. **D6161**

jar test—laboratory procedure for the evaluation of a treatment to reduce dissolved, suspended colloidal and non settleable matter from water (see Practice D2035). **D6161**

JTU—see **Jackson turbidity unit**. **D6161**

junction potential—portion of the total observed potential developed between the sensing and reference electrodes that is formed at the liquid/liquid junction between the reference electrode filling solution and the sample solution. For accuracy, the junction potential should be as low and as constant as possible despite variations in the composition of the sample solution. Reference electrode filling solutions should be judiciously chosen to minimize liquid junction potential. **D4127**

kit (or test kit)—commercially packaged collection of components that is intended to simplify the analytical testing function. **D5463**

known value (KV)—known value of the analyte activity added to the verification sample. See Eq. 6 in 16.2.11. **D7282**

laboratory—single and completely independent analytical system with its own specific apparatus, source of reagents, set of internal standard-operating procedures, and so forth. Different laboratories will differ from each other in all of these aspects, regardless of how physically or organizationally close they may be to each other. **D2777**

laboratory analyzer—device that measures the chemical composition or a specific physical, chemical, or biological property of a sample. **D3864**

laboratory check sample for flow-through systems—see **calibrations**. **D3864**

laboratory control sample (LCS)—aliquot of solution with known concentrations of method analytes. It should be obtained from a reputable source or prepared at the laboratory from a separate source from the calibration standards. The LCS is analyzed using the same sample preparation, analytical method and QA/QC procedure used for test samples. Its purpose is to determine whether method performance is within accepted control limits. **D6800**

laboratory control sample (LCS)—sample of known concentration and composition that is taken through the entire test method to determine whether the analytical system is in control. The LCS must be prepared in the appropriate

ASTM-grade water from a material that sufficiently challenges the test. See Explanation 3 in Appendix X1 of Practice D5847. The LCS can be an IRM obtained from an outside source or prepared in-house from materials of known purity and concentration. Alternatively, the LCS may be a real sample of the matrix that is typically analyzed and which has been fully characterized. **D5847**

Discussion—The LCS may also be commonly known as a “quality control sample” or an “ongoing precision and recovery sample” (OPR).

laboratory control sample, *n*—solution with a certified concentration of barium. **D3986**

laboratory control sample, *n*—solution with certified hardness. **D1126**

laboratory control sample, *n*—solution with a certified concentration of silver. **D3866**

laboratory control sample, *n*—solution with a certified concentration of the antimony. **D3697**

laboratory control sample, *n*—solution with a certified concentration of the strontium. **D3920**

laboratory control sample, *n*—solution with the certified concentration(s) of the analytes. **D1687**

laboratory control sample, *n*—solution with the certified concentration(s) of the analytes. **D1976**

laboratory control sample—solution with the certified concentration(s) of the analytes. **D3372**

laboratory control sample (LCS)—solution with the certified concentration(s) of the analytes. **D4691**

laboratory duplicate (LD)—second aliquot of a sample should be analyzed using the same sample preparation, analytical method and QA/QC procedure used for test samples. Its purpose is to determine whether method performance is within accepted control limits. **D6800**

laboratory duplicates—two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analysis of laboratory duplicates gives an indication of the precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures. **D5790**

laboratory duplicates (LD 1 and LD 2)—two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of LD 1 and LD 2 give a measure of the precision associated with laboratory procedures but not with sample collection, preservation, or storage procedures. **D5175**

laboratory duplicates (LD1 and LD2)—two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of LD1 and LD2 provide a measure of the precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures. **D5315**

laboratory duplicates (LD 1 and LD 2)—two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of LD 1 and LD 2 provide a measure of the precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures. **D5812**

Discussion—Analysis of laboratory duplicates or spiked samples requires the collection of duplicate 1-L sample bottles or the use of 2-L sample containers.

laboratory duplicates (LD1 and LD2)—two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. **D5475**

Discussion—Analyses of LD1 and LD2 give a measure of the precision with laboratory procedures, but not with sample collection, preservation, or storage procedures.

laboratory-fortified blank—aliquot of reagent water to which known quantities of the test method analytes are added in the laboratory. The laboratory-fortified blank is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements at the required detection limit. **D5790**

laboratory fortified blank (LFB), *n*—aliquot of reagent water to which known quantities of the analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements. **D5175**

laboratory fortified blank (LFB)—aliquot of reagent water to which known quantities of the test method analytes are added in the laboratory. The LFB is analyzed exactly as a sample is; its purpose is to determine whether the methodology is in control and whether the laboratory is capable of making accurate and precise methods at the required test method detection limit. **D5315**

laboratory fortified blank (LFB)—aliquot of reagent water to which known quantities of analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements. **D5812**

laboratory fortified blank (LFB)—aliquot of water to which known quantities of the test method analytes are added in the laboratory. **D5475**

Discussion—The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements at the required method detection limit.

laboratory-fortified sample matrix—aliquot of an environmental sample to which known quantities of the test method analytes are added in the laboratory. The laboratory-fortified sample matrix is analyzed exactly like a sample, and its purpose is to determine whether or not the sample matrix or the addition of preservatives or dechlorinating agents to the sample contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot, and the measured values in the laboratory-fortified sample matrix must be corrected for background concentrations. **D5790**

laboratory fortified sample matrix (LFM), *n*—aliquot of an environmental sample to which known quantities of the analytes are added in the laboratory. The LFM is analyzed as a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations. **D5175**

laboratory-fortified sample matrix (LFM)—aliquot of an environmental sample to which known quantities of the test method analytes are added in the laboratory. The LFM is analyzed exactly as a sample is; its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations. **D5315**

laboratory fortified sample matrix (LFM)—aliquot of an environmental sample to which known quantities of analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations. **D5812**

laboratory fortified sample matrix (LFM)—aliquot of an environmental sample to which known quantities of the test method analytes are added in the laboratory. **D5475**

Discussion—The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The back-ground concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations.

laboratory organization—business entity that provides similar types of measurements from more than one workstation located in one or more laboratories, all of which operate under the same quality system. **D6689**

Discussion—Key aspects of a quality system are covered in ISO 17025 and include documenting procedures, application of statistical control to measurement processes and participation in proficiency testing.

laboratory performance check solution—solution of one or more compounds (analytes, surrogates, internal standard, or other test compounds) used to evaluate the performance of the instrument system with respect to a defined set of test method criteria. **D5790**

laboratory performance check solution (LPC)—solution of method analytes, surrogate compounds, and internal standards used to evaluate the performance of the instrument system with respect to a defined set of method criteria. **D5315**

laboratory performance check solution (LPC)—solution of method analytes, surrogate compounds, and internal standards used to evaluate the performance of the instrument system with respect to a defined set of test method criteria. **D5475**

laboratory reagent blank—aliquot of reagent water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents, internal standards, and surrogates that are used with other samples. The laboratory reagent blank is used to determine if test method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus. **D5790**

laboratory reagent blank (LRB)—aliquot of reagent water that is treated as a sample including exposure to all glassware, equipment, solvents, and reagents used with other samples. The LRB is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus. **D5175**

laboratory reagent blank (LRB)—aliquot of reagent water treated exactly the same as a sample, including being exposed to all glassware, equipment, solvents, reagents, internal standards, and surrogates that are used with other samples. The LRB is used to determine whether method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus. **D5315**

laboratory reagent blank (LRB)—aliquot of reagent water that is treated exactly like a sample, including exposure to all glassware, equipment, solvents, and reagents that are used with other samples. The LRB is used to determine whether method analytes or other interferences are present in the laboratory environment, reagents, or apparatus. **D5812**

laboratory reagent blank (LRB)—aliquot of water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents, internal standards, and surrogates that are used with other samples. **D5475**

Discussion—The LRB is used to determine if test method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

lag deposits—larger and heavier particles that are sorted out and left behind in stream channels. **D4410**

lag time—see **response time**. **D3864**

Langelier Saturation Index—index calculated from total dissolved solids, calcium concentration, total alkalinity, pH, and solution temperature that shows the tendency of a water solution to precipitate or dissolve calcium carbonate. **D3739**

langelier saturation index—see **LSI**. **D6161**

Langmuir-Blodgett (LB) membrane—synthetic membrane formed by sequential depositing of one or more monolayers of surface active component onto a porous support. **D6161**

large water bodies—water areas large enough to require use of electronic horizontal positioning devices. **D4581**

lateral accretion deposits—see **point bar**. **D4410**

lateral dispersion—process of disseminating the dye within a river water's horizontal axis perpendicular to its longitudinal axis. The completion of this process is dependent on the width of the river and velocity variations. **D5613**

LB—see **Langmuir-Blodgett (LB) membrane**. **D6161**

leading edge—first detectable dye concentration observed at a sampling site. **D5613**

leaf—sandwich layer of flat-sheet membrane/product channel spacer/flat-sheet membrane, glued together on the sides and across the outer end in a spiral wound element. **D6161**

leak—bypassing of the intact membrane from the feed side to the permeate side. **D3923**

length (L)—length of bridge abutment in direction of flow. Subscripts or symbols identify other lengths as follows: **D5129**

L_d = length of dikes,
L_w = distance from approach section to upstream side of contraction,
U = length of projection of abutment beyond wingwall junction, and
X = horizontal distance from the intersection of the abutment and embankment slopes to the location on upstream embankment having the same elevation as the water surface at Section 1.

lethal dose 50—see **LD-50**. **D6161**

lime—$Ca(OH)_2$, calcium hydroxide, a common water treatment chemical. **D6161**

lime soda softening—use of lime and Na_2CO_3 for softening water. **D6161**

limestone—either calcite limestone ($CaCO_3$) or dolomitic limestone ($CaCO_3$-$MgCO_3$). **D6161**

limit of detection—calibration curve ordinarily has the shape shown in Fig. 4.

By analogy with definitions adopted in other fields, the limit of detection should be defined as the concentration for which, under the specified conditions, the potential *E* deviates from the average potential in region *I* by some arbitrary multiple of the standard error of a single measurement of the potential in region *I*.

In the present state of the art, and for the sake of practical convenience, a simple (and more convenient) definition is recommended at this time. The practical limit of detection may be taken as the activity (or concentration) of *A* at the point of intersection of the extrapolated linear segments of the calibration curve, as shown in Fig. 2. Since many factors affect the detection limit, the experimental conditions used should be reported, that is composition of the solution, the history and preconditioning of the electrode, stirring rate, and so forth. **IUPAC, D4127**

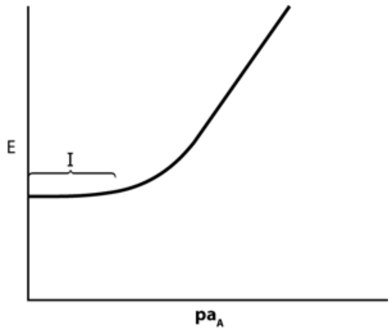

FIG. 4 Limit of Detection

limit of detection—concentration of twice the criterion of detection when it has been decided that the risk of making a Type II error is equal to a Type I error as described in Practice D4210. **D3864**

limiting current density—current density at which dramatic increases in resistance are observed such as in an ion exchange membrane system under the influence of an applied electric field between the upstream and downstream. Limiting current density is the point where liquid phase ionic diffusion rate limitations result in substantial depletion of ion concentrations at the membrane surface. **D6161**

limiting pore diameter—diameter of a circle having the same area as the smallest section of a given pore. **F316**

line of position (LOP)—locus of points established along a rangeline. **D5906**

line sample—see **samples**. **D3864**

line sample calibration—see **calibrations** . **D3864**

line sample validations—see **validations** . **D3864**

line sample verification—see **verification** . **D3864**

line velocity—downstream component of water velocity averaged over an acoustic path. **D5389**

linear alkyl benzene sulfonate (LAS)[6]—form of alkyl benzene sulfonate (ABS) in which the alkyl group is linear rather than a branched chain. See also Terminology D459.

linearity—extent to which an actual analyzer reading agrees with the reading predicted by a straight line drawn between upper and lower calibration points—generally zero and full-scale. (The maximum deviation from linearity is frequently expressed as a percentage of full scale.) **D3864**

liquid ion-exchange electrode membrane—see **membrane**. **D4127**

liquid junction potential—dc potential that appears at the point of contact between the reference electrode's salt bridge and the sample solution. Ideally this potential is near zero, and is stable. However, in low conductivity water it becomes larger by an unknown amount, and is a zero offset. As long

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[6] For a more complete discussion of terms relating to synthetic detergents and their significance, refer to "Syndets and Waste Disposal" by McKinney, R. E., *Sewage and Industrial Wastes*, Vol 29, Part 6, June 1957, pp. 654-666.

as it remains stable its effect can be minimized by "grab sample" calibration.[7] **D5128**

liquid junction potential—dc potential which appears at the point of contact between the reference electrode's salt bridge and the sample solution. Ideally this potential is near zero, and is stable. However, in low conductivity water it becomes larger by an unknown amount, and is a zero offset.[6] **D5464**

liquid junction potential—dc potential which appears at the point of contact between the reference electrode's salt bridge and the sample solution. Ideally this potential is near zero and is stable. However, in samples with extreme pH it becomes larger by an unknown amount and is a zero offset. **D6569**

log reduction value—logarithm to the base 10 of the ratio of the number of microorganisms in the challenge to the number of organisms in the filtrate. **F838**

log reduction value—see **LRV-Log Reduction Value**. **D6161**

log reduction value (LRV)—measure of the particle removal efficiency of the membrane system expressed as the log of the ratio of the particle concentration in the untreated and treated fluid. For example, a 10-fold reduction in particle concentration is an LRV of 1. The definition of LRV within this Standard is one of many definitions that are used within the industry. The user of this standard should use care as not to interchange this definition with other definitions that potentially exist. The USEPA applies the LRV definition to pathogens only. **D6908**

longitudinal dispersion—process of disseminating the dye within a river's waters along its upstream-downstream axis. This component of the dispersion process continues downstream indefinitely. **D5613**

long-throated flume—flume in which the prismatic throat is long enough relative to the head for essentially critical flow to develop on the crest. **D5390**

long-throated flume—flume in which the prismatic throat is long enough, relative to the head, for a region of essentially critical flow to develop on the crest. **D5640**

loose RO—see **nanofiltration**. **D6161**

LSI—see **langelier saturation index**. **D6161**

luminometer—instrument capable of measuring light emitted during a luminescent reaction, over a wide range of wavelengths. **D6592**

m-value—negative slope of a curve plotting log flow versus log time. A measurement of the degrees of membrane compaction as a result of temperature, pressure, and time. **D6161**

manganese greensand—manganese dioxide coated greensand used as a filter medium for removal of manganese and iron. See **greensand**. **D6161**

manifold—enlarged pipe with connections available to the individual feed, brine, air and product ports. **D6161**

Manning's equation—Manning's equation for computing discharge for gradually varied flow is: **D5388**

$$Q = \frac{1.49}{n} A R^{2/3} S_f^{\,1/2}$$

where:

Q = discharge, ft^3/s (m^3/s);
n = Manning's roughness coefficient;
A = cross-section area, ft^2 (m^2);
R = hydraulic radius, ft, (m); and
S_f = friction slope, ft/ft (m/m).

mass chromatogram (see Discussion)—limited mass RGC, or mass chromatogram, represents the intensities of ion currents for only those ions having particular mass to charge ratios. It is a means of quickly scanning a complex RGC plot to locate peaks which could be specific compounds or types of compounds. However, a complete mass spectrum is required for tentative identification. **D4128**

DISCUSSION—There are several synonyms in current use for mass chromatogram. These include: mass fragmentogram, extracted ion current profile, and limited mass reconstructed gas chromatogram.

mass transfer coefficient (MTC)—mass (or volume) transfer through a membrane based on driving force. **D6161**

match—two criteria must be satisfied to verify a comparison of a sample component to a standard match: *(1)* elution of the sample component at the same retention time as the standard component as shown by co-injection or standard addition, and *(2)* correspondence of the sample component and the standard component mass spectrum. If co-elution of interfering components prohibits accurate assignment of the sample component retention time from the total ion chromatogram, the retention time should be assigned by using extracted ion current profiles for ions unique to the component of interest. To meet the second criteria, all ions present in the authentic mass spectra at a relative intensity greater than 10 % (whereas the most abundant ion in the spectrum equals 100 %) must be present in the sample spectrum; the relative intensities of these ions must agree within ±20 % between the standard and sample spectra. (As an example, for an ion with an abundance of 50 % in the standard spectra, the corresponding sample abundance must be between 30 % and 70 %.) However, there may be additional peaks in the sample mass spectrum caused by co-eluting interfering components that are not present in the reference mass spectrum. **D4128**

material blank—sample composed of construction materials such as those used in well installation. Well development, pump and flow testing, and slurry wall construction. Examples of these materials are bentonite, sand, drilling fluids, and source and purge water. This blank documents the contamination resulting from usage of the construction materials. **D5612**

material safety data sheet—federally mandated, safety related document that must be made available to kit chemistry users. **D5463**

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[7] Bates, R. G., *Determination of pH, Theory and Practice*, John J. Wiley and Sons, Chapter 3, pp. 31-38.

materials of natural origin—chemically unmodified packaging materials and constituents of natural origin, such as wood, wood fiber, cotton fiber, starch, paper pulp or jute. **D6888**

matrix, *n*—in the analysis of water, in the material being analyzed, the aggregate of constituents other than the target analyte and the unique physical, chemical, and biological characteristics of the material, of concern for their potential impact on analytical precision and bias.

DISCUSSION—This term is often used to specify the origin of a sample. It is preferable to use the term "source" to identify the origin of a sample.

matrix, *n*—substance in which the analyte or property exists.

matrix—sample contents other than the target analyte. **D5463**

matrix spike (MS)—addition of a known concentration of analyte to a routine sample representing a specific matrix for the purpose of evaluating interference from matrix components. (See Guide D5810.) **D5847**

matrix spike, *n*—quantity (mass) of a component (analyte) of interest which is added to a sample (matrix) in order to test bias as measured by recovery (of that component under specific analytical conditions) and reported as percent recovery (*P*). **D5788**

matrix spike, *n*—quantity (mass) of a component (analyte) of interest that is added to a sample (matrix) in order to test the bias as measured by recovery (of that component under specific analytical conditions) and reported as percent recovery (*P*). **D5810**

matrix spike (MS)—second aliquot of a sample to which known concentrations of target analyte(s) are added in the laboratory and should be analyzed using the same sample preparation and analytical method used for test samples. Its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentration of the matrix must be determined in a separate aliquot and the measured values in the MS corrected for the concentrations found. Recommended spike levels are listed in Annex Table A1.3 of Practice D6800. **D6800**

maximum contaminant level—see **MCL.** **D6161**

maximum deviation—maximum error associated with a report value, at a specified confidence level, for a given concentration of a given element, determined by a specific method, throughout a laboratory organization. **D6689**

maximum holding time—maximum period of time during which a properly preserved sample can be stored before such degradation of the constituent of interest or change in sample matrix occurs that the systematic error exceeds the 99 % confidence interval (not to exceed 15 %) of the test calculated around the mean concentration found at zero time. **D4841**

maximum transit rate—maximum speed at which the sampler can be lowered and raised in the sampling vertical and still have the sample collected isokinetically. **D4410**

maximum transit rate—maximum speed at which the sampler can be lowered and raised in the sampling vertical and still have the sample collected isokinetically. **D6326**

mean and standard deviation—see Practice D4375. **D7282**

mean ionic activity coefficient—*for a salt that is composed of two monovalent ions*, the geometric mean of the individual ionic activity coefficients. (The geometric mean is obtained, in this case, by multiplying the two individual ionic activity coefficients and then taking the square root.) It is important because, unlike individual ionic activity coefficients, it can be measured by a variety of techniques, such as freezing point depression and vapor pressure, as well as by paired sensing electrodes. **D4127**

measured sediment load—that part of the total sediment discharge that can be measured with available suspended-sediment samplers; does not include bed-load discharge and suspended sediment discharge very near the bed. **D4410**

measured value (MV)—measured value of the verification sample. See Eq. 4 in 16.2.9. **D7282**

measurement, *n*—set of operations having the object of determining a numeric value or non-numeric characteristic.

measurement—determining the value of a characteristic within a representative sample or in situ determinations of selected components of riverine, lacustrine, or estuarine systems. **D6145**

measurement—determining the values of a characteristic within a sample or in situ. **D5851**

measurement plane—plane formed by two or more parallel acoustic paths of different elevations. **D5389**

measurement quality objective, *n*—the precision, accuracy, and detection requirements for measurement data, based on the intended use of that data.

measurement quality objective (MQO)—quantitative or qualitative statement of a performance objective or requirement for a particular method performance characteristic. **D7282**

measurement quality objectives—model used by the laboratory organization to specify the maximum error associated with a report value, at a specified confidence level. **D6689**

measurement traceability, *n*—property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.

NOTE 4—The concept is often expressed by the adjective *traceable*.

NOTE 5—The unbroken chain of comparisons is called a *traceability chain*.

mechanical analysis—determination of the particle-size distribution of a sample by mechanical separation. **D4410**

median diameter—grain diameter such that half of the sediment by mass is composed of particles of larger size and half by mass is composed of particles of smaller size; commonly denoted by the symbol “D_{50}”. **D4410**

megohm—unit of measurement of water purity by electrical resistance; One million ohms; reciprocal of conductivity. See **microsiemens, ohm**. **D6161**

membrane—engineered thin semipermeable film which serves as a barrier permitting the passage of materials only up to a certain size, shape, or electro-chemical character. Membranes are used as the separation agent in reverse osmosis, electrodialysis, ultrafiltration, nanofiltration, and microfiltration, as disc filters in laboratories, and as pleated filter cartridges, particularly for microfiltration. **D6161**

membrane—thin space of material covering a structure of separating solutions and permitting selection transport of a chemical species between the two solutions. **D4127**

*crystal membrane or solid-state electrode membrane—*a thin single or mixed crystal that is an ionic conductor and that separates the internal reference element or internal reference solution from the sample solution. **D4127**

*gas electrode membrane—*a plastic film, permeable to gases but impermeable to water, separating the electrode from the simple solution. **D4127**

*liquid ion-exchange electrode membrane—*a porous plastic disk, permeable to the ion exchanger, and impermeable to water, which allows the ion exchanger to contact the sample solution and separates the internal filling solution from the sample. **D4127**

membrane area—area available in contact with the feed water. **D6161**

membrane compaction—compression of membrane structure due to a pressure difference across its thickness. See **compaction**. **D6161**

membrane conditioning (pretreatment)—process carried out on a membrane after completion of its preparation and prior to its use in a separation application such as thermal annealing. **D6161**

membrane configuration—design and shape of a given membrane element (cartridge) such as tubular, spiral wound or hollow fiber. **D6161**

membrane distillation—distillation process in which the fluid and gas phases are separated by a porous membrane. **D6161**

membrane element—bundle of spiral membrane envelopes or hollow fiber membranes bound together as a discrete entity. **D6161**

membrane filter, *n*—a thin, nonfibrous filtration medium for fluids, with mean pore size larger than 0.01 µm in diameter, with which particles larger than the rated pore size are retained at or near the delivery surface.

membrane filter—geometrically regular porous matrix; removes particles above pore size rating by physical size exclusion. **D6161**

membrane module—manifold assembly containing one or more membranes to separate the streams of feed, permeate and retenate (brine). See Fig. 2 of Terminology D6161. **D6161**

membrane partition (distribution) coefficient—parameter equal to the equilibrium concentration of a component in a membrane divided by the corresponding equilibrium concentration of the component in the external phase in contact with the membrane surface. **D6161**

membrane physical ageing—change in the transport properties of a membrane over a period of time due to physical chemical structural alterations. **D6161**

membrane post-treatment—process carried out on a membrane after its essential structure has been formed but prior to its exposure to an actual feed stream. **D6161**

membrane reactor—device for simultaneously carrying out a reaction and membrane-based separation in the same physical enclosure. **D6161**

membrane salt passage—SP_m is the concentration of a compound in the permeate related to its average concentration on the feed/concentrate side. (See **B-value**.) **D6161**

membrane softening—use of crossflow membrane to substantially reduce hardness ions in water. See **nanofiltration** . **D6161**

membrane system—refers to the membrane hardware installation including the membrane, membrane housings, interconnecting plumbing, seals and valves. The membrane can be any membrane with a pore size less than about 1 µm. **D6908**

metadata—ancillary data that describe the natural conditions under which an environmental data value is measured, the purpose for collection, the methods and standards used, and the organization responsible. **D5851**

metal cyanide complex—negatively charged ionic complex consisting of one or more cyanide ions bound to a single transition metal cation. Also referred to as metal-complexed cyanides , these complexes have the general formula: **D6994**

$$[M(CN)_b]^{x-}$$

where:

M = transition metal cation,
b = number of cyanide groups, and
x = ionic charge of the transition metal complex.

DISCUSSION—Metal cyanide complexes are relatively stable and require moderate to highly acidic conditions in order to dissociate and form free cyanide. Based on their stability, metal cyanide complexes are divided into two categories: “weak metal cyanide complexes” and “strong metal cyanide complexes.” Examples of strong metal cyanide complexes include the iron cyanide complexes prevalent in many cyanide containing industrial wastewaters. The iron cyanide complexes are considered to be among the most stable and least toxic forms of cyanide. Refer to Guide D6696 for a more detailed discussion of aqueous cyanide species.

Discussion—The metal cyanide complexes can form salts with a variety of alkali and transition metal cations. These alkali metal cyanide complex salts are soluble under alkaline conditions.[8]

metalloid—an element which has properties that are intermediate between those of a metal and a nonmetal. **D7126**

method blank (blank)—reagent water (see Specification D1193) either known to be free of the constituent(s) of interest or containing only a low, known concentration of the constituent(s) of interest not exceeding five times the estimated detection limit. **D5847**

Discussion—The purpose of analysis of the method blank is to confirm that the reagents or analytical system, or both, do not contribute a measurable amount of the constituent(s) of interest during analysis of routine samples or, if they do, to determine what the contribution is.

method blank (MB)—suitable aliquots of reagent water are analyzed using the same sample preparation technique, analytical method and QA/QC procedure used for test samples. The MB is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents or apparatus. **D6800**

method detection limit (MDL)—determined as described in the U.S. Federal Register (see 40 CFR Part 136, Appendix B). **D6800**

method detection limit (MDL)—the minimum concentration of an analyte that can be identified, measured and reported with 99 % confidence that the analyte concentration is greater than zero. This confidence level is determined from analysis of a sample in a given matrix containing the analyte(s). **D5673**

microaerophilic bacteria—aerobic bacteria that require 2 to 10 % oxygen to grow. See **bacteria (microaerophiles)**. **D6161**

microfiltration (MF)—pressure driven membrane based separation process designed to remove particles and dissolved macromolecules in the approximate range of 0.05 to 2 µm. **D6161**

microbe—bacteria and other organisms that require the aid of a microscope to be seen. **D6161**

micron (micrometre)—a metric unit of measurement equivalent to 10^{-6} m, 10^{-4} cm. Symbol is µm. **D6161**

microorganism—see **microbe**. **D6161**

microsiemens—unit of measurement of water purity by electrical conductivity; one micromho; reciprocal of resistivity. See **megohm, ohm**. **D6161**

midpoint of peak width, *n*—CIE peaks typically are asymmetrical with the peak apex shifting with increasing concentration, and the peak apex may not be indicative of true analyte migration time. Midpoint of peak width is the midpoint between the analyte peak's start and stop integration, or the peak center of gravity. **D6508**

migration time, *n*—time required for a specific analyte to migrate through the capillary to the detector. The migration time in capillary ion electrophoresis is analogous to retention time in chromatography. **D6508**

milliequivalent per litre (meq/L)—weight-volume measurement obtained by dividing the concentration expressed in milligrams per litre by the equivalent weight of the substance or ion. If specific gravity is unity meq/L is the same as epm. **D6161**

milligram per litre (mg/L)—weight-volume measurement which expresses the concentration of a solute in milligrams per litre of solution. When specific gravity is unity mg/L = ppm. When specific gravity is not unity, mg/L divided by specific gravity of solution equals ppm. **D6161**

millions of gallons per day—see **MGD (MGPD)**. **D6161**

minimum determinability, *n*—the lowest value that can be determined within the stated precision of a method expressed quantitatively in the same dimension that is used for reporting results of the test.

mixed bed, *n*—a physical mixture of anion-exchange and cation-exchange materials.

mixed bed—physical mixture of anion-exchange material and cation-exchange material. **D2187**

mixed bed, *n*—physical mixture of anion-exchange material and cation-exchange material. **D4548**

mixed-bed—physical mixture of anion-exchange and cation-exchange materials. **D6161**

mixing—blending of two or more substances into one uniform mass. **D5613**

monitoring system—integrated equipment package comprising sampling system, analyzer, and data output equipment, required to perform water quality analysis automatically. **D3864**

analyzer—device that continually measures the specific physical, chemical, or biological property of a sample. **D3864**

data acquisition equipment—analog or digital devices for acquiring, processing, or recording, or a combination thereof, the output signals from the analyzer. **D3864**

sampling system—equipment necessary to deliver a continual representative sample to the analyzer. **D3864**

mobile carrier—distinct species moving freely within a membrane for the purpose of increasing the selective sorption and flux of a specific component in a feed stream relative to all other components. **D6161**

module—membrane element combined with the element's housing. Pressure vessel containing membrane element(s). **D6161**

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[8] Meeussen, J. C. L., Keizer, M. G., van Riemsdijk, W. H., and de Haan, F. A. M., "Dissolution Behavior of Iron Cyanide (Prussian Blue) in Contaminated Soils," *Environ. Sci. Technol.*, Vol 26, 1992, pp. 1832-1838; Meeussen, J. C. L., Keizer, W. H., and de Haan, F. A. M., "Chemical Stability and Decomposition Rate of Iron Cyanide Complexes in Soil Solutions," *Environ. Sci. Technol.*, Vol 26, 1992, pp. 511-516; and Ghosh, R. S., Dzombak, D. A, and Luthy, R. G., "Equilibrium Precipitation and Dissolution of Iron Cyanide Solids in Water," *Environ. Eng. Sci.*, Vol 16, 1999, pp. 293-313.

molality (m_1)—moles (gram molecular weight) of solute per 1000 g of solvent. **D6161**

molarity (m_1)—moles (gram molecular weight) of solute per litre of total solution. **D6161**

molecular weight cut off (MWCO)—rating of a membrane for the size of uncharged solutes it will reject a percent rejection coefficient for a given membrane. Also referred to as nominal molecular weight cut off (NMWCO). **D6161**

monitoring, *v*—the continual sampling, measuring, recording, and/or signaling, of the characteristics of water or waterborne material.

monochromator, *n*—device used for isolating a narrow portion of the spectrum by means of a grating or prism. **D4691**

morphologic surveys—surveys made to determine shape, depth, and volume of water bodies; also density, distribution, and volume of sediment and characteristics of watersheds contributing to the water body. **D4581**

most probable number (MPN)—statistical method for determining bacterial density based on the Poisson distribution. **D6503**

movable bed—stream bed made up of materials readily transportable by the stream flow. **D4410**

mudflow—mass of water-sediment mixture that, because of its high viscosity, moves more slowly than water. **D4410**

multimedia filter—filter with a bed consisting of three or more separate filter media. The coarsest, lowest density at the top and the finest, highest density at the bottom. **D6161**

multiple laboratories operational precision, *n*—the standard deviation of the results of a series of determinations by several laboratories employing the method with its associated sample container preparation, collection, splitting, preservation, transmission, and storage on a homogeneous sample.

multiple standard calibration—see **calibrations** . **D3864**

multiplexing—sharing of a common set of physical, optical, and/or electrical components across multiple system sample points. Two approaches of multiplexing are considered in this practice: sensor multiplexing and liquid multiplexing. Sensor multiplexing monitors a unique sample with a dedicated sensor. Sensors are linked to a centralized location, where data processing and the determinative measurement is performed. Liquid multiplexing uses a common instrument to measure multiple process sample streams in a sequential manor. Samples are fed to the common analyzer via a system of a manifold, valves and tubing. **D6908**

multi-plexing—sharing of a common set of physical optical and/or electrical components across multiple numbers of sensors. Each sensor is capable of monitoring a unique sample. Each sample is monitored separately and referenced against its unique baseline characteristics. **D6161**

Nanofiltration (NF)—crossflow process with pore sizes designed to remove selected salts and most organics above about 300 molecular weight range, sometimes referred to as loose RO. A pressure-driven membrane separation process in which particles and dissolved molecules smaller than about 2nm are rejected. **D6161**

nappe—curved sheet or jet of water overfalling the weir. **D5242**

nappe—curved sheet or jet of water overfalling a weir. **D5640**

nappe—curved sheet or jet of water overfalling the downstream end of the weir. **D5614**

National Geodetic Vertical Datum of 1929 (NGVD)—before 1973 known as mean sea level datum; a spheroidal datum in the conterminous United States and Canada that approximates mean sea level but does not necessarily agree with sea level at a specific location. **D5413**

National geodetic vertical datum (NGVD) of 1929—before 1973 known as mean sea level datum, a spheroidal datum in the conterminous United States and Canada that approximates mean sea level but does not necessarily agree with sea level at a specific location. **D5674**

national response plan (NRP), *n*—a publication by the US Department of Homeland Security which details actions to be taken, with appropriate responsibilities and authorities, in the event of a national-scale emergency. **D7316**

National Sanitation Foundation (International)—see **NSF (International)**. **D6161**

national standards body—an organization such as National Institute of Standards and Technology (NIST) or another national standards body that provides standards traceable to BIPM (Bureau International des Poids et Mesures (International Bureau of Weights and Measures)). Traceability is accomplished with guidance from ANSI N42.22. **D7282**

native water—water from a sampled medium; this water has been unaffected by sampling, handling, and preservation. **D4410**

natural organic matter—see **NOM**. **D6161**

natural levee—raised berms or crests above the flood-plain surface adjacent to the channel usually containing coarser materials deposited by flood flows. **D4410**

natural-matrix sediment—granular rock or earthy material that has been naturally deposited in or by a water body, in which the finer grained material encloses or fills the interstices between the larger grains or particles of sediment. **D5074**

naturally dispersed sample—sample having sediment that will not settle in about 4 h due to the character of fineness of particles or due to the nature of the dissolved constituents, or both. **D4410**

naturally occurring radioactive materials (NORM), *n*—radioactive materials which occur in nature, often concentrated by an industrial or chemical process.

DISCUSSION—NORM includes uranium (U) and thorium (Th) and their decay products as well as potassium-40 (^{40}K). U and Th are often found in earthen products and ^{40}K is often found in agricultural products. **D7316**

neat petroleum, *n*—oil visibly free of contaminants.

nebulizer, *n—as used in atomic absorption*, that portion of the burner system where the sample solution is converted into fine mist. **D4691**

nephelometer—device used to measure mainly the turbidity of water with results expressed in nephelometric turbidity units (NTU). Measures light at 90°. **D6161**

nephelometer—instrument that measures the amount of light scattered in a suspension. **D4410**

nephelometric turbidity measurement—measurement of light scatter from a sample in a direction that is at 90° with respect to the centerline of the incident light path. Units are NTU (Nephelometric Turbidity Units); when ISO 7027 technology is used, units are FNU (Formazin Nephelometric Units). **D6698**

nephelometric turbidity measurement—measurement of light scatter from a sample in a direction that is at 90° with respect to the centerline of the incident light path. Units are NTU (Nephelometric Turbidity Units); when ISO 7027 technology is used, units are in FNU (Formazin Nephelometric Units). **D6855**

Nernst equation—mathematical description of electrode behavior: **D4127**

$$E = E_x + 2.3\ RT/zF \log A$$

where:

E = total potential developed between the sensing and reference electrodes, V;
E_x = potential dependent on the choice of reference electrodes, V;
RT/zF = Nernst factor;
R = gas constants, 8.3143 V C/K·mol;
F = Faraday constant, 96 485 C/mol;
z = charge on the ion, including sign;
T = absolute temperature in Kelvin; and
A = activity of the ion to which the electrode is responding.

Nernst factor—term $2.3RT/nF$ in the Nernst equation, which is equal (at $T = 25°C$) to 59.16 mV when $n = 1$ and 29.58 mV when $n = 2$, and which includes the sign of the charge on the ion in the term n. The Nernst factor varies with temperature. This factor is often referred to as the *electrode slope*. **D4127**

Nernstian response—response of an ion-selective electrode is over a given range of activity (or concentration) in which a plot of the potential of such an electrode in conjunction with a reference electrode versus the logarithm of the ionic activity of a given species (a_A) is linear with a slope of $2.303 \times 10^3\ RT/z_A{}^F$ mV/decade ($59.16/z_A$ mV per unit of pa_A at 25°C). **IUPAC, D4127**

neutron, *n*—uncharged particle emitted during fission of an atomic nucleus. **D7316**

99 %/95 % Interlaboratory Detection Estimate (99 %/95 % IDE)—also denoted LD for Limit of Detection in accordance with Currie[9]—lowest concentration at which there is 90 % confidence that a single measurement from a laboratory selected from the population of qualified laboratories represented in an interlaboratory study will have a true detection probability of at least 95 % and a true nondetection probability of at least 99 %. **D6091**

noise, *n*—an extraneous electronic signal that effects baseline stability.

noise—extraneous electronic signal that affects baseline stability. **D2580**

noise—extraneous electronic signal which affects baseline stability. **D2908**

nominal diameter—diameter of a sphere that has the same volume as the sediment particle. Sometimes called *equivalent spherical diameter*. **D4410**

non-carbonate hardness—hardness caused by chlorides, sulfates, and nitrates of calcium and magnesium. **D6161**

noncohesive sediments—discrete particles, the movement of which for given erosive forces depends only upon the properties of shape, size, and density and upon the relative position of the particle with respect to surrounding particles. **D4410**

nonfilterable matter—also commonly known as total suspended solids. It is that particulate matter that is retained on a glass fiber filter and dried to a constant weight at 103 to 105°C, as determined by following the procedures outlined in this test method. **D5907**

nonfilterable matter, *n*—includes all matter that will pass through a 0.45-µm pore size filter and may be captured on anion, or cation ion exchange membranes, or both. **D6301**

nonionic polyelectrolyte—neutral charged polymers, usually polyacrylamides, used for coagulation/flocculation. See **polyelectrolytes**. **D6161**

nonpoint pollution—condition of water within a water body caused by the presence of undesirable materials from diffuse locations with no particular point of origin. **D6146**

nonpoint source pollution—condition of water within a water body caused by the presence of undesirable materials that enter the water system from diffuse locations with no particular point of origin. **D6145**

nonpolar material—oil and grease remaining in solution after contact with silica gel and measured by Test Method D7066. **D7066**

normal depth—uniform depth of flow for a given flowrate in a long open channel of specific shape, roughness, and slope. **D1941**

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[9] L. A. Currie, ed., *Detection in Analytical Chemistry—Importance, Theory, and Practice*, American Chemical Society, Chapter 1, 1988, p. 10.

normalization—converting actual data to a set of reference conditions to "standardize" operation to common base. **D6161**

notch—overflow section of a triangular weir or of a rectangular weir with side contractions. **D5242**

notch—overflow section of a triangular weir or of a rectangular weir with side contractions. **D5640**

nuclide, *n*—an atomic species characterized by the constitution of its nucleus, specifically by the number of protons and neutrons.

observation—fact duly noted and recorded. **D4375**

odor-intensity index, *n*—the number of times the concentration of the original sample is halved by addition of odor-free water to obtain the least definitely perceptible odor.

odor-intensity index—number of times the concentration of the original sample is halved by addition of odor-free water to obtain the least definitely perceptible odor. **D1292**

odor threshold number, *n*—the greatest dilution of the sample with odor-free water to yield the least definitely perceptible odor.

odor threshold number—greatest dilution of the sample with odor-free water to yield the least definitely perceptible odor. **D1292**

official method—analytical test method officially approved by an industry consensus organization such as ASTM, AOAC, or APHA or by a government entity such as the USEPA.[10]

ohm—unit of electric resistance equal to the resistance of a circuit in which a potential difference of one volt produces a current of one ampere. **D6161**

oil and grease—organic matter extracted from water or waste water and measured by Test Method D3921. **D3921**

oil and grease—organic matter extracted from water or wastewater and measured by Test Method D7066. **D7066**

oil and grease—the organic matter and other materials extracted by the solvent from water and wastewater and measured by these test methods. **D4281**

oily discharge—any release of oily contaminants into the environment that exceeds the allowable limit. **D6104**

oily discharge—any release of oily contaminants into the environment that exceeds the allowable limit. **D6157**

100(1-γ) %—confidence statistical tolerance limit for 100(1-δ) % of a population (also known as a one-sided statistical tolerance interval)—statistically determined limit that will, with 100(1-γ) % confidence, exceed (or fall below) 100(1-δ) % of the population (the 100(1-δ) % quantile). See Hahn and Meeker[11] for further explanation and tables of values. **D6091**

open-barrel sampler—in simplest form, a straight tube open at both ends. More elaborate open-barrel samplers have core catchers and check valves. **D4823**

operating cycle, *n*—an ion-exchange process consisting of a backwash, regeneration, rinse, and service run.

operating pressure—gage hydraulic pressure at which feedwater enters a device. **D6161**

operation and maintenance—see **O&M** . **D6161**

operator—usually the individual analyst within each laboratory who performs the test method throughout the collaborative study. However, for complicated test methods, the operator may be a team of individuals, each performing a specific function throughout the study. **D2777**

optical opacity—expression for the amount of light absorbed and scattered by a suspension reported as: extinction coefficient, or percent of incident light scattered in 90°, or percent of incident light transmitted at 180° over a standard distance, or all three. **D4410**

optimum concentration range, *n*—defined by limits expressed in concentration, below which scale expansion must be used and above which curve correction should be considered. The range varies with the characteristic concentration of the instrument and the operating conditions employed. **D4691**

original equipment manufacturer—see **OEM**. **D6161**

organic fouling—buildup of organic material in or on anion exchange resins by sorption during the service cycle and incomplete removal during regeneration. **D5042**

organic fouling—buildup of organic material in or on anion exchange resins by sorption during the service cycle and incomplete removal during normal regeneration. **D5217**

osmosis—spontaneous flow of water from a less concentrated solution to a more concentrated solution through a semipermeable membrane until chemical potential equilibrium is achieved. **D6161**

osmotic pressure—measurement of the potential energy difference between solutions on either side of a semipermeable membrane. In reverse osmosis and nanofiltration systems, the applied pressure must exceed the osmotic pressure to produce permeate. **D6161**

output—signal, usually electrical, that is related to the parametric measurement and is the intended input to data acquisition equipment. **D3864**

overland flow—rainfall runoff from a surface containing concentrated flow no larger than rill flow. **D4410**

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[10] Other documents: Official Methods of Analysis of the Association of Official Analytical Chemists, 15th Ed., AOAC, Arlington, VA, 1990. Changes are published in annual supplements. Standard Methods for the Examination of Water and Wastewater, 17th Ed., APHA, AWWA, and WPCF. Washington, DC, 1989. Methods for the Chemical Analysis of Water and Wastes, USEPA, Cincinnati, OH, March 1983.

[11] Hahn, G., and Meeker, W., *Statistical Intervals—A Guide for Practitioners*, Wiley, New York, 1991, pp. 34-36, 41-52.

oxbow lake—lake formed when a meander bend is cut off and its ends filled in, thus isolating the lake from the main channel of the stream. **D4410**

oxidation-reduction potential, *n*—the electromotive force developed by a noble metal electrode immersed in the water, referred to the standard hydrogen electrode.

oxidation-reduction potential—electromotive force developed by a noble metal electrode immersed in the water, referred to the standard hydrogen electrode. **D6161**

oxidation-reduction potential—electromotive force, Em, developed between a noble metal electrode and a standard reference electrode. This oxidation-reduction potential (ORP) is related to the solution composition by: **D1498**

$$E_m = E^o + 2.3\,\frac{RT}{nF}\log A_{ox}/A_{red}$$

where:

E_m = ORP;
E^o = constant that depends on the choice of reference electrodes;
F = Faraday constant;
R = gas constant;
T = absolute temperature, °C + 273.15;
n = number of electrons involved in process reaction; and
A_{ox} *and* A_{red} = activities of the reactants in the process.

oxygen demand, *n*—the amount of oxygen required, under the specified test conditions for the oxidation of waterborne organic and inorganic matter.

oxygen demand—amount of oxygen required for the oxidation of waterborne organic and inorganic matter under the specified test conditions. **D6161**

oxygen demand, *n*—amount of oxygen required, under specified test conditions for the oxidation of water-borne organic and inorganic matter. **D6697**

parameter—measurable quantity characteristic of a population. **D4375**

parametric system, *n*—a system that uses the response of a sensor to produce an output that is correlatable with the selected parameter.

partial digestion—dissolution of a sediment matrix such that quantitation will produce a measurement of less than 95 % of the constituent present in the sample. In such cases, recovery is operationally defined by the digestion procedure. **D4698**

partial pressure (of oxygen)—volume fraction of oxygen multiplied by the total pressure. The partial pressure of oxygen is the actual parameter detected by DO probes, whether in air or dissolved in water. **D5462**

particle count—method of particle size analysis in which the number of particles in the various size ranges are counted manually. **D4822**

particle sieve diameter—measure of the size of a sediment particle; the smallest standard sieve opening through which the particle will pass. For an elongated particle, it is a measure of its intermediate axis. **D4410**

particle size—diameter, usually the intermediate diameter, of a particle measured by settling, sieving, micrometric, or direct measurement methods. **D4822**

particle size—linear dimension, usually designated as diameter, used to characterize the size of a particle; the dimension may be determined by any of several different techniques, including sedimentation, sieving, micrometric measurement, or direct measurement. **D4410**

particle size distribution—relative amount of a sediment sample in a range of specific sizes in terms of percentages by mass, volume, or number, finer than a given particle size. **D4822**

particle-size distribution—relative amount of a sediment sample of a range in specific sizes in terms of percentages by mass finer than a given size, D, often shown on a semilog plot. **D4410**

particle-size, intermediate axis—size of a sediment particle determined by direct measurement of the axis normal to a plane representing the longest and shortest axes. **D4410**

particulate matter, *n*—that nonliquid matter, exclusive of gases, which is heterogeneously dispersed in water.

parts per billion (ppb)—measure of proportion by weight, equivalent to a unit weight of solute per billion unit weights of solution (approximate µg/L or mg/m^3 in dilute solutions). **D6161**

parts per million—mass unit of any substance in a million mass-units of the water-substance mixture. **D4410**

parts per million (ppm)—measure of proportion by weight, equivalent to a unit weight of solute per million unit weights of solution (approximate mg/L or g/m^3 in dilute solutions). **D6161**

parts per trillion (ppt)—measure of proportion by weight, equivalent to a unit weight of solute per trillion unit weights of solution (approximate g/L or µg/m^3 in dilute solutions). **D6161**

pass—treatment step or one of multiple treatment steps producing in a membrane system a product stream in a membrane system. **D6161**

path velocity—water velocity averaged over the acoustic path. **D5389**

peak—maximum dye concentration observed at a sampling site. **D5613**

penetrant (permeant)—entity from a phase in contact with one of the membrane surfaces that passes through the membrane. **D6161**

permanent hardness—total milliequivalents of hardness minus the milliequivalents of bicarbonate alkalinity in a water. See **hardness, alkalinity**. **D6161**

permeability—capacity of a rock (or other porous medium) to conduct liquid or gas. It is measured as the proportionality constant between flow velocity and hydraulic gradient. **D4520**

permeability—see **permeance**. **D6161**

permeability coefficient—parameter defined as a transport flux per unit transmembrane driving force per unit membrane thickness. **D6161**

permeable—allowing material to pass through. **D6161**

permeance (pressure normalized flux)—transport flux per unit transmembrane driving force. **D6161**

permeate—that portion of the feed stream which passes through a membrane. See Fig. 1 and Fig. 2 of Terminology D6161. **D6161**

permeate—that portion of the feed which passes through the membrane. **D5090**

permeate collector fabric—see **product (permeate) channel spacer**. **D6161**

permeate flow rate—quantity of permeate produced per unit time. **D5090**

permeate post-treatment—one or more final conditioning steps to improve permeate quality such as contacting with ion exchange resins to remove trace ions in the permeate. **D6161**

permeator—reverse osmosis module of the hollow fiber configuration consisting of membrane(s) and pressure vessel. **D6161**

pervaporation—separation process involving vaporization of one liquid from a mixture of two or more liquids, with the aid of a membrane which functions as a barrier to the liquid phase. The feed and brine streams are both liquid phase and the permeate emerges downstream face of the membrane as a vapor. **D6161**

petrographic—pertaining to the description of rocks or rocklike substances. Such description is usually in terms of morphology and optical properties. **D1245**

petroleum hydrocarbons—oil and grease remaining in solution after contact with silica gel and measured by Test Method D3921. **D3921**

pH, *n*—the negative logarithm of the hydrogen-ion activity in an aqueous solution, or, the logarithm of the reciprocal of the hydrogen-ion activity.

pH—negative logarithm of the effective hydrogen-ion activity, approximately $-\log_{10}[\mathrm{H}^+]$ where $[\mathrm{H}^+]$ is equivalents per litre concentration. **D6161**

pH, *n*—pH of an aqueous solution is derived from *E*, the electromotive force (emf) of the cell

glass electrode | *solution* ‖ *reference electrode*

Where the double vertical line represents a liquid junction) when the electrodes are immersed in the solution in the diagrammed position, and E_s is the electromotive force obtained when the electrodes are immersed in a reference buffer solution.

With the assigned pH of the reference buffer designated as pH_s, and E and E_s expressed in volts is the following:[12]

$$\mathrm{pH} = \mathrm{pH}_s + \frac{(E - E_s)F}{2.3026\,RT}$$

where:

F = Faraday,
R = gas constant, and
T = absolute temperature, t(°C) + 273.15.

The reciprocal of $F/2.3026\,RT$ is known as the slope of the electrode, and is the expected difference in observed voltage for two measurements one pH unit apart. **D1293**

pH electrode—ion-selective electrode, made of glass, that responds to hydrogen ion activity. Wide-range pH electrodes function over the activity range 1 M H^+ (pH 0) to 10^{-14} M H^+ (pH 14). pH electrodes may be subject to "acid error" in strongly acidic solutions and are also subject to "alkaline error" caused by response to sodium or other cations in basic solutions. **D4127**

pH/mV meter—instrument that measures and displays the voltage developed between a sensing electrode and a reference electrode placed in a solution, and can convert the voltage developed by a pH electrode to a corresponding pH value. **D4127**

analog pH/mV meter—instrument that displays voltages, pH units, or other concentration units by means of a needle pointer and scale. **D4127**

digital pH/mV meter—instrument with digital display of millivolts or pH units. Less operator error is associated with digital instruments since there is no need for interpolation and no risk of confusing scales. **D4127**

pH unit—tenfold change in hydrogen ion activity, expressed as the negative logarithm of the hydrogen ion activity. Thus a solution of pH 7 is 10^{-7} M in hydrogen ion activity, and a pH 8 solution is 10^{-8} M. The lower the solution pH, the more acid the solution. Occasionally, ion levels are expressed in p*X* units. Thus pNa = 3.5 is equivalent to $10^{-3.5}$ M Na^+, or 3.0×10^{-4} M. **D4127**

phase—state of matter, either solid, liquid, or gaseous. **D6161**

phenolic compounds, *n*—hydroxy derivatives of benzene and its condensed nuclei.

phenolic compounds—hydroxy derivatives of benzene and its condensed nuclei. **D2580**

phenolic compounds—hydroxy derivatives of benzene and its condensed nuclei. **D1783**

photodiode—semiconductor light sensor that generates a current or voltage when illuminated by light. **D6592**

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[12] Bates, R. G., *Determination of pH: Theory and Practice*, 2nd Ed., J. Wiley and Sons, New York, 1973, p. 29.

phosphonate, *n*—group of organophosphorus compounds typically used for mineral scale and corrosion control, as cleaning agents, dispersants, and chelants. Typical phosphonate compounds include, but are not limited to, the following phosphonic acid and their neutralized salts: Aminotri(methylenephosphonic acid), 1-hydroxyethylidene-1,1-diphosphonic acid, ethylenediaminetetra (methylenephosphonic acid), hexamethylenediaminetetra (methylenephosphonic acid), and diethylenetriaminepenta (methylenephosphonic acid). **D6501**

photodetector—a device for detecting and measuring the intensity of radiant energy. **D7126**

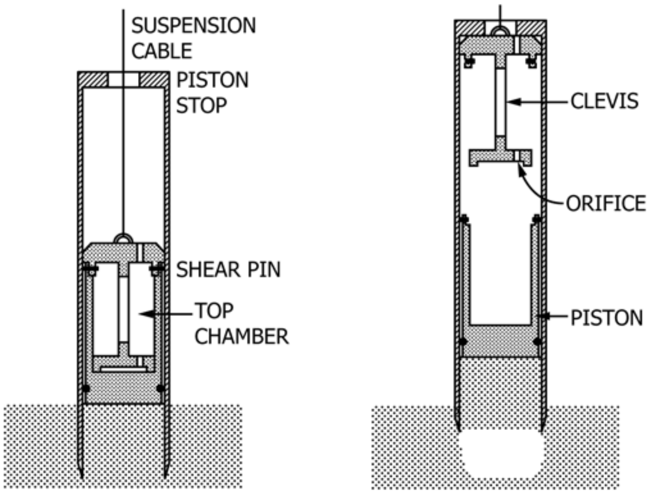
piston immobilizer—special coupling (see Fig. 5) that protects a core from disruptive forces that arise during sampler pull-out. Piston immobilizers are also called *split pistons* or *break-away pistons*. **D4823**

piston sampler—a core sampler (see Fig. 6) with a solid cylinder (piston) that seals against the inside walls of the core barrel. The piston remains fixed at the bed-surface elevation while the core barrel cuts down through the sediment. **D4823**

plane bed—sedimentary stream bed without elevations or depressions larger than the maximum size of the bed material. **D4410**

plant capacity—manufacture of product per unit time, expressed as m^3/day, m^3/h, GPD, MGD. **D6161**

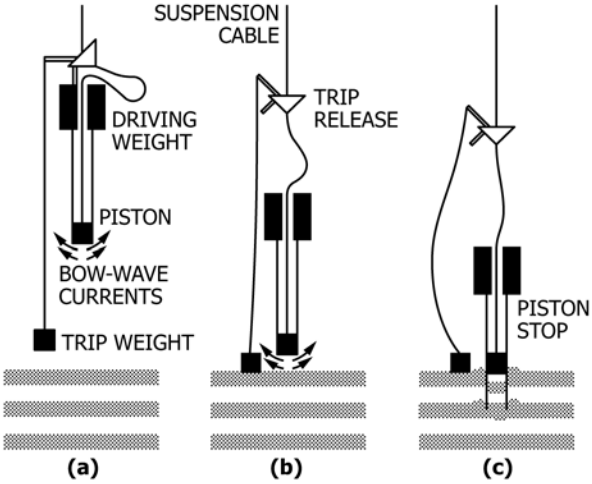
plaque—area of clearing caused by the cytopathic effects of virus on a susceptible cell monolayer. **D5244**



NOTE 1—During penetration the shear pins break but the flow-restricting orifice holds the clevis and piston together. During retrieval, water in the top chamber flows through the orifice and allows the piston and clevis to separate. Cable tension pulls the clevis up against the stop but friction locks the piston and core barrel together.

NOTE 2—Source: Kermabon, A., Blavier, P., Cortis, V., and Delauze, H., "The "Sphincter'' Corer: A Wide-Diameter Corer with Watertight Core-Catcher," *Marine Geology*, Vol 4, 1966, pp. 149-162.

FIG. 5 Piston Immobilizer



NOTE 1—(*a*) The sampler is lowered slowly through the water. (*b*) The sampler falls free when the trip weight contacts the bed. (*c*) The core barrel cuts downward but the piston remains stationary.

NOTE 2—Source: Schultheiss, P. J., "Geotechnical Properties of Deep Sea Sediments: A Critical Review of Measurement Techniques," Institute of Oceanographic Sciences, Wormley, U.K., Report No. 134, 1982.

FIG. 6 Operation of a Piston-Type Core Sampler

plaque, *n*—circular zone of clearing (lysis) of the visible growth of bacteria on a one or two layer agar plate, caused by the action of one or more bacteriophage. **D6734**

plaque-forming unit (PFU), *n*—term used to report the number of plaques formed on an agar culture plate previously seeded with a microorganism susceptible to a bacteriophage. Although theoretically, each plaque develops from the action of a single bacteriophage, microbiologists use the term, PFU, to acknowledge that a plaque may have been formed from the action of two or more bacteriophage in close proximity, which is indistinguishable from that formed by a single phage. **D6734**

plastic—material that contains as an essential ingredient one or more organic polymeric substances of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or processing into finished articles, can be shaped by flow. **D6888**

platform or similar device—flat, grooved or ungrooved piece of pyrolytic graphite inserted in the graphite tube on which the sample is placed.[13] **D3919**

plugging factor—see **fouling factor** and **SDI**. **D6161**

point bar—one or a series of low ridges, usually of coarse sediment, deposited on the inner (convex) side of a river bend. **D4410**

point-integrated sample—sample of water-sediment mixture collected at a relatively fixed point in accordance with the technique of point integration. A point-integrated sample is

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[13] L'Vov, B. V., "The Way Towards Absolute Method of Atomic Absorption Analysis," *Spectrochimica Acta, 33B*, 153, 1977.

discharge weighted. However, because the sample is obtained from a single point, the concentration of any component of the mixture that is transported exactly at stream velocity can be considered as either a spatial or a discharge-weighted concentration. Samples collected with instruments that instantaneously capture a quantity of water-sediment mixture are not true point-integrated samples. (See **point sample**.) **D4410**

point-integrating sediment sampler—instrument capable of collecting a water-sediment mixture isokinetically for a specified period of time by opening and closing under water; an instrument suitable for performing point integration. **D4410**

point-integrating suspended-sediment sampler—instrument capable of collecting water-sediment mixtures isokinetically. The sampling action can be turned on and off while the sampler intake is submerged so as to permit sampling for a specified period of time; hence, an instrument suitable for performing point or depth integration. **D4411**

point-integration—method of sampling at a fixed point whereby a water-sediment mixture is withdrawn isokinetically for a specified period of time. **D4411**

point-integration—method of sampling at a relatively fixed point whereby the water-sediment mixture is withdrawn isokinetically for a specified period of time. **D4410**

point sample—sample of water-sediment mixture taken at a single point, either with an instantaneous or a point-integrating sampler. **D4410**

point sample—water sample collected in such a manner as to be representative of the water mixture moving in the river in the vicinity of the sampler at a single point in a cross section. **D5613**

polarizability—inability of an electrode to reproduce a reading after a minute electrical current has been passed through the membrane. Glass pH electrodes are especially prone to polarization errors caused by small currents flowing from the pH meter input circuit and from static electrical charges built up as the electrodes are removed from the sample solution, or when the electrodes are wiped. **D4127**

polarization—see **concentration polarization**. **D6161**

polarographic systems—sensing probes and measuring instruments that include circuitry to control the operating voltage of the system, usually using a third (reference) electrode in the probe. **D5462**

pollution—condition caused by the presence of substances of such character and in such quantities that the quality of the environment is impaired. **D4410**

poly-aluminum chloride—see **PAC** and **PACI**. **D6161**

polydisperse, *adj*—size population, in this case of aerosol particles, composed of many different sizes; the opposite of monodisperse, a distribution of just one size. **D5544**

polyelectrolyte—synthetic (or natural) molecules, containing multiple ionic groups, used as coagulants and flocculants; available as anionic, cationic and nonionic. **D6161**

polymer—substance consisting of molecules characterized by the repetition (neglecting ends, branch junctions, other minor irregularities) of one or more types of monomeric units. **D6888**

polymers—substance consisting of molecules characterized by the repetition of one or more types of monomeric units. **D6161**

population—set of data that consists of all possible observations or values of a certain phenomenon. **D4375**

pore—opening or void in a membrane or filter matrix. **D6161**

pore size—capillary equivalent pore diameter. **F316**

pore volume—volid volume of a porous medium that can be saturated with the transmitted fluid. **D4520**

porosity—ratio, usually expressed as a percentage of the volume of voids of a given soil, rock mass, or other porous medium to the total volume of the soil, rock mass, or other porous medium. **D4520**

porosity—that portion of a membrane filter volume which is open to fluid flow, also known as void volume. **D6161**

porous—substances containing pores for fluids to pass as a result of an open physical structure. **D6161**

post treatment—addition of chemicals to the product or concentrate stream to make it suitable for the desired end use application. **D6161**

post treatment—process of applying chemical(s) to a membrane after formation to improve its performance. **D6161**

post treatment—utilization of equipment such as degasifiers to make the product or concentrate stream, or both, suitable for the desired end use application. **D6161**

potable water—term used to indicate water having a total dissolved solids content less than 500 mg/L with a sufficiently low level of biological agents, suspended solids, organic odor and color-generating components to be safe and palatable for drinking. **D6161**

potassium hydrogen phthalate (KHP)—$KHC_8H_4O_4$. **D5904**

potentiometric systems, *n*—those instrumental probes in which an electrical potential is generated and from which the final measurement is derived. **D888**

powdered activated carbon—see **PAC**. **D6161**

powdered ion-exchange material, *n*—ion-exchange resin that has undergone post-manufacturing size reduction to less than 300 µm. **D4266**

powdered ion exchange resin—ion exchange resin that has undergone post-manufacturing size reduction to less than 30 µm. **D4456**

precipitate—insoluble product of a chemical reaction of soluble compounds in water. **D6161**

precipitation titration—see **titration** . **D4127**

precision, *n*—the degree of agreement of repeated measurements of the same parameter expressed quantitatively as the standard deviation computed from the results of a series of controlled determinations.

precision—degree of agreement of repeated measurements of the same parameter expressed quantitatively as the standard deviation or as the 95 % confidence limits of the mean computed from the results of a series of controlled determinations. **D5392**

precision—degree of agreement of repeated measurements of the same property, expressed in terms of dispersion of test results about the arithmetical-mean result obtained by repetitive testing of a homogeneous sample under specified conditions. The precision of a test method is expressed quantitatively as the standard deviation computed from the results of a series of controlled determinations. **D2777**

precision—refers to how close a set of measurements can be repeated. (See Terminology D1129.) **D5906**

precoat—initial coating of the septum in a diatomaceous earth filter to provide initial straining medium. **D6161**

prepared value, *n*—best estimate of the concentration of a given analyte based upon the purity of raw materials and the method of preparation of the material. **D6362**

presence-absence, *n*—term used to indicate if enterococci is present in a water sample. It is a qualitative value, "yes" or "no" for reporting results. **D6503**

pressure filtration—filtration performed in an enclosed pressurized filter vessel. **D6161**

pressure reducer—a device designed to reduce pressure, and therefore control flow, of sample to a pressure level where it can be regulated easily. This device shall be located downstream of the cooled sample where cooling is required. **D3370**

pressure vessel—vessel containing one or more individual membrane elements and designed to withstand safely the hydraulic pressure driving the separation mechanism. **D6161**

pretreatment—processes such as chlorination, filtration, coagulation, clarification, acidification which may be used on feedwater ahead at membrane devices to improve quality, minimize scaling and corrosion potential, control biological activity. **D6161**

Price-type current meters—generic name for specific vertical axis meters with a rotating element consisting of six conical cups and constructed as described in Footnote 6.[14] **D4409**

primary device—device (in this case, the weir) that creates a hydrodynamic condition that can be sensed by the secondary instrument. **D5614**

primary dilution standard solution—solution of several analytes prepared in the laboratory from stock standard solutions and diluted as necessary to prepare calibration solutions and other necessary analyte solutions. **D5315**

primary dilution standard solution—solution of several analytes prepared in the laboratory from stock standard solutions and diluted as needed to prepare calibration solutions and other needed analyte solutions. **D5790**

primary instrument—device (in this case, a weir or flume) that creates a hydrodynamic condition that can be sensed by the secondary instrument. **D5640**

primary instrument—device (in this case, the flume) that creates a hydrodynamic condition that can be sensed by the secondary instrument. **D1941**

primary instrument—device (in this case, the flume) that creates a hydrodynamic condition that can be sensed by the secondary instrument. **D5390**

primary instrument—device (in this case, the weir) that creates a hydrodynamic condition that can be sensed by the secondary instrument. **D5242**

primary standard, *n*—standard that is designated or widely acknowledged as having the highest metrological qualities and whose value is accepted without reference to other standards of the same quantity.

NOTE 6—The concept of primary standard is equally valid for base quantities and derived quantities.

probability of false detection—false positive probability, denoted α, that a single measurement of a blank sample will result in a detection. (See Fig. 1 of Practice D6091.) This probability is often referred to as the Type 1 error probability and depends on the analyte, measurement system, analytical method, matrix, analyst, and measurement (recovery) threshold (measurement critical value) used to decide whether detection has occurred. This definition can be generalized to

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[14] Smoot, G. F., and Novak, C. E., "Calibration and Maintenance of Vertical-Axis Type Current Meters," *Techniques of Water Resources Investigations of the United States Geological Survey*, Book 8, Chapter B2, U.S. Government Printing Office, 1968; Buchanan, T. J., and Somers, W. P., "Discharge Measurements at Gaging Stations," *Techniques of Water Resources Investigations of the U.S. Geological Survey*, Book 8, Chapter A8, U.S. Government Printing Office, 1969; and U.S. Bureau of Reclamation, *Water Measurement Manual*, Second Edition, Revised Reprint, U.S. Government Printing Office, 1974.

refer to unwanted detection from a single measurement of a sample at any nonzero concentration of the analyte rather than a blank sample, provided that the nonzero concentration is less than the detection limit or IDE. **D6091**

probability of false nondetection—false negative probability, denoted β or β (*T*), that a single measurement of a sample containing a nonzero concentration, *T*, of an analyte of interest will result in a nondetection. This is the complement of the probability of true detection. (See Fig. 1 of Practice D6091.) This probability function is often referred to as the Type 2 error probability function, and it depends explicitly on the concentration (*T*). It depends implicitly on the analyte, measurement system, analytical method, matrix, analyst, and critical value for detection. **D6091**

probability of true detection—probability, denoted 1-β or 1-β (*T*), that a single measurement of a sample containing a nonzero concentration, *T*, of an analyte of interest will result in a detection. (See Fig. 1 of Practice D6091.) This probability is often referred to as statistical power or the power of detection, and it depends explicitly on the concentration (*T*). It depends implicitly on the analyte, measurement system, analytical method, matrix, analyst, and critical value for detection. **D6091**

probability of true nondetection—true negative probability, denoted 1-α, that a single measurement of a blank sample will result in a nondetection. This is the complement of the probability of false detection. (See Fig. 1 of Practice D6091.) This probability also depends on the analyte, measurement system, analytical method, matrix, analyst, and response threshold. The probability of true nondetection can be similarly generalized: it can apply to a single measurement of a sample at any nonzero concentration less than the detection limit or IDE.

probe calibration—see **calibrations**. **D3864**

procedure—any process involving sequential steps conducted to achieve a specific objective. **D5172**

product channel spacer (permeate carrier)—fabric or other material through which permeate water flows after it passes through the flat sheet membrane. **D6161**

product staging—process in which the permeate from one membrane module is used as the feed to another membrane module in order to further improve product quality. **D6161**

product tube—tube at the center of the spiral wound cartridge which collects permeate water. **D6161**

product water—purified water produced by a process. See **permeate**. **D6161**

productivity—flow rate of product water. **D6161**

projection—calculation, usually performed by a software package, which predicts the performance of parts or all of a water plant. **D6161**

Pseudomonas aeruginosa—aerobic, motile, gram negative rod that produces fluorescent pigments and pyocyanin. It is oxidase and caseinase positive, is able to grow at 42°C, is relatively resistant to many antibiotics, and may use acetamide. **D5246**

pulsed wave system—electronic positioning system in which the signal from the transmitting station to the reflecting station travels in an electromagnetic wave pulse. **D5906**

pumping sampler—device that draws the water-sediment mixture through a pipe or hose, the intake of which is placed at the desired sampling point in a stream. **D4410**

purgeable organic—any organic material that is removed from aqueous solution under the purging conditions described in Test Method D3871. **D3871**

purgeable organic—any organic material that is removed from aqueous solution under the purging conditions described in this test method. **D5790**

pyrogens—any substance capable of producing a fever in mammals. Often a bacterial endotoxin such as lipo polysaccaride generated by gram negative bacteria at destruction. Chemically and physically stable, pyrogens are not necessarily destroyed by conditions that kill bacteria. **D6161**

qualitative, *adj*—pertaining to a descriptive measurement, such as *(1)* taste or *(2)* presence/absence of a characteristic or component.

qualitative method, *n*—validated method that detects presence or absence of an analyte at a specified screening limit. **D6850**

quality assurance, *n*—in analytical laboratories, administrative efforts with the objective of assuring that proscribed quality-control elements are present and functioning as desired.

quality assurance project plan (QAPjP)—orderly assemblage of detailed procedures designed to produce data of sufficient quality to meet the DQOs for a specific data collection activity. **D5612**

quality assurance program plan (QAPP)—orderly assemblage of management policies, objectives, principles, and general procedures by which an organization involved in environmental data generation activities outlines how it intends to produce data of known quality. **D5612**

quality control, *n*—in the analysis of water, components of an analytical system, often present in the context of a batch, designed to assure that the system remains within acceptable performance limits.

quality control , *adj*—in the analysis of water, describing a component of an analytical system, often present in the context of a batch, designed to assure that the system remains within acceptable performance limits.

quality control reference solution (QCS)—solution with the certified concentration(s) of the analytes, prepared by an independent laboratory, and used for a verification of the instrument's calibration. **D5673**

quality control sample—sample matrix containing test method analytes or a solution of method analytes in a water-miscible solvent that is used to fortify reagent water or environmental samples. The quality control sample is obtained from a source external to the laboratory and is used to check laboratory performance with externally prepared test materials. **D5790**

quality control sample (QCS), *n*—sample containing analytes or a solution of analytes in a water-miscible solvent used to fortify reagent water or environmental samples. The QCS must be independent of solutions used to prepare standards and should be obtained from a source external to the laboratory. The QCS is used to check laboratory performance with externally prepared test materials. **D5175**

quality control sample (QCS)—sample matrix containing test method analytes or a solution of test method analytes in a water miscible solvent that is used to fortify water or environmental samples. The QCS is obtained from a source external to the laboratory and is used to check the laboratory performance with externally prepared test materials. **D5315**

quality control sample (QCS)—sample containing analytes or a solution of analytes in a water-miscible solvent that is used to fortify reagent water or environmental samples. The QCS must be independent of solutions used to prepare standards and should be obtained from a source external to the laboratory. The QCS is used to check laboratory performance with externally prepared test materials and is analyzed exactly like a sample. **D5812**

quality control sample (QCS)—sample matrix containing test method analytes or a solution of test method analytes in a water-miscible solvent which is used to fortify water or environmental samples. **D5475**

Discussion—The QCS is obtained from a source external to the laboratory, and is used to check laboratory performance with externally prepared test materials.

quality manual (QM)—a document stating the management policies, objectives, principles, organizational structure and authorities, accountability, and implementation of a laboratory's quality system, to assure the quality of its data.

Discussion—The quality manual shall document the process by which appropriate analytical methods are selected, their capability is evaluated and their performance is documented. The analytical methods manual and standard operating procedure manuals shall be part of but not necessarily included in the quality manual. The quality manual or standard operating procedures, or both, shall also include instructions that prescribe corrective action, for example, in the event of instrument check source (ICS), or instrument contamination check (ICC), or background subtraction count (BSC), or a combination thereof, failure. **D7282**

quantification, *n*—the process of performing a quantitative determination.

quanti-tray™—system for the quantification of enterococci. It consists of a sealer and trays which have multi-wells and can enumerate up to 2000 CFU/100 mL without dilution. **D6503**

quantitation limit, *n*—the lowest result that would be considered quantitative.

quantitation limit—minimum concentration or amount of a substance that can be measured with a known degree of confidence. **D5847**

quantitation limit (QL) or limit of quantitation (LQ)—numerical value, expressed in physical units or proportion, intended to represent the lowest level of reliable quantitation. The IQE is an example of a QL. **D6512**

quantitative, *adv*—having precision and bias levels that meet the intended use of the result.

quicklime—CaO, calcium oxide. **D6161**

R titration—see **titration**. **D4127**

radioactive daughter, *n*—the direct radioactive decay product of a radionuclide.

radioactive homogeneous water—water in which the radioactive material is uniformly dispersed throughout the volume of water sample and remains so until the measurement is completed or until the sample is evaporated or precipitating reagents are added to the sample. **D1890**

radioactivity, *n*—spontaneous nuclear disintegration with emission of corpuscular or electromagnetic radiation, or both.

radioactivity half-life, *n*—the unvarying characteristic period of time in which one half of the radioactive atoms of a given radionuclide decay.

radioisotopes, *n*—radionuclides having the same atomic number.

radiological emergency, *n*—an event which represents a significant threat to workers and the public due to the release or potential release of significant quantities of radioactive material. **D7316**

radiological incident, *n*—an unplanned event involving radiation or radioactive materials. **D7316**

range—distance to a point measured by physical, optical, or electronic means. **D5906**

range—the region defined by the minimum and maximum measurable limits. **D3864**

range line—imaginary, straight line extending across a body of water between fixed shore markings. **D5906**

range line markers—site poles or other identifiable objects used for positioning alignment on a range line. **D5906**

rangeability—spread between the maximum, *Qmax*, and minimum, *Qmin*, flow rates that a measuring instrument can usefully and reliably accommodate; this may be described as the ratio *Qmax/Qmin*. **D5640**

ranney collector—underground water collection system sometimes called ranney wells. **D6161**

rating curve, sediment—graph of the relationship between stream discharge and sediment discharge at a stream cross section. The graph is sometimes called a *sediment transport curve*. **D4410**

ratio turbidity measurement—measurement derived through the use of a nephelometric detector that serves as the primary detector and one or more other detectors used to compensate for variation in incident light fluctuation, stray light, instrument noise, or sample color. **D6698**

ratio turbidity measurement—measurement derived through the use of a nephelometric detector that serves as the primary detector and one or more other detectors used to compensate for variation in incident light fluctuation, stray light, instrument noise, or sample color. **D6855**

raw water—water that has not been treated. Untreated water from wells, surface sources, the sea or public water supplies. **D6161**

reagent, *n*—in the analysis of water, a solution crafted from chemicals to achieve formulation concentrations, to be utilized as the reaction materials in the performance of analyses.

DISCUSSION—In the performance of an analysis, both chemicals and reagents may be utilized.

reagent, *adj*—in the analysis of water, characterizing a solution containing the reactant chemicals employed in a specific analytical method, for example, "reagent blank."

reagent background—*in the measurement of radioactivity of water samples*, the counting rate observed when a sample is replaced by mock sample salts or by reagent chemicals used for chemical separations that contain no analyte. **D1890**

DISCUSSION—Reagent background varies with the reagent chemicals and analytical methods used and may vary with reagents from different manufacturers and from different processing lots.

reagent background, *n—in the measurement of radioactivity of water samples*, the counting rate observed when a sample is replaced by mock sample salts or by reagent chemicals used for chemical separations that contain no analyte.

DISCUSSION—Reagent background varies with the reagent chemicals and analytical methods used and may vary with reagents from different manufacturers and from different processing lots. **D7283**

reagent blank, *n*—volume of water containing the same matrix as the calibration standards, carried through the entire analytical procedure. **D1976**

reagent blank—volume of water containing the same matrix as the calibration standards, carried through the entire analytical procedure. **D5673**

reagent water—standard laboratory water purified to meet Specification D1193 Type I or better. **D6800**

reagent water—water that is used specifically as a component of an analytical measurement process and meets or exceeds the specifications for these waters. **D1193**

reconstructed gas chromatogram (see Discussion) (RGC)—RGC is the computer output representing either the summed intensities of all scanned ion intensities or a sample of the total current in the ion beam for each spectrum scan plotted against the corresponding spectrum number. Generally, it can be correlated with a flame ionization detector gas chromatogram. **D4128**

DISCUSSION—There are many synonyms in common use for RGC. These include: total ionization plot, total ionization current trace, reconstructed ion chromatogram, total ion current profile, and total ion chromatogram.

realtime, *n*—time that an event is occurring plus the response time; in this case, the response time is 3 to 5 min. Therefore, contamination is recorded 3 to 5 min after it occurs. **D5544**

recovery or conversion—ratio of permeate flow rate to total feed flow rate, expressed as a percent. **D5090**

recovery ratio—ratio A/B where "A" (see Fig. 1 under *check valve*) is the distance from the top of the sediment core to the bottom of the cutting bit and "B" is the distance from the surface of the parent deposit to the bottom of the cutting bit. **D4823**

recovery—Y (conversion)—ratio of product quantity (permeate stream flow rate) over the feed quantity (feed stream flow rate), given as fraction or in percent. **D6161**

redox (ORP) electrode—metallic electrode, usually platinum, used to follow reversible oxidation-reduction reactions. The potential developed between the redox electrode and reference electrode is a Nernstian function of the ratio of a species in two different oxidation states. Redox (ORP) electrodes are primarily used to determine a species in one oxidation state by titration with a reagent that oxidizes or reduces the species being determined. **D4127**

redox (ORP) potential—potential developed by a metallic electrode when placed in a solution containing a species in two different oxidation states. Some sensing electrodes, notably the early silver billet electrodes, act as redox (ORP) electrodes as well as sensing electrodes in certain types of solutions, leading to measurement errors. **D4127**

redox (ORP) titration—see **titration** . **D4127**

re-entrainment—condition in which the level of contamination of the effluent water of a separator containing oil is higher than the influent contamination level due to internal remixing. This definition usually applies to situations where clean water passes through a separator that already contains hydrocarbons stored within and atop the water so as to form an interface. **D6104**

re-entrainment—condition in which the level of contamination of the effluent water of a separator containing oil is higher than the influent contamination level due to internal remixing. This definition usually applies to situations where clean water passes through a separator that already contains Hydrocarbons stored within and atop the water so as to form an interface. **D6157**

reference sample, *n*—a matrix whose analytes of interest are of known or accepted concentration or property.

refill—replacement package of test kit components used in testing. **D5463**

reference electrode—that half of the electrode pair which provides a constant potential regardless of solution composition. The potential developed by the sensing electrode is measured against this reference potential to give an overall system potential which can be converted to the level of the species sensed. **D4127**

*calomel reference electrode—*reference electrode with an internal reference element of mercury/mercurous chloride. The filling solution is usually saturated KCl, saturated with mercurous chloride. Due to the hazards associated with mercury and the poorer thermal characteristics of this reference system, this electrode is not used as commonly as it once was. **D4127**

*ceramic junction reference electrode—*reference electrode in which the filling solution contacts the sample solution by means of a small porous ceramic junction. **D4127**

*double-junction reference electrode—*reference electrode that utilizes two separate filling solutions: an inner solution to provide a constant level of the ion sensed by the reference element and an outer filling solution that provides a low-junction potential liquid junction with the sample solution. The liquid junction potential between the inner and outer solutions is constant but not necessarily zero. **D4127**

*fiber or frit-type reference electrode—*reference electrode in which the filling solution contacts the sample solution by means of asbestos fibers or a small sintered piece of porous glass. **D4127**

*iodide/triiodide redox couple reference electrode—*reference electrode using iodide-triiodide solution as the internal reference system. Response is rapid because there is no solid phase as part of the equilibrium. Iodide/triiodide electrodes provide electrode potentials which are invariant with temperature, showing better thermal characteristics than calomel and silver/silver chloride electrodes. They are also useful for samples where leaching of silver or mercury metal is undesirable. **D4127**

*silver/silver chloride reference electrode—*reference electrode with an internal reference element of silver and silver chloride. The filling solution must contain chloride and be saturated with respect to silver chloride. Saturated KCl, 1 *M* KCl, and equitransferent filling solutions are all commonly used. Ag/AgCl electrodes have better thermal characteristics than calomel electrodes and are therefore preferable for specific ion measurements and precision pH measurements. **D4127**

*single-junction reference electrode—*reference electrode containing a single electrolyte. The electrolyte *(1)* provides a constant level of the ion sensed by the reversible reference element and *(2)* forms a low-junction potential liquid junction with the sample solution. **D4127**

*sleeve-type reference electrode—*reference electrode in which the filling solution contacts the sample solution by means of a narrow ring-shaped opening between a removable outer sleeve and the inner body of the electrode. The space between the body and sleeve widens above the tip to form a reservoir for the filling solution. Sleeve-type electrodes provide exceptionally stable junction potentials, making them especially suitable for specific ion and precision pH measurements. The junction area, due to its size and the high-leak rate of the internal filling solution, does not easily become clogged. **D4127**

reference compounds—these are authentic materials used to obtain mass spectra, gas chromatographic retention data, and response factors. The operator can prepare the standards or they can be prepared commercially. Quality control solutions should be prepared independently from the calibration solutions. Quantitation methods may also require surrogate spiking solutions to determine extraction efficiency. **D4128**

reference electrode filling solution—concentrated salt solution contacting the internal reference element and the sample solution. The composition of the filling solution is chosen to maximize stability of the potentials developed at the internal reference element/filling solution interface and the filling solution/sample junction. In general, filling solutions for AgCl internal construction reference electrodes should: *(1)* contain Cl^- and be saturated with AgCl to prevent the reference element from dissolving; *(2)* be at least ten times higher in total ionic strength than the sample; *(3)* be equitransferent; *(4)* not contain the ion being measured or an ion that interferes with the measurement. **D4127**

reference material producer—technically competent body (organization or firm, public or private) that is fully responsible for assigning the certified or other property values of the RMs it produces and supplies, which have been produced in accordance with ISO Guide 35, Practice D6362, and ISO Guide 31. **D6808**

reference sample—see **samples**. **D3864**

reference sample calibration—see **calibrations** . **D3864**

reference sample validations—see **validations** . **D3864**

reference sample verification—see **verification** . **D3864**

reference turbidity standard—standard that is synthesized reproducibly from traceable raw materials by the user. All other standards are traced back to this standard. The reference standard for turbidity is formazin. **D6698**

reference turbidity standard—standard that is synthesized reproducibly from traceable raw materials by a skilled analyst. All other standards are traced back to this standard. The reference standard for turbidity is formazin (see 9.2.2 of Test Method D6855). **D6855**

refractory material—that which cannot be oxidized completely under the test method conditions. **D4839**

refractory material—that which cannot be oxidized completely under the test method conditions. **D5904**

refractory material, *n*—that which cannot be oxidized completely under the test method conditions. **D5997**

refractory material—that which cannot be oxidized completely under the test method conditions. **D6317**

refrigeration—storage at 2 to 8°C. **D5246**

regeneration, *n*—that part of the operating cycle of an ion-exchange process in which a specific chemical solution is passed through the ion-exchange bed to prepare it for a service run.

regeneration—in ion exchange systems, the process of using either an acid, alkali, or salt solution to remove the accumulated cations or anions. The cation exchange resins take on hydrogen or sodium ions and the anion exchange resins take on hydroxide ions to restore themselves to the original hydrogen or hydroxide form when using strong acid and strong alkali solutions for the process. **D6161**

regeneration level, *n*—the total weight of regenerant used per unit quantity of ion-exchange material in a single regeneration.

regimen of a stream—characteristics of a stream with respect to flow duration, form of and changes in channel, capacity to transport sediment, and amount of material supplied for transportation. **D4410**

reject—portion of the feed stream that does not pass through the membrane. Concentrate stream from a desalination device (brine). **D6161**

rejection factor, R—parameter equal to one minus the ration of the concentration of a component on the downstream and upstream sides of a membrane. Concentrations may be either in the bulk (Apparent Rejection Factor or at the membrane surface (Intrinsic Rejection Factor). **D6161**

relative retention ratio, *n*—in chromatography, the column retention time of a component divided by the column retention time of a standard.

relative retention ratio—retention time of the unknown component divided by the retention time of the internal standard. **D2908**

relative standard deviation (RSD)—generic continuous monitoring parameter used to quantify the flucuation of the particulate light scatter baseline from a lasar-based incident light source. **D6161**

relative standard deviation (RSD)—generic continuous monitoring parameter used to quantify the fluctuation of the particulate light scatter baseline from a laser-based incident light source. As an example, the RSD may be calculated as the standard deviation divided by the average for a defined set of measurements that are acquired over a short period of time. The result is multiplied by 100 to express the value as a percentage and is then reported as % RSD. The sample monitoring frequency is typically in the range of 0.1 to 60 seconds. The RSD parameter is specific for laser-based particulate light-scatter techniques which includes particle counters and laser turbidimeters. The RSD is can be treated as an independent monitoring parameter. Other methods for RSD calculations may also be used. **D6908**

relative standard deviation (RSD)—relative standard deviation of the mean expressed as a percentage (also known as coefficient of variation). See Practice D4375 and 16.2.7. **D7282**

release—any sudden discharge of an oily substance from vessels that are specifically designed to store, contain, or transfer oily products such as storage tanks, pipelines, diked areas, and transfer equipment and which may appear in the influent to a separator. **D6104**

release—any sudden discharge of an oily substance from vessels that are specifically designed to store, contain, or transfer oily products such as storage tanks, pipelines, diked areas, and transfer equipment and which may appear in the influent to a separator. **D6157**

repeatability—measure of the precision of one analyzer to repeat its results on independent introduction of the same sample at different time intervals. **D3864**

repenetration—mishap that occurs when a core sampler collects two or more cores during one pass. **D4823**

reporting detection limit (RDL)—lowest concentration at which an analyte can be reliably quantified. The RDL represents the minimum concentration at which method performance becomes quantitative and is not subject to the degree of variation observed at concentrations between the MDL and the RDL. **D6800**

reporting limit, *n*—in the analysis of water, a concentration level for a specific analyte, a specific method, and a specific laboratory environment below which desired measurement certainty cannot be achieved.

Discussion—Typically, results below this level are censored or annotated to indicate the greater uncertainty of these results.

reproducibility—measure of the precision of different analyzers to repeat results on the same sample. **D3864**

reservoir—man-made impounded body of water or controlled lake where water is collected and stored. **D4410**

residue after evaporation, *n*—contaminants remaining after all water is evaporated; sometimes known as nonvolatile residue or total dissolved and suspended solids. **D5544**

resin dosage, *n*—weight of mixed resin applied per unit area of precoatable filter surface. This is expressed as dry pounds per square foot. **D4266**

resin floc—that voluminous aggregate formed when powdered anion-exchange resin and powdered cation-exchange resin are slurried together in an aqueous suspension. **D4266**

resin floc—that voluminous aggregate formed when powdered anion exchange resin and powdered cation exchange resin are slurried together in an aqueous suspension. **D4456**

resin particle—specially manufactured polymer beads used in the ion exchange process to remove dissolved salts from water. **D6161**

resin ratio, *n*—ratio of the weights of powdered cation-exchange resin to powdered anion-exchange resin used to prepare a resin slurry. If not otherwise indicated, it is understood to be the ratio of the dry resin weights. **D4266**

resistivity—property of a substance (in this case, water) to resist the flow of electricity; the measurement of that resistance; the inverse of conductivity. Measured by a resistivity monitor, and described in ohms·cm. **D6161**

resolution—ability of an analytical column to separate constituents under specific test conditions. **D4327**

resolution—ability of an analytical column to separate constituents under specific test conditions. **D5442**

resolution, *n—*ability of an analytical column to separate constituents under specific test conditions. **D5996**

resolution—ability of an analytical column to separate the method analytes under specific test conditions. **D6581**

resolution—ability of a column to separate constituents under specified test conditions. **D5257**

resource management system (RMS)—combination of conservation practices identified by the primary use of the land that will protect the soil resource base, maintain acceptable water quality, and maintain acceptable ecological and management levels for the selected resource use. **D6145**

response time—length of time necessary to obtain a stable electrode potential when the electrode is removed from one solution and placed in another of different concentration. Response time depends on the electrode type, the magnitude and direction of the concentration change, temperature, and the presence of electrode interferences, if any. After exposure to a change in concentration, values of apparent concentration asymptotically approach the true concentration. **D4127**

response time—time interval from a step change in the input or output reading to 90 % of the ultimate reading. **D3864**

lag time—time interval from a step change in input to the first corresponding change in output. **D3864**

total time—time interval from a step change in the input to a constant analyzer signal output. **D3864**

result, *n—*the outcome of a measurement.

retentate—see **concentrate**. **D6161**

retention time, *n—*the time that elapses from the introduction of the sample until the component peak maximum is reached.

retention time—time that elapses from the introduction of the sample until the component peak maximum is reached. **D2580**

retention time—time that elapses from the introduction of the sample until the peak maximum is reached. **D2908**

reverse osmosis (RO)—separation process in which one component of a solution is removed from another component by flowing the feed stream under pressure across a semipermeable membrane. RO removes ions based on electrochemical forces, colloids, and organics down to 150 molecular weight. May also be called hyperfiltration (see Terminology D6161). **D1193**

reverse osmosis (RO)—separation process in which one component of a solution is removed from another component by flowing the feed stream under pressure across a semipermeable membrane that causes selective movement of solvent against its osmotic pressure difference. RO removes ions based on electro chemical forces, colloids, and organics down to 150 molecular weight. May also be called hyperfiltration. **D6161**

reverse osmosis (RO)—the separation process where one component of a solution is removed from another component by flowing the feed stream under pressure across a semipermeable membrane. RO removes ions based on electrochemical forces, colloids, and organics down to 150 molecular weight. May also be called hyperfiltration (see Terminology D6161). **D1193**

Reynolds number—dimensionless number expressing the ratio of inertia forces to viscous forces in a moving fluid. The number is given by VLr/m where "V" is the fluid's velocity, "L" is a characteristic length or distance such as pipe diameter, "r" is the fluid's mass density, and "m" is the fluid's dynamic viscosity. **D4410**

Reynolds number—dimensionless number expressing the ratio of inertial to viscous forces in a flow. In a flume throat the pertinent Reynolds number is equal to the (critical) throat velocity multiplied by the throat length and divided by the kinematic viscosity of the water. **D5390**

Reynolds number—dimensionless number expressing the ratio of inertial to viscous forces in a flow. The pertinent Reynolds number on the weir crest is equal to the (critical) velocity multiplied by the crest length and divided by the kinematic viscosity of the water. **D5614**

rinse, *n—*that part of the operating cycle retention time, n—the time that elapses from the introduction of the sample until the component peak maximum is reached.

rinse, *n—*that part of the operating cycle of an ion exchange process in which a specified water is passed through a bed of the ion exchange material to remove the residual regenerant solution.

ripple—small, triangular-shaped bed forms that are similar to dunes but smaller. **D4410**

RO train—one of two or more complete RO installations, including membranes and high pressure pump operating in parallel. **D6161**

rock-water interaction—reaction between a porous rock and the injected water causing precipitation or swelling or release of fines (clays) within the rock. **D4520**

roughness coefficient (n)—Manning's *n* is used in the Manning equation. **D5243**

roughness coefficient (n)—or Manning's *n* is used in the Manning equation. Roughness coefficient or Manning's n is a measure of the resistance to flow in a channel. The factors that influence the magnitude of the resistance to flow include the character of the bed material, cross-section irregularities, depth of flow, vegetation, and alignment of the channel. A reasonable evaluation of the resistance to flow in a channel depends on the experience of the person selecting the coefficient and reference to texts and reports that contain values for similar stream and flow conditions.[15,16] **D5130**

roughness coefficient (n)—or Manning's *n* is used in the Manning equation. Roughness coefficient or Manning's n is a measure of the resistance to flow in a channel. The factors that influence the magnitude of the resistance to flow include the character of the bed material, cross-section irregularities, depth of flow, vegetation, and channel alignment. A reasonable evaluation of the resistance to flow in a channel depends on the experience of the person selecting the coefficient and reference to texts and reports that contain values for similar stream and flow conditions. **D5388**

roundness—ratio of the average radius of curvature of the individual edges of a particle to the radius of the maximum circle that can be inscribed within the particle. **D4410**

runoff—that part of precipitation appearing in surface streams. **D4410**

ryznar stability index (RSI)—index indicating if a water has a tendency to corrode or precipitate $CaCO_3$; equals 2* pH ($CaCO_3$ saturation) - pH (actual), RSI < 6.0 scale formation, > 7.0 corrosive. **D6161**

S titration—see **titration**. **D4127**

Safe Drinking Water Act of the United States—see **SDWA**D6161.

salinity, *n*—the concentration of dissolved matter found in water after bromide and iodide have been replaced by an equivalent quantity of chloride, all carbonate converted to oxide, and all organic matter destroyed.

salinity—concentration of inorganic salts in water. **D6161**

salt flux—amount of dissolved salt passing through the membrane, moles per day per square unit of membrane area. **D6161**

salt passage, SP—ratio of product (CP) and feed (CF) salt concentrations expressed as percent

$$SP = \frac{CP \times 100,}{CF}$$

the ratio of product (*CP*) and feed (*CF*) salt concentrations expressed as percent. **D6161**

salt rejection, SR—(100 - salt passage) expressed as percent: **D6161**

$$SR = 100\left(1 - \frac{CP}{CF}\right)$$

salt-splitting, *adj*—ability of anion-exchange or cation-exchange materials to exchange hydroxide or hydrogen ions respectively for the ions in neutral salts. **D4548**

sample, *n*—in analytical chemistry, a portion of a source material used to characterize, through analysis, the constituent or physical characteristics of the source.

Discussion—To avoid confusion, the term "sample" should be avoided for other materials such as processed samples; use terms like digestate or extract.

sample, *n*—a discreet portion of matrix intended to represent its source.

sample—portion of an environmental or source matrix that is collected and used to determine the characteristics of that matrix. **D4840**

sample—set of data from the population. **D4375**

sample, *adj*—in the analysis of water, relating to a sample, for example, "sample digestate."

sample chain-of-custody—process whereby a sample is maintained under physical possession or control during its entire life cycle, that is, from collection to disposal. **D4840**

sample chain-of-custody record—documentation providing evidence that physical possession or control was maintained during sample chain-of-custody. **D4840**

sample conditioning—reduction of the temperature and pressure of a flowing sample from process conditions to a controlled temperature and pressure, and maintenance of a constant flow rate both in incoming sample lines and through on-line analyzers. **D5540**

sample cooler—small heat exchanger designed to cool small streams of water or steam. **D5540**

sample cooler—small heat exchanger designed to provide cooling/condensing of small process sampling streams of water or steam. **D1066**

sample cooler—a small heat exchanger designed to provide primary or secondary cooling, or both, of small process sampling streams of water or steam. **D3370**

sample or population size—(*N* may be finite or infinite, but *N* and *n* are finite for all calculations). **D4375**

sample port—that point in the sampling system located between the sample conditioning unit and the analyzer or at the outlet of the analyzer from which samples for laboratory analysis are taken. **D3864**

sample pretreatment (pretreatment)—any handling, manipulation or treatment of a sample prior to subjecting the sample to the analysis. Examples are filtration, digestion, dilution, pH adjustment and extraction. **D5847**

sample site—study site where water samples are collected for determination of the tracer-concentration response curve. **D5613**

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[15] Benson, M. A., and Dalrymple, T., "General Field and Office Procedures for Indirect Discharge Measurements," Techniques of Water Resources Investigations, Book 3, Chapter , U.S. Geological Survey, 1967.

[16] Matthai, Howard F., "Measurement of Peak Discharge at Width Contractions by Indirect Methods," Techniques of Water Resources Investigations, Book 3, Chapter A4, U.S. Geological Survey, 1984.

sample test source (STS)—a sample, sample aliquant, or final product of a chemical or physical process prepared for the purpose of activity determination. **D7282**

sampled zone—that part of a transect presumed to be wholly represented by sediment samples. **D4410**

samples:—

line sample—process sample withdrawn from the sample port (3.2.16) during a period when the process stream flowing through the continuous analyzer is of uniform quality and the analyzer result displayed is essentially constant. Laboratory tests or results from a second continuous analyzer are obtained from each sample and compared with the continuous analyzer results obtained at the time of sampling. **D3864**

reference sample—can be a primary standard or a dilution of a primary standard of known reference value. The reference value must be established through multiple testing using an appropriate ASTM or other standard laboratory test method. Bulk quantities of the reference sample must be stored and handled to avoid contamination or degradation. One or more reference samples encompassing the range of the analyzer may be required. **D3864**

DISCUSSION—It is essential that the laboratory analyzer be checked carefully before these tests are performed to ensure compliance with the requirements of the standard test procedure. To further ensure proper operation it is recommended that a previously calibrated reference sample or an in-house control standard of known concentration be tested to validate the operations of the laboratory analyzer.

sampling, *v*—obtaining a representative portion of the material concerned.

sampling—removal of a portion of the water which may or may not be representative of the whole. This is not monitoring. **D5851**

sampling—withdrawal of a representative portion of the steam flowing in the boiler drum lead or pipeline by means of a sampling nozzle and the delivery of this portion of steam in a representative manner for analysis. **D1066**

sampling system—see **monitoring system**. **D3864**

sampling vertical—approximately vertical path from the water surface to the bottom along which one or more samples are collected to define various properties of the flow, such as sediment concentration. **D4410**

sampling vertical—approximately vertical path from water surface to the streambed. Along this path, samples are taken to define various properties of the flow such as sediment concentration or particle-size distribution. **D4411**

sand size (fluvial sediment)—0.062 to 2 mm in diameter. **D4410**

sanitization—reduction in the number of bacterial contaminants to safe levels. See **disinfection**. **D6161**

saturated steam—vapor whose temperature corresponds to the boiling water temperature at the particular existing pressure. **D1066**

saturation—point at which a solution contains enough of a dissolved solid, liquid, or gas so that no more will dissolve into the solution at a given temperature and pressure. **D6161**

scale, *n*—a deposit formed from solution directly upon a surface.

scale—a deposit formed from solution directly in place upon a surface. **D887**

scale inhibitor—chemical which inhibits the growth of microcrystals (inhibits precipitation of sparingly soluble salts). See **antiscalant**. **D6161**

scale of particle sizes—based on AGU (American Geophysical Union) scale. **D4410**

scaling—buildup of precipitated salts on a surface, such as membranes, pipes, tanks, or boiler condensate tubes. **D6161**

scour—enlargement of a flow section by the removal of the boundary material by the motion of a fluid. **D4410**

scow float—in-stream flat for depth sensing usually mounted on a hinged cantilever. **D1941**

scow float—in-stream float for depth sensing, usually mounted on a hinged cantilever. **D5390**

scow float—in-stream float for depth sensing, usually mounted on a hinged cantilever. **D5242**

screening limit, *n*—concentration of analyte that can be determined with a given certainty. The task group responsible for the method establishes the determination of the screening limit. **D6850**

screening method—method that is used to separate or categorize samples. **D6850**

DISCUSSION—An example would be a method that provides results that would be used to separate samples into those that contain an analyte above or below a specified action level.

screening procedure, *n*—any procedure performed to provide a preliminary evaluation of a sample characteristic in order to make a decision concerning the need for additional analysis(es).

DISCUSSION—The designation of a procedure as "screening" is a function of how a measurement(s) is applied. Any procedure can be "screening" depending on how the results are applied. Screening procedures are typically employed when there is a need to reduce costs, or when there are physical or time constraints, or both.

sea water—water with an approximate concentration of total dissolved solids ranging from 30 000 to 60 000 mg/L. See **brackish water, high brackish water**.

seasoning—process of conditioning laboratory glassware with the standard to be diluted to a lower value. The process reduces contamination and dilution errors. See Appendix X2 for the suggested procedure. **D6855**

seasoning—process of conditioning labware with the standard that will be diluted to a lower value. The process reduces contamination and dilution errors. See Appendix X2 of Test Method D6698 for suggested procedure. **D6698**

seawater reverse osmosis—see **SWRO**. **D6161**

secondary instrument—in this case, a device that measures the depth of flow (referenced to the crest) at an appropriate location upstream of the weir plate. The secondary instrument may also convert the measured depth to an indicated flowrate. **D5242**

secondary instrument—in this case, a device that measures the depth of flow at an appropriate location in the flume. The secondary instrument may also convert the measured depth to an indicated flow rate. **D1941**

secondary instrument—in this case, a device that measures the depth of flow (referenced to the throat elevation) at an appropriate location upstream of the flume. The secondary instrument may also convert this measured head to an indicated flowrate, or could totalize flowrate. **D5390**

secondary instrument—*in this case*, a device that measures the depth of flow (referenced to the crest elevation) at an appropriate location upstream of the weir. The secondary instrument may also convert this measured head to an indicated flow rate or could totalize flow rate. **D5614**

secondary instrument—in this case, a device that measures the head on the weir or flume; it may also convert this measured head to an indicated flowrate or could totalize the flow. **D5640**

sediment—see **fluvial sediment**. **D4410**

sediment concentration—*(a)* the ratio of the mass of dry sediment in a water-sediment mixture to the mass of the mixture or *(b)* the ratio of the mass of dry sediment in a water-sediment mixture to the volume of the mixture. As indicated by Table 1, the two ratios differ except at concentrations less than 8000 mg/L. **D3977**

sediment delivery—see **sediment yield**. **D4410**

sediment delivery ratio—ratio of sediment yield to gross erosion expressed in percent. **D4410**

sediment discharge—mass or volume of sediment passing a stream cross section in a unit of time. (The term may be qualified as suspended-sediment discharge, bedload discharge or total-sediment discharge.) **D4410**

sediment discharge—mass of sediment transported per unit of time. **D4411**

sediment load—general term that refers to material in suspension or in transport, or both; it is not synonymous with either discharge or concentration. (See **bed-load** and **suspended-sediment load**.) **D4410**

sediment particle—fragment of mineral or organic material in either a singular or aggregate state. **D4410**

sediment sample—quantity of water-sediment mixture or deposited sediment that is collected to represent some property or properties of the sampled medium. **D4410**

sediment transport rate—see **sediment discharge**. **D4410**

sedimentation—*(a)* consists of five fundamental processes: *(1)* weathering, *(2)* erosion, *(3)* transportation, *(4)* deposition, and *(5)* diagenesis, or consolidation into rock; *(b)* deposition of particles, especially in engineering. **D4410**

sedimentation—the precipitation or settling of insoluble materials from a suspension, either by gravity or artificially. For example, centrifuge, pressure. **D6161**

sedimentology—the scientific study of sediment, sedimentary rocks, and the processes by which they were formed. **D4410**

selective ion meter—an instrument that measures the potential of pH and ion-selective electrodes and displays it directly in concentration or activity units, such as pH, moles per litre, or milligrams per litre, on a logarithmic scale. Millivolt scales are provided for titrations and to verify proper electrode operation.

selective membrane skin—region, often located at the upstream face of an asymmetric membrane that forms a thin distinguishable layer primarily responsible for determining the permeability of the asymmetric membrane. **D6161**

selectivity constant—a measure of a liquid ion exchange or glass electrode's response to an interfering ion compared to its response to the ion being measured. The smaller the selectivity constant, the greater the electrode's preference for the ion being measured. The principal use of selectivity constants is in determining whether an electrode can be used in a particular application. Since selectivity constants vary somewhat with the ratio of the two ions, they should not be used to correct for errors caused by interferences. The term selectivity constant is sometimes mistakenly applied to solid-state electrodes (that are based on solubility product) to indicate the maximum allowable ratio of interference to ion being measured. Unlike liquid and glass electrodes, solid-state electrodes exhibit an all-or-nothing response to an interference, with no interference as long as the critical ratio is not exceeded. **D4127**

semipermeable membrane—a membrane which preferentially allows the passage of specific compounds while rejecting others. **D6161**

semi-quantitative method Type 1, *n*—method whose results are given in specified, discreet concentration ranges. **D6850**

DISCUSSION—Two types of examples of this would include semi-quantitative immunoassays or test strips. The cutoff concentration of the ranges has been predefined.

semi-quantitative method Type 2, *n*—method whose results are reported as a single number along with the stated uncertainty. **D6850**

DISCUSSION—The uncertainty will be reported as (standard deviation of x at a concentration of y). The values of x and y can be established from the Initial Demonstration of Performance study.

semi-volatile organic compound—an organic compound that can be separated from water by extraction, either liquid/liquid or solid phase, undergo volume adjustment, and be injected onto a GC. The compounds must elute from the column within its temperature range without alteration of the structure of the compound. **D4128**

sensitivity, *n*—sometimes referred to as the characteristic concentration. It is that concentration of the analyte which produces an absorbance of 0.0044 absorbance units (1 % absorption) when compared to the analytical blanks.[17,18,19] The characteristic concentration varies with instrumental conditions and atomization efficiency, as well as other factors and should be determined as conditions change. The characteristic concentration is determined by the following equation:

$$\text{characteristic concentration} = C \times 0.0044/A$$

where:

C = concentration of the analyte and
A = absorbance of analyte concentration used in the determination.

The characteristic concentration defines the slope of the calibration curve. **D4691**

separator—a flow through primary treatment device the primary purpose of which is to separate oil from water. **D6104**

separator—a flow through primary treatment device the primary purpose of which is to separate oil from water. **D6157**

separator column—the ion exchange column used to separate the ions of interest according to their retention characteristics prior to their detection. **D4327**

separator column—the ion exchange column used to separate the ions of interest according to their retention characteristics prior to their detection. **D5542**

service run, *n*—that part of the operating cycle of an ionexchange process in which a water is passed through a bed of the ion-exchange material in order to remove specific ions from the water or to exchange them for an equivalent amount of a specific ion from the bed material.

settling—the process of depositing, by gravity, matter suspended in water. **D4410**

shore markings—any object, natural or artificial, that can be used as a reference for maintaining boat alignment or establishing the boats position as it moves along it course. Examples include range line markers, sight poles, trees, power poles, land surface features, structures, and so forth. **D5906**

SI units—this is the International System of Units (SI) which is the modernized Metric System as described in IEEE/ ASTM SI 10-1997. A SI Quick Reference Guide is included at the back (in the "gray pages") of volumes 11.01 and 11.02. **D6568**

Siemens—a measure of electrical conductance in water, equivalent to a mho. See **Mho, Ohm**. **D6161**

signal conditioner, *n*—the component that receives the output from a sensor and processes it for subsequent use.

silt density index (SDI)—an index calculated from the rate of plugging of a 0.45-μm membrane filter. **D4189**

silt density index—see **SDI—siltdensity index**. **D6161**

silt size (fluvial sediment)—0.004 to 0.062 mm in diameter. **D4410**

siltation—see **deposition**. **D4410**

simulated weathering of waterborne oils by distillation— considers only the effect of evaporation, which likely is the most significant short-term weathering effect in the environment. **D3326**

simulated weathering of waterborne oils by evaporation— under ultraviolet light simulates the loss of light components on weathering, as well as some oxidative weathering. **D3326**

single and multiple solvent systems—a single-solvent system is a one-solution treatment. A multiple solvent system is a treatment using two or more solutions in sequence. **D5256**

single-operator operational precision, SOOP, *n*—the standard deviation of the results of a series of determinations by a single operator employing the method with its associated sample container preparation, collection, splitting, preservation, transmission, and storage on a homogeneous sample.

site poles—metal or wood poles used as a sighting rod. **D5906**

slime—biological deposits of gelatinous or filamentous matter. **D6161**

slip stream nephelometer—an on-line turbidimeter that determines the turbidity of a sample as the sample flows through a sampling chamber. The sample is drawn from the source into the turbidimeter, analyzed and then transported to drain. **D6698**

slope—the angle between the horizontal axis and the line formed by plotting electrode potentials against ion level on semilogarithmic graph paper. By analogy, slope has also come to be a measure of electrode response to the ion being detected. Theoretical Nernstian slope, which is temperature-dependent, is 59.16 mV at 25°C for a ten-fold change in the activity of a monovalent ion and 29.58 mV for a divalent ion. Less than theoretical slopes (that is, smaller millivolt changes per decade) are observed if potentials are plotted against concentration, if interferences are present, or if liquid electrodes need renewal. Greater than theoretical slopes are relatively rare and usually indicate that more than one electrode process is occurring. **D4127**

sloughs—a stagnant or sluggish channel of water in a flood plain. **D4410**

sludge, *n*—a water-formed sedimentary deposit.

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[17] Bennett, P. A., and Rothery, E., "Introducing Atomic Absorption Analysis," Varian Publication, Mulgrave, Australia, 1983.

[18] Price, W. J., "Spectrochemical Analysis by Atomic Absorption," John Wiley & Sons, New York, NY, 1983.

[19] VanLoon, J. C., "Analytical Atomic Absorption Spectroscopy—Selected Methods," Academic Press, New York, NY, 1980.

sludge—a water-formed sedimentary deposit. **D6161**

sludge—a water-formed sedimentary deposit. **D887**

sludge blanket—suspended bed of solids in a solids contact or sludge blanket clarifier. **D6161**

small water bodies—water areas that can be surveyed using stretched cables or visual triangulation for horizontal positioning. **D4581**

snap pack, *n*—a package containing Enterolert reagent for testing 100-mL sample either in the P/A format or quantitatively, that is, Quanti-Tray™ system). **D6503**

snapping cup—container provided for holding the sample and snapping tip of the vial. **D6530**

sodium bisulfite—see **SBS**. **D6161**

sodium cycle, *n*—the operation of a cation-exchange unit wherein the removal of specific cations from the influent water is accomplished by exchange with an equivalent amount of sodium ion from the exchange material.

sodium hexametaphosphate—see **NaHMP**. **D6161**

sodium metabisulfite—see **SMBS**. **D6161**

sodium triphospahte—see **STP**. **D6161**

sodium tripolyphosphate—see **STPP**. **D6161**

softener—water treatment equipment that uses a sodium based ion-exchange resin principally to remove cations as calcium and magnesium. **D6161**

softening—see **membrane softening**. **D6161**

sol-gel membrane formation—multistep process for making membranes by a reaction between two chemically multifunctional materials, dissolved in a solvent, that results in a network structure with solvent retained in the network followed by heat treatment to achieve a desired pore structure. **D6161**

solid solution—a homogeneous mixture of two or more components, in the solid state, retaining substantially the structure of one of the components. **D1245**

solids contact clarifier—water treating device used in lime softening, waste water treatment and coagulation processes. **D6161**

solubility product—$[M^+]\ ^a[X^-]^b/[MX]$ where the brackets indicate the concentrations of the components of the ionization equilibrium $M_aX_b \rightarrow aM^+ + bX$. For sparingly soluble salts [MX] is essentially unity. **D6161**

solutes—matter dissolved in a solvent. **D6161**

solution-diffusion—molecular-scale process in which penetrant is sorbed into the upstream membrane far from the external phase, moves by molecular diffusion in the membrane to the downstream face and leaves into the external gas, vapor or liquid phase in contact with the membrane. **D6161**

solvent—dimer/trimer of chlorotrifluoroethylene (S-316). **D7066**

solvent—here defined as water. **D6161**

solvent system—specified chemicals or combination of chemicals, that may include corrosion inhibitors, formulated to react with and remove deposits. **D5256**

solvent system—specified chemicals or combinations of chemicals, which may include corrosion inhibitors designed to react with and remove deposits. **D3263**

sonar, *n*—a method for detecting and locating objects submerged in water by means of the sound waves they reflect or produce. **D5073**

sorting—the process by which sedimentary particles are selectively separated from associated but dissimilar particles by flowing water. **D4410**

sound, *v*—to determine the depth of water.[20] **D5073**

sound—to determine the depth of water. **D6318**

sounding line—a rope or cable used for supporting a weight while the weight is lowered below the water surface to determine depth. **D5073**

sounding scroll—the chart record of an underwater cross section or profile of the bottom. **D6318**

sounding weight, *n*—a heavy object usually of lead, that may be bell-shaped, for use in still water and soft bottom materials or torpedo shaped with stabilizing fins, for use in flowing water. **D5073**

span drift—see **drift**. **D3864**

special nuclear material (SNM), *n*—plutonium, uranium-233, or uranium enriched in the isotopes uranium-233 or uranium-235 (USA definition). **D7316**

specific conductivity, *n*—direct electrolytic conductivity measurement of a power plant sample, usually dominated by treatment chemicals, such as ammonia or amines. **D6504**

specific flux—flux divided by net pressure driving force. See **permeance**. **D6161**

specific gravity—the ratio of the mass (density) of a sample material to the mass (density) of an equal volume of water at the same specified temperature. **D6161**

specific gravity—ratio of the mass of any volume of a substance to the mass of an equal volume of water at 4°C. **D4410**

specific weight (of sediment deposits)—dry weight of sediment solids per unit volume of deposit in place. Synonymous with **volume-weight**. **D4410**

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[20] Rantz, S. E., et al., "Measurement and Computation of Streamflow: Volume 1, Measurement of Stage and Discharge," U.S. Geological Survey Water Supply Paper 2175, 1982.

specificity—ability of a test method to select or distinguish, or both, the target bacteria in the same water sample; the specificity characteristic of the method is usually reported as the percent of false positive and false negative results. **D5392**

spectral bandwidth, *n*—related to the observed dispersion between absorption bands. It is expressed as the exit slit multiplied by the observed separation of two emission lines divided by the difference in wavelength between these lines. **D4691**

spectrophotometer, *n*—an instrument that provides the ratio, or a function of the ratio, of the radiant power of a beam as a function of spectral wavelength. **D4691**

sphericity—the ratio of the surface area of a hypothetical sphere of the same volume as the particle to the actual surface area of the particle. (A more convenient expression is the ratio of the diameter of a circle with an area equal to that of the projection of a grain when it rests on its larger face to the diameter of the smallest circle circumscribing this projection). (Shape factor). **D4410**

spike, *v*—the addition of a known amount of an analyte of known identity to a measured volume of a sample (from a specific matrix) to determine the efficiency with which the added analyte can be "recovered" from (measured in) that matrix by the analytical system after exposure to a specific portion of an analytical process. Matrix spiking is a process for accomplishing this. The precision and bias estimates from several trials under specific analytical conditions represent the measurement efficiency with which the analyte may be determined under these conditions. **D5788**

spike, *v*—the addition of a known amount of an analyte of known identity to a measured volume of a sample (from a specific matrix) to determine the efficiency with which the added analyte can be "recovered" from (measured in) that matrix by the analytical system after exposure to a specific portion of an analytical process. Matrix spiking is a process for accomplishing this. The precision and bias estimates from several trials under specific analytical conditions represent the measurement efficiency with which the analyte may be determined under these conditions. **D5810**

spike—an addition of a known quantity of a component of known identity to a known volume of a sample in order to determine the efficiency with which the added component is recovered. Spike components should be prepared from a different source than that used for calibration standards. Refer to Guide D5810 for guidance on spiking organics into aqueous samples.

spike—a small volume, high relative concentration aliquot of analyte added quantitatively to a split sample as a quality check. **D5463**

spiked blank (SB)—an aliquot of reagent water to which known concentrations of analyte(s) is added in the laboratory, using the same solution as used to prepare the matrix spike. The spike blank is analyzed using the same sample preparation, analytical method and QA/QC procedure used for test samples. The purpose of the spike blank is to determine whether method performance is within acceptable limits. The spike blank is also useful for troubleshooting matrix spike results that are outside the acceptance limits, by allowing the analyst to differentiate between spike solution and spiking technique problems and matrix interferences. Recommended spike levels are listed in Annex, Table A1.3. **D6800**

spiked sample, *n*—a sample portion into which a known amount of analyte has been added.

spiking solution—the solution in which one or more spikes are dissolved (along with any necessary preservatives). This solution acts as a carrier to provide ease of measurement and more rapid and thorough mixing of the spike into the sample, as compared to adding the spike as a pure compound. **D5788**

spiking solution—the solution in which one or more spikes are dissolved (along with any necessary preservatives). This solution acts as a carrier to provide ease of measurement and more rapid and thorough mixing of the spike into the sample, as compared to adding the spike as a pure compound. **D5810**

spiking solution—the standard solution added to the polarographic cell that is used to quantitate the sample. **D3557**

spin test—test performed to check the bearings of a current meter. This test is used primarily with vertical axis current meters. **D4409**

spiral wound cartridge—a crossflow membrane element design consisting of a product tube, flat membrane leaves, feed channel spacers, anti-telescoping devices, and brine (concentrate) seal. **D6161**

spiral wound membrane—a flat sheet membrane with one or more feed channel spacers and barrier layers, all of which are rolled into a spiral configuration. **D6161**

splay—deposits of flood debris, usually of sand, scattered on the flood plain. **D4410**

split sample—a sample that is split into sub-samples that are intended to have the same composition as the original sample. **D5463**

split sample—a single sample separated into two or more individual parts in a manner that each part is representative of the original sample. **D4410**

spores—*C. perfringens* produces single oval subterminal spores less than 1.0 µm in diameter during adverse conditions. Sporulation can also occur in the intestinal tract. The endospore that develops is a highly refractile body formed within the cell. Spores are notably resistant to heat, drying, and chemical disinfectants which would kill the vegetative forms of *C. perfringens*. This resistance to unfavorable conditions preserves the organisms for long periods of time. **D5916**

stadia—telescopic instrument equipment with horizontal hairs and used for measuring the vertical intercept on a graduated vertical rod held vertically and at some distance to and in front of the instrument. **D5906**

stage—a device or group of devices, several of which may be included in a system, which share common manifolds on the feed, concentrate and permeate stream plumbing. The concentrate from one stage becomes the feed to the following stage. **D5090**

stage—the height of a water surface above an established (or arbitrary) datum plane; also termed *gage height*. **D3858**

stage—the height of a water surface above an established (or arbitrary) datum plane; also gage height. **D5389**

stage—a sequestial arrangement of pressure vessels, usually reject staged such as 2:1 array, sometimes permeate staged as in double pass RO. **D6161**

staging—see **brine staging** and **product staging**. **D6161**

standard, *n*—in the analysis of water, a solution or suspension, crafted from chemicals to achieve intended concentrations, utilized to calibrate analytical systems or to validate the performance of analytical systems.

Discussion—Highest-quality standards are traceable to certified reference materials.

standard or standardized, *adj*—in the analysis of water, characterized to a high degree of accuracy with regard to chemical constituents or physical properties.

standard addition or known addition—a procedure for the determination of the concentration of a particular species in a sample by adding known amounts of that species to the sample solution and recording the change in potential of an ion-selective electrode versus a suitable reference electrode. **IUPAC, D4127**

standard-fall diameter—the diameter of a sphere with a specific gravity of 2.65 and the same standard-fall velocity as the particle. **D4410**

standard-fall velocity—the rate of fall that a particle would finally attain if falling alone in quiescent distilled water of infinite extent and a temperature of 24°C. **D4410**

standard (heterotrophic) plate count (SPC)—see **SPC—standard (heterotrophic) plate count**. **D6161**

standard integrated depth sampler—a device designed to accumulate a water sample from a stream vertical at such a rate that the velocity in the nozzle at the point of intake is always as nearly as possible identical with the immediate stream velocity. **D5613**

standardized material, *n*—in the analysis of water, a material with a complex or otherwise challenging matrix, that has been processed as a lot with high uniformity and has been characterized as to specific analyte concentrations with high precision or accuracy (or both).

Discussion—Although most standards are a pure chemical in a water matrix, suspensions or solutions of materials from the environment (naturally occurring or not) are often used as standards after having been well characterized. These materials have the benefit of testing analytical recovery in a more challenging matrix, a matrix that may be more similar to a sample matrix of interest. Standardized materials also serve well as batch quality-control indicators, again providing a more realistic challenge to the analytical system. In the case of batch quality control, exact knowledge of true concentration is not necessary, as stable recovery is the parameter of interest.

standard-sedimentation diameter—the diameter of a sphere with the same specific gravity and fall velocity as the given particle. **D4410**

standard solution, secondary dilution, *n*—a solution of several analytes prepared in the laboratory from stock standard solutions and diluted as needed to prepare calibration solutions and other needed analyte solutions. **D5175**

standard solution, secondary dilution—a solution of several analytes prepared in the laboratory from stock analyte solutions and diluted as necessary to prepare calibration solutions and other needed analyte solutions. **D5812**

standard solution, stock, *n*—a concentrated solution containing a single certified standard that is an analyte or a concentrated solution of a single analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare secondary dilution standards. **D5175**

standard solution, stock—a concentrated solution containing a single certified standard that is an analyte, or a concentrated solution of a single analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare secondary dilution standards. **D5812**

standard subtraction or known subtraction—a variation of the standard addition method. In this procedure, changes in the potential resulting from the addition of a known amount of a species (for example, a complexing agent) that reacts stoichiometrically with the ion of interest are employed to determine the original activity or concentration of the ion. **IUPAC, D4127**

standard test conditions—the parameters under which a membrane manufacturer tests devices for flow and salt rejection **D6161**

statistic—an estimated quantity for a parameter calculated from a sample. **D4375**

sterile, *adj*—free from any viable organism, either active or dormant.

sterilization—destruction or removal of all viable organisms. **D6161**

Stiff and Davis saturation index—see **S&DSI**. **D6161**

Stiff & Davis stability index, S&DSI—an index calculated from total dissolved solids, calcium concentration, total alkalinity, pH and solution temperature that shows the tendency of a water solution to precipitate or dissolve calcium carbonate. S&DSI is used primarily for seawater RO applications. See Practice D4582 and LSI. **D6161**

Stiff and Davis Stability Index (S & DSI)[21]**—**an index calculated from total dissolved solids, calcium concentration, total alkalinity, pH, and solution temperature that shows the tendency of a water solution to precipitate or dissolve calcium carbonate. **D4582**

stilling well—a small free-surface reservoir connected through a constricted channel to the approach channel upstream of the weir so that a depth (head) measurement can be made under quiescent conditions. **D5242**

stilling well—a small free-surface reservoir connected through a restricted passage to the approach channel upstream of the flume so that a head measurement can be made under quiescent conditions. **D5390**

stilling well—a small free-surface reservoir connected through a restricted passage to the head-measurement location upstream of the weir so that a head measurement can be made under quiescent conditions. **D5614**

stilling well—a small reservoir connected through a constricted passage to the main channel, that is, the flume, so that a depth measurement can be made under quiescent conditions. **D1941**

stilling well—a well connected to the stream with intake pipes in such a manner that it permits the measurement of stage in relatively still water. **D5674**

stock standard solution—a concentrated solution containing a single certified standard that is a test method analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare primary dilution standards. Commercially available stock standard solutions may be used. **D5790**

stock standard solution—a concentrated solution containing one or more analytes, obtained as a certified solution form a reputable source. **D5790**

stock standard solution—a concentrated solution containing one or more analytes, obtained as a certified solution form a reputable source. **D6800**

stray, *n*—spurious marks on the graphic depth records caused by surfaces other than the bottom surface of a water body below the sounding vessel. **D5073**

stray light—all light reaching the detector other than that contributed by the sample. For example: ambient light leakage and divergent light in optical systems. **D6698**

stray light—all light reaching the detector other than that contributed by the sample. For example: ambient light leakage, internal reflections and divergent light in optical systems. **D6855**

stream discharge—the quantity of flow passing a given cross section in a given time. The flow includes the mixture of liquid (usually water), dissolved solids, and sediment. **D4411**

stream discharge—the quantity of flow passing through a cross section in a unit of time. **D4410**

streambank erosion—the removal of bank material by flowing water. **D4410**

streaming potential—a potential that is generated in dilute solutions moving at high velocity through small channels. [Liquid junction potential problems are often wrongly confused with streaming potentials.] **D4127**

streaming potential—the static electrical charge that is induced by the movement of a low ionic strength solution having a high electrical resistivity or low electrical conductivity (such as pure water), across relatively non-conductive surfaces such as the pH measurement electrode's glass membrane or other non-conductive wetted materials found in flowing sample streams. **D5128**

stripping peak potential—the applied potential versus SCE at which the stripping peak current is a maximum. **D3557**

stripping peak signal—the current measured at the stripping peak maximum for a metal. **D3557**

study reach—the section of a river's length that is to be studied. **D5613**

study site—sections of a river where data are to be determined, monitored, measured, and where tracer is to be introduced into the river. **D5613**

subbottom profile—a trace of a subsurface horizon due to a change in the acoustic properties of the medium through which the sound energy has traveled. **D5073**

subcritical flow—open channel flow at a velocity less than the velocity of gravity waves in the same depth of water. Subcritical flow is affected by downstream conditions, since disturbances are able to travel upstream. **D1941**

subcritical flow—open channel flow in which the average velocity is less than the square root of the product of the average depth and the acceleration due to gravity; sometimes called tranquil flow. **D5242**

subcritical flow—open channel flow that is deeper and at lower velocity than critical flow for the same flowrate; sometimes called tranquil flow. **D5390**

subcritical flow—open channel flow that is deeper and at lower velocity than critical flow for the same flow rate; sometimes called tranquil flow. A Froude number less than one exists. **D5614, D4410**

subcritical flow—open channel flow that is deeper and at lower velocity than critical flow for the same flow rate; sometimes called tranquil flow. A Froude number less than one exists. **D5614**

subcritical flow—open-channel flow that is deeper and at a lower velocity than critical flow for the same flow rate; sometimes called tranquil flow.

DISCUSSION—The Froude number is less than unity for this flow. **D5640**

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[21] Stiff, H. A. and Davis, L. E., "A Method for Predicting the Tendency of Oil Field Waters to Deposit Calcium Carbonate," *Petroleum Transactions* , Vol 195, 1952.

submerged flow—a condition where the water stage downstream of the flume is sufficiently high to affect the flow over the flume crest and hence the free-flow depth-discharge relation no longer applies and discharge depends on two head measurements. **D1941**

submergence—a condition in which the water level on the downstream side of the weir is high enough to affect the flow over the weir and hence alter the head-discharge relation. It is usually expressed as a ratio or percentage of downstream to upstream head or downstream to upstream total head. **D5614**

submergence—a condition in which the depth of flow immediately downstream of the flume is large enough to affect the flow through the flume so that the flowrate can no longer be related to a single upstream head. **D5390**

submergence—a condition in which the water level on the downstream side of the weir is at the same or at a higher elevation than the weir crest; depending on the percent of submergence the flow over the weir and hence the head-discharge relation may be altered. **D5242**

submergence—the ratio of downstream head to upstream head on a weir or flume. Submergence greater than a critical value affects the discharge for a given upstream head. **D5640**

substitute wastewater—a mixture of dissolved and suspended materials in water, typical of the influent to a municipal wastewater treatment facility. **D5905**

supercritical flow—open channel flow at a velocity greater than that of gravity waves in the same depth, so disturbances cannot travel upstream, and downstream conditions do not affect the flow. **D1941**

supercritical flow—open channel flow in which the average velocity exceeds the square root of the product of the average depth and the acceleration due to gravity. **D5242**

supercritical flow—open channel flow that is shallower and at higher velocity than critical flow for the same flowrate. **D5390**

supercritical flow—open channel flow that is shallower and at higher velocity than critical flow for the same flow rate. A Froude number greater than one exists. **D5614, D4410**

supercritical flow—open channel flow that is shallower and at higher velocity than critical flow for the same flow rate. A Froude number greater than one exists. **D5614**

supercritical flow—open-channel flow that is shallower and at higher velocity than critical flow for the same flow rate. **D5640**

Discussion—The Froude number is greater than unity for this flow.

supercritical flow—open channel flow at a velocity greater than that of gravity waves in the same depth, so disturbances cannot travel upstream, and downstream conditions do not affect the flow. **D1941**

superheated steam—vapor whose temperature is above the boiling water temperature at the particular existing pressure. **D1066**

supernate—clear, overlying liquid in a sediment sample. **D3977**

supernate or supernatant—the liquid above the surface of settled sediment. **D4410**

supersaturation—a state in which the inorganic salt (s) are in solution at a level higher than the respective solubility product. **D6161**

suppressor device, *n*—an ion-exchange-based device placed between the analytical column and the conductivity detector of an ion chromatography system, that exchanges counterions with hydronium or hydroxyl ions. This process enchances the analyte signal by lowering eluant background conductivity, and, for strong acid and strong base ions, forms a more conductive species.

suppressor device—a device that is placed between the analytical columns and the detector. Its purpose is to inhibit detector response to the ionic constituents in the eluant, so as to lower the detector background and at the same time enhance detector response to the ions of interest. **D5542**

suppressor device—an ion exchange based device that is placed between the analytical column set and the conductivity detector. Its purpose is to minimize detector response to the ionic constituents in the eluent, in order to lower background conductance; and at the same time enhance the conductivity detector response of the ions of interest. **D6581**

surface sampler—a device for collecting sediment from the surface of a submerged deposit. Surface samplers are sometimes referred to as grab samplers. **D4823**

surface tension, *n*—a property arising from the molecular forces of the surface film of all liquids which tend to alter the contained volume of liquid into a form of minimum superficial area, expressed as work in newtons per millimetre.

surrogate analyte—a pure analyte(s), which is extremely unlikely to be found in any sample, and which is added to a sample aliquot in known amount(s) before extraction. It is measured with the same procedures used to measure other sample components. The purpose of a surrogate analyte is to monitor the method performance with each sample. **D5315**

surrogate analyte—a pure analyte that is extremely unlikely to be found in any sample, that is added to a sample aliquot in a known amount, and is measured with the same procedures used to measure other components. The purpose of a surrogate analyte is to monitor test method performance with each sample. **D5790**

surrogate analyte—a pure analyte(s), which is extremely unlikely to be found in any sample, and which is added to a sample aliquot in known amount(s) before extraction and is measured with the same procedures used to measure other sample components. **D5317**

Discussion—The purpose of a surrogate analyte is to monitor method performance with each sample.

surrogate analyte—a pure analyte(s), which is extremely unlikely to be found in any sample, and which is added to a sample aliquot in known amount(s) before extraction and is measured with the same procedures used to measure other sample components. **D5475**

DISCUSSION—The purpose of a surrogate analyte is to monitor test method performance with each sample.

surrogate spikes—lanthanum and terbium are added at a concentration of 5 ng/mL in the initial 100-mL sample. The surrogate spikes are then preconcentrated to approximately 50 ng/mL in the final 10-mL sample not correcting for the final preconcentration. The surrogate spikes are used to determine potential method problems such as improper pH adjustment or faulty filters used when collecting the precipitate. **D6800**

surrogates—compounds that are similar to analytes of interest in chemical composition and behavior, separation, and measurements, but that are not normally found in environmental samples. **D596**

DISCUSSION—These compounds are added to blanks, standards, samples, or spiked samples before analysis to confirm the proper operation of the analytical system.

surveillance, *n*—the act of maintaining supervision or vigilance over a well-specified portion of water so that detailed information is provided concerning the state of that portion.

suspended sediment—sediment supported by turbulent currents in flowing water or by Brownian movement. **D3977**

suspended sediment—sediment that is carried in suspension by the turbulent components of the fluid or by Brownian movement. **D4410**

suspended sediment—sediment that is carried in suspension in the flow of a stream for appreciable lengths of time, being kept in this state by the upward components of flow turbulence or by Brownian motion. **D4411**

suspended-sediment concentration—See **concentration of sediment (by mass)**. **D4410**

suspended-sediment discharge—the quantity of suspended-sediment passing through a stream cross section per unit of time. **D4410**

suspended-sediment load—that part of the sediment load which is suspended sediment. **D4410**

suspended-sediment sampler—a device that collects a representative portion of the water with its suspended-sediment load. **D4410**

suspended solids (SS)—solid organic and inorganic particles that are held in suspension in a liquid. **D6161**

suspension effect—the change in junction potential when a reference electrode is immersed to different depths in a solution containing resins or charged colloids, such as certain clays and soils. The suspension effect, which can be as large as 100 mV, does not occur with sensing electrodes. **D4127**

symmetric membrane—membrane and bulk polymer have equivalent characteristic (isotropic). **D6161**

T titration—see **titration**. **D4127**

tailwater—the water elevation immediately downstream of the flume. **D5390**

tailwater—the water elevation immediately downstream of the weir. **D5614**

tailwater—the water level immediately downstream of the weir. **D5242**

tare—weights of empty containers used in analysis procedure. **D3977**

telescoping—the movement of the outer layers of a spiral wound cartridge in the direction of the feed flow caused by excessive pressure drop through the feed channel spacer. **D6161**

temperature compensation—adjustment of the analyzer measured value for variation in temperature of the sample from a pre-established value by the use of electronic adjustment or data manipulation. **D5540**

temperature correction factor (TCF)—defines the effect of temperature on permeate flow relative to a base temperature (25°C), TCF is mainly a function of fluid characteristics but also membrane polymer. **D6161**

temperature effects—changes in potential developed between a sensing and reference electrode due to changes in temperature. The slope of a sensing electrode varies with temperature, as does the potential developed by the internal reference element in the reference electrode. In addition, the solubility of salts such as AgCl or Hg_2Cl_2 changes with temperature. It is therefore advisable to measure all samples and standardizing solutions at the same temperature. **D4127**

temperature range—those temperatures at which electrode measurements can be made. The lower temperature limit is set by the freezing point of the solution that has the highest freezing point (including the sample as well as all filling solutions). The upper temperature limit is set by the boiling point of the solutions, except for liquid ion exchange electrodes, whose upper temperature limit is determined by the solubility of the ion exchange solution. Electrode life decreases with exposure to high temperatures. In many cases, the limit of detection also rises with increasing temperature. For these reasons, it is preferable to cool hot solutions before measurement. **D4127**

temporary hardness—usually the bicarbonate salts of calcium and magnesium. **D6161**

tentative identification—all identifications are considered tentative until confirmed by co-injection of an authentic reference compound showing identical retention time and similar mass spectra. (Tentative identification based on library matches only are subjected to false positives.) **D4128**

terminal velocity—the limiting velocity reached by a particle falling under the action of gravity in a still liquid at a specified temperature. **D4410**

test core—a sample cut from a full core that has been recovered from the formation into which water is injected. **D4520**

texture—the geometric aspects of the component particles of a sediment deposit or rock including size, shape, and arrangement. **D4410**

thalweg—the line connecting the lowest or deepest point along a stream bed, valley, or reservoir, whether underwater or not. **D4410**

theoretical free mineral acidity—the free mineral acidity that would result from the conversion of the anions of strong acids in solution to their respective free acids. **D1782**

thermally induced phase-separation membrane formation—process in which a dissolved polymer is precipitated or coagulated by controlled cooling to form a membrane structure. **D6161**

thermometer—any device used to measure temperature, consisting of a temperature sensor and some type of calibrated scale or readout device. **D6764**

thickener—a vessel designed to concentrate treatment sludges; similar to a clarifier. **D6161**

thin film composite (TFC)—see **composite membrane**. **D6161**

threshold treatment—the process of stopping precipitation at the start of occurrence; usually does not stop the formation of nuclei but does inhibit growth. See **antiscalant** . **D6161**

throat—the constricted portion of the flume. **D5390**

throat—the constricted portion of a flume. **D5640**

throat—the constriction in a flume. **D1941**

thrust collar—a plastic cylinder placed between the last spiral wound cartridge and vessel end plate to support the last cartridge in a pressure vessel against telescoping. **D6161**

time-corrected peak area, *n*—normalized peak area; peak area divided by migration time. CE principles state that peak area is dependent upon migration time, that is, for the same concentration of analyte, as migration time increases (decreases) peak area increases (decreases). Time-corrected peak area accounts for these changes. **D6508**

time-proportioned sample, *n*—a sample collected at preselected time intervals.

time response—the time required for the system to reach 63.2 % of the total change between the state of initial equilibrium in response to a step change introduced at the input to the system. **D3370**

titration—a quantitative analytical technique for measuring the concentration of a species by incremental addition of a reagent (titrant) containing a species that reacts with the sample species. Sensing electrodes can be used to follow titrations if they respond to either the species being determined or the titrant ion. Electrode potentials are plotted against millilitres of titrant added, and the equivalence point (when equivalent amounts of the two species are present) is determined from the first or second derivative of the curve. **D4127**

back titration—a titration in which an excess of reagent is added to the sample to complex or precipitate the species being determined. The excess reagent is then determined by second titration, usually with the species that was originally in the sample. Back titrations are useful for increasing accuracy in the analysis of very dilute solutions. **D4127**

complexometric titration—a titration in which the titrant and sample ion form a complex. Many classic complexometric titrations can conveniently be followed by electrode. The success of the titration depends on the lower limit of detection of the electrode, the strength of the complex, and the possible presence of ions that compete for the complexing agent or which interfere with the electrode. Examples of complexometric titrations are the determination of calcium with EDTA, and acid-base titrations. **D4127**

differential titration—determination of the concentration of two or more species in one sample by titration with a reagent containing a species that reacts with both sample species. In order to obtain distinct end-point breaks, the formation constants or solubility products of the two species formed must differ by several orders of magnitude. **D4127**

indicator titration—in ion-selective electrode work, a type of differential complexometric titration in which a metal ion complex is added to the sample as an electrode indicator, and a different metal ion in the sample is determined by titration with the complexing agent contained in the indicator. An electrode that responds to the indicator metal ion is used to detect the point at which the titrant has complexed all of the ion being determined. An abrupt change in the indicator ion concentration occurs when excess complexing agent is added. **D4127**

precipitation titration—a titration in which the titrant and the sample species form a precipitate. An electrode can be used to follow the titration if it senses either of the ions involved in the reaction. The success of the titration depends on the lower limit of detection of the electrode, the solubility of the precipitate, the reaction rate, and the possible presence of other species which are also precipitated by the titrant. Examples of precipitation titrations are the determination of halides with silver nitrate and sulfate with lead ion. **D4127**

redox (ORP) titration—a titration in which the ratio of two different oxidation states of a species is changed by the incremental addition of an oxidizing or reducing agent. A redox (ORP) electrode, which responds to the logarithm of the ratio of the activities of the two oxidation states, is used to follow the titration. Among the many substances that can be determined in this manner are H_2O_2, I_2, Fe^{+3}, MnO_4^-, and Sn^{++}. Differential titrations are possible in some cases. **D4127**

R titration—a titration in which the sensing electrode responds to an ion introduced by a reagent prior to titration. A synonym for *indicator titration*. **D4127**

S titration—a titration in which the sensing electrode responds to the ion being removed from the sample by the titrant. **D4127**

T titration—a titration in which the sensing electrode responds to the titrant ion, not to the sample species being determined. **D4127**

topset bed—a layer of sediment deposited on the top surface of an advancing delta that is continuous with the landward alluvial plain. **D4410**

total, *n*—the concentration determined on an unfiltered sample following vigorous digestion. **D1976**

total bacteria count—see **TBC**. **D6161**

total bacterial counts, *n*—total number of viable microorganisms present in the named sample, excluding anaerobic organisms, determined in accordance with Test Methods F1094. **D5127**

total carbon (TC)—the sum of IC and TOC. **D4839**

total carbon (TC)—the sum of IC and TOC. **D5904**

total carbon (TC), *n*—the sum of IC and TOC. **D5997**

total carbon (TC)—the sum of IC and TOC. **D6317**

total colony count—see **TCC**. **D6161**

total chemically bound nitrogen—all inorganic and organic nitrogen in the sample, except molecular nitrogen (N_2). **D5176**

total cyanide—the sum total of all of the inorganic chemical forms of cyanide. Total cyanide thus includes both free cyanide and anionic metal cyanide complexes. **D6994**

total digestion—the dissolution of a sediment matrix such that quantitation will produce a measurement which is more than 95 % of the constituent present in the sample. **D4698**

total dissolved solids—see **TDS**. **D6161**

total Kjeldahl nitrogen, *n*—the sum of the nitrogen contained in the free ammonia and other nitrogen compounds which are converted to ammonium sulfate under specified digestion conditions.

total Kjeldahl nitrogen—the sum of the nitrogen contained in the free ammonia and other nitrogen compounds which are converted to ammonium sulfate [$(NH_4)_2SO_4$] under the specified digestion conditions. **D3590**

total matter, *n*—the sum of the particulate and dissolved matter.

total organic carbon—carbon in the form of organic compounds. **D5196**

total organic carbon—see **TOC**. **D6161**

total organic carbon (TOC)—carbon in the form of organic compounds. **D4839**

total organic carbon (TOC)—carbon in the form of organic compounds. **D5904**

total organic carbon (TOC), *n*—carbon in the form of organic compounds. **D5997**

total organic carbon (TOC)—carbon in the form of organic compounds. **D6317**

total organic carbon (TOC), *n*—carbon measured after inorganic carbon response has been eliminated by one of the prescribed ASTM test methods (such as elimination in accordance with Test Method D4779). **D5127**

total organic chlorine—see **TOCl**. **D6161**

total organic halide formation potential—see **TOXFP**. **D6161**

total organic halides—see **TOX**. **D6161**

total oxygen demand (TOD)—the amount of oxygen required to convert the elements in compounds to their most stable oxidized forms. **D6238**

total recoverable—the amount of a metal analyte measurable by atomic absorption spectrophotometry, plasma emission spectroscopy or plasma mass spectrometry after applying the digestion procedure in either Practice A, Practice B, or Practice C. The choice of Practice A, B, or C shall be noted in reporting resultant data. **D1971**

total recoverable—the concentration of analyte determined on a whole, unfiltered water or solid sample following vigorous digestion as described in US EPA Method 1640. **D6800**

total recoverable, *adj*—a term relating to forms of each element that are determinable by the digestion method that is included in this procedure. **D1976**

total recoverable—a term relating to forms of each element that are determinable by the digestion method included in this procedure. **D5673**

total recoverable aluminum—arbitrary term relating to the forms of aluminum recovered in the acid digestion procedure specified in this test method. **D857**

total recoverable antimony—an arbitrary analytical term relating to forms of antimony that are determinable by the digestion method which is included in the procedure. Some organic compounds may not be completely recovered. **D3697**

total recoverable arsenic—an arbitrary analytical term relating to the forms of arsenic that are determinable by the digestion method which is included in the procedure. Some organic-arsenic compounds, such as phenylarsonic acid, disodium methane arsonate, and dimethylarsonic acid, are not recovered completely during the digestion step. **D2972**

total recoverable barium—arbitrary analytical term relating to the recoverable forms of barium that are determinable by the digestion method which is included in this test method. **D4382**

total recoverable barium—recoverable forms of barium that are determinable by the digestion method which is included in the procedure. **D3986**

total recoverable beryllium—total recoverable beryllium relates only to the recoverable forms of beryllium by these test methods. **D3645**

total recoverable cobalt—an arbitrary analytical term relating to the recoverable forms of cobalt that are determinable by the digestion method which is included in the procedure. **D3558**

total recoverable element, *n*—a term relating to forms of each element that are determinable by the digestion method that is included in this test method. **D4190**

total recoverable iron—arbitrary analytical term relating to the recoverable forms of iron that are determinable by the digestion method which is included in these test methods. **D1068**

total recoverable lead—an arbitrary analytical term relating to the recoverable forms of lead that are determined by the digestion method which are included in the procedure. **D3559**

total recoverable manganese—an arbitrary analytical term relating to the recoverable forms of manganese that are determinable by the digestion method which is included in the procedure. **D858**

total recoverable molybdenum—an arbitrary analytical term relating to the forms of molybdenum that are determinable by the digestion procedure described in Test Method D3372. **D3372**

total recoverable nickel—an arbitrary analytical term relating to the recoverable forms of nickel that are determinable by the digestion method that is included in these test methods. **D1886**

total recoverable selenium—an arbitrary analytical term relating to the recoverable forms of selenium that are determinable by the digestion procedures included in these test methods. **D3859**

total recoverable silver—an arbitrary analytical term relating to forms of silver that are determinable by the digestion method that is included in the procedures. **D3866**

total recoverable strontium, *n*—an arbitrary analytical term relating to the forms of strontium that are determinable by the digestion procedure described in this test method. **D3920**

total recoverable vanadium—dissolved vanadium plus that solubilized by acid digestion of particulates and organics in the sample. **D3373**

total recoverable zinc—an arbitrary analytical term relating to the recoverable form of zinc that is determinable by the digestion method. **D1691**

total residual chlorine—see **TRC**. **D6161**

total residual chlorine (chlorine residual), *n*—the amount of available chlorine-induced oxidants present in water at any specified period, subsequent to the addition of chlorine. **D1253**

DISCUSSION—Chlorine present as chloride is neither included in these terms nor determined by this test method.

DISCUSSION—Bromine, bromine combined with ammonia or nitrogenous compounds, and chlorine dioxide are not distinguished by this test method from the corresponding chlorine compounds.

total-sediment discharge—the total quantity of sediment passing a section per unit of time. **D4410**

total-sediment load (total load)—all of the sediment in transport; that part moving as suspended load plus that moving as bedload. **D4410**

total station—an electronic surveying instrument which digitally measures and displays horizontal distances and vertical angles to a distant object. **D5906**

total suspended solids—see **TSS**. **D6161**

total time—see **response time**. **D3864**

total trihalomethane—see **TTHM**. **D6161**

towfish, *n*—a streamlined container, containing acoustical equipment for sounding depth, and designed to be pulled behind or beneath a survey vessel. **D5073**

traceability—property of the result of a measurement or the value of a standard whereby it can be related, with a stated uncertainty, to stated references, usually national or international standards, through an unbroken chain of comparisons. **ISO Guide 30:1992, D6568**

tracer response curve—at each sampling site, the plots of tracer concentration versus time after the tracer injection. **D5613**

track-etch membrane formation—process for forming membranes with well-defined pores by exposing a dense film to ion bombardment followed by etching of the damaged region. Usually produces pores with a narrow size distribution. **D6161**

traction—transport of debris by running water in which the particles are swept along close to the bed of the stream by rolling, sliding, or saltation. **D4410**

trailing edge—the point of the falling limb of the dye response curve that is equal to approximately 2 % of the peak concentration observed at a sampling site. **D5613**

train—a grouping of devices (or cassettes immersed in a tank all connected to the same permeate pump). See **array**, **bank**, **block**. **D6161**

tranquil flow—see **subcritical flow**. **D4410**

tranquil flow—see **subcritical flow**. **D5416**

transducer, *n*—a device for translating electrical energy to acoustical energy and acoustical energy back to electrical energy. **D5073**

transducer—a device for translating electrical energy to acoustical energy and acoustical energy back to electrical energy. **D6318**

transducer draft, *n*—the distance from the water surface to the radiating face of a transducer. **D5073**

transit rate—the speed at which the suspended-sediment sampler is lowered and raised in the sampling vertical. **D4410**

transit rate—the speed at which the suspended sediment sampler is lowered and raised in the sampling vertical. **D6326**

transit-rate ratio—the ratio computed by dividing the transit rate by the mean stream velocity in the vertical being sampled. **D6326**

transit-rate ratio—the ratio computed by dividing the transit rate by the mean stream velocity in the vertical being sampled. **D4410**

transmembrane pressure (TMP)—the net driving force (pressure or vacuum) across the membrane. The hydraulic pressure differential from the feed side to permeate side less the osmotic pressure differential on each side. **D6161**

transportation—the complex process of moving sediment particles by water. The principal factors affecting transportation are turbulence; ratio of settling velocity to water velocity; shape, size, density, and quantity of particles; and saltation. **D4410**

trap efficiency—the percent of the incoming sediment load that is deposited. **D4410**

trihalomethanes—see **THM**. **D6161**

trihalomethane precursors—see **THMP**. **D6161**

trip release—a mechanism (see Fig. 6 under piston sampler and Fig. 7*(b)*) that releases a core sampler from its suspension cable and allows the sampler to freely fall a predetermined distance before striking the bed. **D4823**

trisodium phosphate (TSP)—$Na_3PO_4 12H_2O$, a cleaning agent. **D6161**

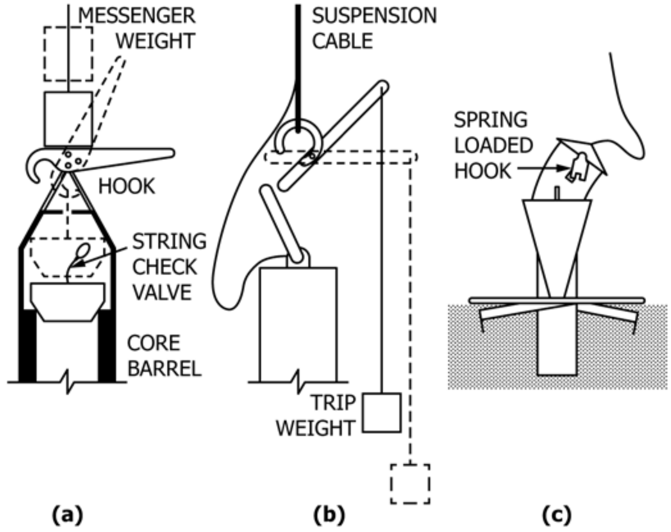
trivial name, *n*—a name that is not produced by any systematic procedure of naming.

true, *n*—in the analysis of water, the assumed real value of an analyte concentration.

Discussion—There is an assumption that there is an absolute, correct value expressing the concentration of an analyte in any given sample. This concentration could theoretically be expressed as the number of atoms or molecules present of the sample component being determined. This value is never known with absolute certainty, and is usually approximated through the use of standards of well characterized concentration. Deviations from this sense of true are the basis for bias (systematic deviations) in analytical measurements.

tuning solution—a solution that is used to determine acceptable instrument performance prior to calibration and sample analysis. **D5673**

turbidimeter—an instrument that measures light scatter using a nephelometric detector. Examples include photoelectric nephelometers and ratio photoelectric nephelometers. **D6698**



Note 1—(*a*) The messenger weight strikes the hook and releases the string holding the check valve. (See Note 2.) (*b*) The trip weight strikes the sediment and unhooks the sampler. (See Note 3.) (*c*) The cable slackens and allows the spring-loaded hook to open. (See Note 4.)

Note 2—Source: Milbrink, G., "A Simplified Tube Bottom Sampler," Oikos:Acta-Oecologica-Scandinavica. No. 22, 1971, pp. 260–263.

Note 3—Source: Bascom, W., Mardesich, J., and Stubbs, H., "An Improved Corer for Soft Sediments," Coastal Water Research Project, Biennial Report for 1981–1982, Willard Bascom, ed., Southern California Coastal Water Research Project, Long Beach, CA, 1982, pp. 267–271.

Note 4—Source: Peters, R. D., Timmins, N. T., Calvert, S. E., and Morris, R. J., "The IOS Box Corer: Its Design, Development, Operation and Sampling," Institute of Oceanographic Sciences, Wormley, U.K., Report No. 106, 1980.

FIG. 7 Release Mechanism

turbidimeter—an instrument that measures light scatter using a nephelometric detector. Examples include photoelectric nephelometers and ratio photoelectric nephelometers. **D6855**

turbidity, *n*—reduction of transparency of a sample due to the presence of particulate matter.

turbidity—expression of the optical properties of a sample that causes light rays to be scattered and absorbed rather than transmitted in straight lines through the sample. (Turbidity of water is caused by the presence of suspended and dissolved matter such as clay, silt, finely divided organic matter, plankton, other microscopic organisms, organic acids, and dyes.) **D1889**

turbidity—expression of the optical properties of a sample which causes light rays to be scattered and absorbed rather than transmitted in straight lines through the sample. Turbidity of water is caused by the presence of suspended and dissolved matter such as clay, silt, finely divided organic matter, plankton, other microscopic organisms, organic acids, and dyes. **D4410**

turbidity—an expression of the optical properties of a sample that causes light rays to be scattered and absorbed rather than transmitted in straight lines through the sample. Turbidity of water is caused by the presence of matter such as clay, silt, finely divided organic matter, plankton other microscopic organisms, organic acids and dyes. **D6161**

turbidity—an expression of the optical properties of a sample that causes light rays to be scattered and absorbed rather than transmitted in straight lines through the sample. (Turbidity of water is caused by the presence of matter such as clay, silt, finely divided organic matter, plankton, other microscopic organisms, organic acids, and dyes.) **D6698**

turbidity—an expression of the optical properties of a sample that causes light rays to be scattered and absorbed rather than transmitted in straight lines through the sample. Turbidity of water is caused by the presence of suspended and dissolved matter such as clay, silt, finely divided organic matter, plankton, other microscopic organisms, organic acids, and dyes. **D6855**

turbidity, absolute, *n*—the fractional decrease of incident monochromatic light through the sample, integrating both scattering and transmitted light.

turbidity current—see **density current**. **D4410**

turbidity, Jackson candle, *n*—an empirical measure of turbidity in special apparatus, based on the measurement of the depth of a column of water sample that is just sufficient to extinguish the image of a burning standard candle observed vertically through the sample.

turbidity, jackson candle (JTU)—an empirical measure of turbidity in special apparatus, based on the measurement of the depth of a column of water sample that is just sufficient to extinguish the image of a burning standard candle observed vertically through the sample. **D6161**

turbidity, nephelometric, *n*—an empirical measure of turbidity based on a measurement of the light-scattering characteristics (Tyndall effect) of the particulate matter in the sample.

turbidity, nephelometric (NTU)—an empirical measure of turbidity based on a measurement of the light-scattering characteristics (Tyndall effect) of the particulate matter in the sample. **D6161**

turbulence—irregular condition of flow in which the various quantities show a random variation with time and space coordinates so that statistically distinct average values can be discerned. **D5089**

turbulence—irregular condition of flow in which the velocity exhibits a random variation with time and space coordinates so that statistically distinct average values can be discerned. **D4409**

turbulence—the irregular motion of a flowing fluid. **D4410**

turn-back limit, *n*—a condition or set of conditions, which if met, require that the investigation cease and personnel involved in the investigation withdraw from the area to a predetermined "safe" location.

DISCUSSION—It is the responsibility of the users of this guide to establish both the turn-back limit and withdrawal location, if appropriate. **D7316**

Tyndall effect—the path of light through a heterogeneous medium made visible by the solid particles. **D6161**

Type I error—statement that a substance is present when it is not. **D596**

Type II error—statement that a substance was not present (was not found) when the substance was present. **D596**

ultra pure water—water generally used in semiconductor industry having specifications (chemical, physical and biological) for extremely low contaminant levels. **D6161**

ultrafiltration, *n*—a process employing semipermeable membrane under a hydraulic pressure gradient for the separation of components in a solution. The pores of the membrane are of a size which allow passage of the solvent(s) but will retain non-ionic solutes based primarily on physical size, not chemical potential.

DISCUSSION—The ultrafiltration class membranes comprise a range of possible pore sizes, all of which function for the removal of dissolved solids larger than atomic radii, metal ions, and aqueous salts, but smaller than undissolved particulates.

DISCUSSION—Ultrafiltration membranes are inherently capable of performing the microfiltration of particulates.

DISCUSSION—Unlike reverse osmosis, ultrafiltration is known to rely on a separation mechanism based largely on physical size exclusion (sieve mechanism). Many other potential influencing factors for separation exist, but the sieve mechanism predominates.

ultrafiltration (UF)—a pressure-driven process using semipermeable membrane under a hydraulic pressure gradient for the separation of components in a solution. The pores of the membrane are of a size smaller than 0.1 µm, which allows passage of the solvent(s) but will retain non-ionic solutes based primarily on physical size, not chemical potential. **D6161**

ultrafiltration device—a single housing (vessel), comprising or containing an ultrafiltration element or multiple elements and supporting materials. **D5090**

ultraviolet (UV) radiation—wavelengths between 200 to 300 nm. These wave lengths have a strong germicidal effect. The maximum effect is at 253.7 nm. **D6161**

uncertainty, *n*—(of measurement) parameter, associated with the result of a measurement that characterizes the dispersion of values that could reasonably be attributed to the measurand.

uncertainty (of measurement)—parameter, associated with the result of a measurement that characterizes the dispersion of values that could reasonably be attributed to the measured. (International Vocabulary of Basic and General Terms in Metrology [VIM] (ISO: 2nd ed., 1993) **D6568**

undisturbed sample—sediment particles that have not been rearranged relative to one another by the process used to cut and isolate the particles from their parent deposit. All core samples are disturbed to some degree because raising the cores to the water surface causes pore water and trapped gases to expand.[22] In common usage, the term "undisturbed sample" describes particles that have been rearranged but only to a slight degree.

unit bed-load discharge—bed-load discharge per unit width of river bed. Units are reported in mass of discharge per unit time per unit width, such as tons per day per foot. **D4410**

unmeasured-sediment discharge—the difference between the total sediment discharge and the measured suspended-sediment discharge. **D4410**

unsampled depth—the unsampled part of the sampling vertical; usually within 0.8 to 0.15 m of the stream bed, depending on the kind of suspended-sediment sampler used. **D4410**

unsampled zone—the unsampled part of the sampling vertical, usually assumed to be 90 to 150 mm above the stream bed, depending on the kind of sampler used. **D4410**

upper counting limit (UCL)—that colony count above which there is an unacceptable counting error; the error may be due to overcrowding or antibiosis. **D5392**

upstream—side of a membrane into which penetrants enter from the feed stream. **D6161**

U.S. Environmental Protection Agency—see **USEPA**. **D6161**

vacuum—*for the procedure used*—source of suction that can produce a reading of 500 to 600 mm Hg on a vacuum gage. **D3862**

vacuum—*for the procedure used*, a source of suction that can produce a reading of 500 to 600 mm Hg on a vacuum gage. **D3863**

validations—a one-time comprehensive examination of analytical results. **D3864**

line sample validations—a line sample is analyzed coincidentally a minimum of seven times by an appropriate continuous analyzer and an appropriate laboratory analyzer or a second continuous analyzer. A comparison is made on the differences between the coincidental results using the Student's *t* test at 95 % confidence coefficient, two-tailed test, to evaluate whether the average difference is statistically significantly different from zero difference as described in 14.2. **D3864**

reference sample validations—a reference sample is analyzed a minimum of seven times by an appropriate continuous analyzer and by an appropriate laboratory analyzer. A comparison is made between the average continuous analyzer results and the average laboratory results using the Student's *t* test at 95 % confidence coefficient, two-tailed test as described in 14.1. Passing the Student's *t* test signifies the continuous analyzer's average analysis of the reference sample is not statistically significantly different from the laboratory analyzer's average analysis of the same reference sample (validation test acceptable). Failing the "*t*" test signifies a statistically significant difference exists (validation test not acceptable). **D3864**

valley trenching—gully erosion occurring in flood plains. **D4410**

vandose zone—the zone of soil located between the surface and the water table that is not saturated. **D6146**

variable rod in tube orifice—a type of pressure reducer for high pressure samples that uses a retractable tapered rod inside a reamed tube to provide a variable orifice for pressure reduction that is parallel with the sample flow. This eliminates wear of the orifice and provides variable pressure reduction and flow. **D3370**

velocity head—the square of the average velocity divided by twice the acceleration due to gravity. **D5614, D4410**

velocity head—the square of the average velocity divided by twice the acceleration due to gravity. **D5390**

velocity head—the square of the average velocity divided by twice the acceleration due to gravity. **D5416**

velocity head—the square of the average velocity divided by twice the acceleration due to gravity. **D5640**

velocity head (h_v)—computed as follows: **D5130**

$$h_v = \frac{\alpha V^2}{2g}$$

where:

α = the velocity-head coefficient,
V = the mean velocity in the cross section in ft/s (m/s), and
g = the acceleration of gravity in ft/s/s (m/s/s).

velocity head (h_v)—is computed as follows: **D5243**

$$h_v = \frac{\alpha V^2}{2g}$$

where:

α = the velocity-head coefficient;
V = the mean velocity in the cross section, in ft/s (m/s); and
g = the acceleration due to gravity, in ft/s/s (m/s/s).

velocity head (h_v)—in ft(m), compute velocity head as follows: **D5388**

$$h_v = \frac{\alpha V^2}{2g}$$

where:

α = velocity-head coefficient,
V = the mean velocity in the cross section, ft/s (m/s); and
g = the acceleration of gravity, ft/s/s (m/s/s).

velocity sampling—means of obtaining line velocities in a measurement plane that are suitable for determining flow rate by a velocity-area integration. **D5389**

verification—a periodic or routine procedure to ensure reliability of analytical results. **D3864**

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[22] Kallstenius, T., "Mechanical Disturbances in Clay Samples Taken with Piston Samplers," *Royal Swedish Geotechnical Institute Proceedings* , No. 16, Ivar Haeggstroms Baktryckeri AB, Stockholm, 1958.

line sample verification—a line sample is analyzed as described in 3.2.18.2 of Guide D3864, and the results of the difference between the continuous analyzer and the laboratory analyzer or a second continuous analyzer is plotted on a control chart. If the calculated difference between the continuous analyzer and the laboratory analyzer or a second continuous analyzer is within ±3 S_d, the continuous analyzer is considered verified. If the calculated difference is outside ±3 S_d the continuous analyzer is considered out of control (not verified). **D3864**

reference sample verification—a reference sample is analyzed as described in 3.2.18.1 of Guide D3864 and the results of the differences between the continuous analyzer and the laboratory analyzer are plotted on a control chart. If the calculated difference between the continuous analyzer and the laboratory analyzer is within ±3 S_d the continuous analyzer is considered verified. If the calculated difference is outside ±3 S_d the continuous analyzer is considered out of control (not verified). **D3864**

vertical—an approximately vertical path from water surface to stream bed along which one or more samples are taken to define sediment concentration or distribution. May also be referred to as *sampling vertical*. **D4410**

vertical accretion deposits—flood-plain deposits formed by deposition of suspended sediment from overbank flood waters. **D4410**

vertical control, *n*—a horizontal plane of reference used to convert measured depth to bottom elevation. **D5073**

vertical dispersion—the process of disseminating the dye within a river's water's vertical axis perpendicular to its upstream-downstream axis. This dispersion process is usually completed first. **D5613**

viable—ability to live or grow. For example, bacteria, plants. **D6161**

viable organism count—see **VOC (viable organism count)**. **D6161**

vial—sealed glass ampoule under vacuum containing reagents for the Kool Kount Test. **D6530**

volatile matter, *n*—that matter that is changed under conditions of the test to the gaseous state.

volatile organic compound—an organic compound that can be readily separated from water by inert gas sparging and thermally desorbed onto a GC column or is readily amenable to direct aqueous injection GC. The compounds must elute from the column within its temperature range without alteration of the structure of the compound. **D4128**

volatile organic compound—see **VOC (volatile organic compound)**. **D6161**

volume-weight—see **specific weight**. **D4410**

wash load—the portion of the stream sediment load composed of particles, usually finer than 0.062 mm in diameter which are found only in relatively small quantities in the bed. **D4410**

waste water, *n*—water discharged from a process as a result of its formation or use in that process.

water—water complying with compositions given in Table 1 of Guide D5196. **D5196**

water, *n*—water prepared in accordance with Specification D1193, reagent grade Type I. **D5127**

water discharge—the quantity of water passing a stream cross section per unit of time. **D4410**

water-formed deposits, *n*—any accumulation of insoluble material derived from water or formed by the reaction of water upon the surfaces in contact with the water.

water-formed deposits—any accumulation of insoluble material derived from water or formed by the reaction of water upon the surface in contact with the water. See *Discussion*. **D5256**

DISCUSSION—Deposits formed from or by water in all its phases may be further classified as scale, sludge, corrosion products, or biological deposits. The overall composition of a deposit or some part of a deposit may be determined by chemical or spectrographic analysis; the constituents actually present as chemical substances may be identified by microscope or x-ray diffraction studies. Organisms may be identified by microscopical or biological methods.

water-formed deposits—any accumulation of insoluble material derived from water or formed by the reaction of water upon surfaces in contact with the water. **D887**

water monitoring—water monitoring consists of systematic activities conducted to characterize the quantity or quality, or both, of water. **D5851**

water pollution—the harmful or objectionable material introduced into water in sufficient quantities to adversely affect its usefulness. **D4410**

water quality association—see **WQA**. **D6161**

waterborne oil—any oil, whether or not derived from petroleum, carried by a water system (for example, ocean, bay, lake, river, etc.) usually at the surface but occasionally emulsified or dissolved in the water. The waterborne oil can also be found on beaches or banks edging the water body, in the sediments underlying the water, or in the organisms living in the water or in the sediments. **D3415**

waterborne oil—any oil, whether or not derived from petroleum, carried by a water system (for example, ocean, bay, lake, river, etc.) usually at the surface but occasionally emulsified or dissolved in the water. The waterborne oil can also be found on beaches or banks edging the water body, in the sediments underlying the water, or in the organisms living in the water or in the sediments. **D3415**

watershed—all lands enclosed by a continuous hydrologic-surface drainage divide and lying upslope from a specified point on a stream. **D4410**

watershed—all lands enclosed by a continuous hydrologic surface drainage divide and lying upslope from a specified point on a stream. **D6145**

watershed—all lands enclosed by a continuous hydrologic surface drainage divide and lying upslope from a specified point on a stream. **D4410, D6146**

water softener—a vessel having a cation resin in the sodium form that removes cations such as calcium and magnesium from water and releases another ion such as sodium. The resin is usually regenerated. See **softener**. **D6161**

weathering of waterborne oil, *n*—the combined effects of evaporation, solution, chemical oxidation, and biological decomposition from environmental exposure.

weathering of waterborne oil—the combined effects of evaporation, solution, emulsification, oxidation, biological decomposition, and so forth. **D3414**

wetted perimeter (P)—is the sum of the hypotenuse of a right triangle defined by the distance between adjacent stations of the cross section and the difference in bed elevations. **D5129**

wetted perimeter (WP)—the length along the boundary of a cross section below the water surface. **D5243**

wetted perimeter (WP)—the total length of the boundary between the channel bed and the water for a cross section. It is computed as the sum of the hypotenuse of the right triangle defined by the distance between adjacent stations of the cross section and the difference in bed elevations. **D5130**

width (b)—width of contracted flow section. Subscripts denote specific widths as follows: **D5129**

b_d = offset distance for straight dikes, and
b_t = width of contracted flow section at water surface.

work plan—a documented procedure intended for use by a laboratory to meet the measurement traceability requirements of a defined need. **D6568**

working calibration source (WCS)—a calibration source (see 3.1.4), including those diluted or prepared by chemical procedure for the purpose of calibrating an instrument. **D7282**

workstation—a combination of people and equipment that executes a specific test method using a single specified measuring device to quantify one or more parameters, with each report value having an established estimated uncertainty that complies with the measurement quality objectives of the laboratory organization. **D6689**

X-ray fluorescence (XRF) spectroscopy, *n*—an analytical technique in which sample elements are irradiated by a high energy source which induces a transition from the ground state to an excited state condition. Using an excitation source in the 5- to 50-KeV X-ray range, the resulting transition elevates an inner shell electron to one of several outer shells. The excited state condition is unstable and elements so excited will spontaneously drop back to their ground state with a concurrent emission of fluorescent radiation. The energy (or wavelength) of the fluorescence is unique for each element, so the position of the emission lines on the energy scale serves to identify the element(s). Then, the intensity of an emission peak may be used, with proper calibration methods, to determine the concentration of an element in the sample. **D6502**

Z % Interlaboratory Quantitation Estimate (IQE$_{Z\ \%}$)—also denoted “LQ,” for “Limit of Quantitation” in accordance with Currie (**1**), the lowest concentration for which a single measurement from a laboratory selected from the population of qualified laboratories represented in an interlaboratory study will have an estimated Z % relative standard deviation (Z % RSD, based on interlaboratory standard deviation). **D6512**

zeolite—any of various natural or synthetic hydrated aluminum silicates used as ion exchange substrates in water softening. **D6161**

zero discharge—a condition whereby a facility discharges no process effluent. **D6161**

zero drift—see see **drift**. **D3864**

zeta potential—colloidal stability measured in millivolts. High negative value (–10 to –30 mv) results in particulate stability. **D6161**

ABBREVIATIONS, ACRONYMS, AND SYMBOLS

α—see **alpha** **D5129, D5243, D5130, D5388**

A—see **angstrom (A)** **D6161**

A—see **area** **D5129**

A—see **cross-section area (A)** **D5130, D5388**
and **cross-sectional area** **D5243**

AOC—assimilable organic carbon **D6161**

ATD—see **anti-telescoping device** **D6161**

ATP—adenosine triphosphate **D6161**

AWWA—American Water Works Association **D6161**

AWWARF—American Water Works Association Research Foundation **D6161**

b—see **width** **D5129**

BAT—best available technology **D6161**

Be or BE—see **baume scale, Be** **D6161**

BOD —see **biochemical oxygen demand (BOD)** for D1129 definition

BOD (biochemical oxygen demand) —the amount of dissolved oxygen utilized by natural agencies in water in stabilizing organic matter at specified test conditions. **D6161**

BOO—build, own, operate **D6161**

BOOT—build, own, operate and transfer **D6161**

BWRO—brackish water reverse osmosis **D6161**

CA—see **cellulose acetate** **D6161**

CAC—combined available chlorine **D6161**

CAL—see **calibration standard (CAL)** **D5315, D5475**

CF—see **concentration factor** **D6161**

CFU—colony forming unit; unit used in the measure of total bacteria count (TBC) **D6161**

cfu/mL—colony forming units per millilitre **D6530**

CIP—cleaning-in-place **D6161**

COD—chemical oxygen demand—the amount of oxygen required under specified test conditions for the oxidation of water borne organic and inorganic matter **D6161**

CPU—chloroplatinate unit (color indicator) **D6161**

CsI—cesium iodide, a scintillation detector material used to detect gamma and X-ray radiation. **D7316**

DE—see **diatomaceous earth filtration** **D6161**

°C—see **celsius (°C)** **D6161**

°F—see **Fahrenheit (°F)** **D6161**

Δh—see **fall** **D5130, D5388**

ΔP—see **differential pressure (ΔP, dP)** **D6161**

ΔP—see **device pressure drop** **D5090**

DL—see **detection limit (DL)** or **limit of detection (LD)** **D6091**

dP—see **differential pressure (ΔP, dP)** **D6161**

DI—see **deionization** **D6161**

DBP—disinfection by-products (a rule as part of the SDWA) **D6161**

DQO—see **data quality objectives (DQOs)** **D4840, D5612**

ED—see **electrodialysis** **D6161**

EDI—see **equal-discharge-increment (EDI) method** **D4410**

EDM—see **electronic distance measurement (EDM)** **D5906**

EDR—see **electrodialysis reversal** **D6161**

EOF—see **electroosmotic flow (EOF)** **D6508**

EPA—Environmental Protection Agency (USA)—an organization that has set the potable water standards **D6161**

EPM—see **equivalent per million** **D6161**

EPS—see **electronic positioning system (EPS)** **D5906**

EPS, *n*—extracellular polysaccharide produced by bacteria to form a protective coating especially after attaching to the membrane surface. **D6161**

ERD—energy recovery device **D6161**

ERT—energy recovery turbine **D6161**

ESWTR—enhanced surface water treatment rule **D6161**

EWI—see **equal-width-increment (EWI) method** **D4410**

F—see **Froude number (F)** **D5129, D5130, D5243, D5388**

FAC—free available chlorine **D6161**
see **free (available) chlorine** **D6161**

FD 1 and FD 2—see **field duplicates (FD1 and FD2)** **D5475, D5812**

FD1 and FD2—see **field duplicates (FD1 and FD2)** **D5175, D5315**

FI—see **fouling index (FI)** **D6161**

FDA—Food and Drug Administration (USA) **D6161**

FRB—see **field reagent blank (FRB)** **D5175, D5315, D5475, D5812**

FRC—free residual chlorine **D6161**

FRP—fiberglass reinforced plastic **D6161**

GAC—granular activated carbon **D6161**

GD—gallons per day. See **GPD**. **D6161**

GFD (GPDSF)—unit of permeate rate or flux; gallons per day per square foot of effective membrane area. **D6161**

GPD—unit of flow rate; gallons per day. See **GD**. **D6161**

GPG—see **grains per U.S. gallon (GPG)** **D6161**

GPS—see **global positioning system (GPS)** **D5906**

GRAS—materials "generally regarded as safe," as listed by the FDA. **D6161**

h—see **head (h)** **D5129**

HAA—group of six halo acetic acids regulated in drinking water (mono, di and tri-chloroacetic acid, mono and di bromoacetic acid and chlorobromoacetic acid) **D6161**

^{3}He—helium-3, used as a pressurized gas in neutron detection systems. **D7316**

h_f—see **friction loss (h_f)** **D5130, D5388**

Ho—see **expansion or contraction loss (HO)** **D5388**

HPC—heterotrophic plate count, formerly called SPC **D6161**

HPGe—high purity germanium, a semiconductor material used in high resolution γ-ray spectrometry.

Discussion—A detection system using high purity germanium may be necessary for positive nuclide identification. **D7316**

h_v—see **velocity head (h_v)** **D5130, D5243, D5388**

IC—see **ionorganic carbon (IC)** **D4839, D5904, D5997, D6317**

ICSA—see **interference check sample (ICSA)** **D5673**

ICSAB—see **interference check sample (ICSAB)** **D5673**

IDL—see **instrumental detection limit (IDL)** **D5673**

IG—see **imperial gallon** **D6161**

IPC—see **instrument performance check (IPC) solution** **D5812**
and **instrument performance check solution (IPC)** **D5175**

IQE$_{Z\,\%}$—see **Z % Interlaboratory Quantitation Estimate (IQE$_{Z\,\%}$)** **D6512**

IRM—see **independent reference material (IRM)** **D5847**

JTU—see **turbidity, jackson candle (JTU)** **D6161**
and **jackson turbidity unit, JTU** **D6161**

K—see **conveyance (K)** **D5129, D5130, D5243, D5388**

L—see **length (L)** **D5129**

LAS—see **linear alkyl benzene sulfonate (LAS)** **D2230**

LB—see **Langmuir-Blodgett (LB) membrane** **D6161**

LCS—see **laboratory control sample (LCS)** **D4691, D5847, D5800**

LCS—laboratory control standard **D4190**

LD—see **laboratory duplicate (LD)** **D6800**

LD—see **detection limit (DL)** or **limit of detection (LD)** **D6091**

LD 1 and LD 2—see **laboratory duplicates (LD 1 and LD 2)** **D5175, D5812**

LD1 and LD2—see **laboratory duplicates (LD1 and LD2)** **D5315, D5475**

LD-50—concentration required for 50 % mortality (lethal dose) **D6161**

LFB—see **laboratory fortified blank (LFB)** **D5175, D5315, D5475, D5812**

LFM—see **laboratory fortified sample matrix (LFM)** **D5175, D5315, D5475, D5812**

LiI—lithium iodide, scintillation detector material used to detect neutron radiation. **D7316**

LOP—see **line of position (LOP)** **D5906**

LPC—see **laboratory performance check solution (LPC)** **D5315, D5475**

LQ—see **quantitation limit (QL)** or **limit of quantitation (LQ)** **D6512**

LRB—see **laboratory reagent blank (LRB)** **D5175, D5315, D5475, D5812**

LRV—log reduction value

LRV—see log reduction value (LRV) **D6908**

LRV-Log reduction value—measure of the particle removal efficiency of the membrane system expressed as the log of the ratio of the particle concentration in the untreated and treated fluid. For example, a 10-fold reduction in particle concentration is an LRV of 1. **D6161**

LSI—see **langelier saturation index, LSI** **D6161**

LSI—langelier saturation index, measure of $CaCO_3$ solubility in brackish waters. See Practice D3739 and **S&DSL**. **D6161**

m$_1$— **D6161**

MB—see **method blank (MB)** **D6800**

MCL—maximum contaminant level **D6161**

MDL—see **method detection limit (MDL)** **D5673, D6800**

meq/L—see **milliequivalent per litre (Meq/L)** **D6161**

MF—see **microfiltration** **D6161**

MGD (MGPD)—millions of gallons per day **D6161**

mg/L—see **milligram per litre (mg/L)** **D6161**

Mho—a measure of water purity by conductance, reciprocal of ohms. See **ohm**. **D6161**

MPN—see **most probable number (MPN)** **D6503**

MS—see **matrix spike (MS)** **D5847, D6800**

MSDS—Material Safety Data Sheet; should be included with all reagents **D6697**

MTC—see **mass transfer coefficient (MTC)** **D6161**

MWCO—see **molecular weight cut off** **D6161**

n—see **roughness coefficient (n)** **D5130, D5243, D5388**

NaHMP—sodium hexametaphosphate, an antiscalant **D6161**

NaI—sodium iodide, a scintillation detector material used to detect gamma and X-ray radiation. **D7316**

NF—see **Nanofiltration (NF)** **D6161**

NGVD—see **National Geodetic Vertical Datum of 1929 (NGVD)** **D5413**
and **national geodetic vertical datum (NGVD) of 1929** **D5674**

NOM—natural organic matter **D6161**

NSF (International)—National Sanitation Foundation (international), a U.S. based organization that provides testing procedures to certify that equipment meets certain minimum standards to produce potable water. **D6161**

NTU—see **nephelometer and turbidity, nephelometric (NTU)** **D6161**

O&M—operation and maintenance **D6161**

OEM—original equipment manufacturer **D6161**

OFM—see **electroosmotic flow modifier (OFM)** **D6508**

ORP—see **redox (ORP) electrode** and **redox (ORP) potential** **D4127**
and **redox (ORP) titration** [under the term “**titration** ”] **D4127**

P—see **wetted perimeter** **D5129**

PAC—powdered activated carbon or poly-aluminum chloride **D6161**

PACI—poly-aluminum chloride **D6161**

PFU—see **plaque-forming unit (PFU) D6734**

ppb—see **parts per billion (ppb) D6161**

ppm—see **parts per million (ppm) D6161**

ppt—see **parts per trillion (ppt) D6161**

QAPjP—see **quality assurance project plan D5612**

QAPP—see **quality assurance program plan D5612**

QCS—see **quality control reference solution D5673**

QCS—see **quality control sample D5175, D5315, D5475, D5812**

QL—see **quantitation limit (QL)** or **limit of quantitation (LQ) D6512**

R—see **hydraulic radius (R) D5129, D5130, D5243, D5388**

R—see **rejection factor, R D6161**

RDL—see **reporting detection limit (RDL) D6800**

RDS—see **relative standard deviation (RSD) D6161, D6908**

RGC—see **reconstructed gas chromatogram** (see *Discussion*) **(RGC) D4128**

RMS—see **resource management system (RMS) D6145**

RO—see **reverse osmosis (RO) D1193, D6161**
RO train D6161
and **loose RO D6161**

RSI—see **ryznar stability index (RSI) D6161**

S&DSI—Stiff and Davis saturation index, measure of $CaCO_3$ solubility in seawater or highly saline water. See Practice D4582 and **LSI**. **D6161**

S&DSI—see **Stiff and Davis stability index D6161**
and **Stiff and Davis Stability Index (S & DSI) D4582**

SB—see **spiked blank (SB) D6800**

SBS—sodium bisulfite, $NaHSO_3$ **D6161**

SCE—saturated calomel electrode **D3557**

SDI—see **silt density index (SDI) D4189**

SDI—silt density index—an index calculated from the rate of plugging of 0.45-µm membrane filter. It is an indication of the amount of particulate matter in water, sometimes called fouling index. **D6161**

SDWA—Safe Drinking Water Act of the United States, specifying required purity levels of municipal potable water **D6161**

S_f—see **friction slope (S_f) D5129, D5130**

SHMP—sodium hexametaphosphate (NaHMP) **D6161**

SMBS—sodium metabisulfite, $Na_2S_2O_5$ **D6161**

SP—see **salt passage, SP D6161**

SPC—standard (heterotrophic) plate count—measurement method for enumerating bacteria **D6161**

SR—see **salt rejection, SR D6161**

SS—see **suspended solids (SS) D6161**

STP—sodium triphosphate—Na_5 P_3O_{10}, a cleaning agent **D6161**

STPP—sodium tripolyphosphate. See **STP** . **D6161**

SWRO—seawater reverse osmosis **D6161**

TBC—total bacteria count, the total number of viable microorganisms present in the sample, excluding anaerobic organisms **D6161**

TC—see **total carbon (TC) D4839, D5904, D5997, D6317**

TCC—total colony count **D6161**

TCF—see **temperature correction factor (TCF) D6161**

TDS—total dissolved solids, usually expressed as mg/L or ppm (parts per million) **D6161**

TFC—see **thin film composite (TFC) D6161**

THM—trihalomethanes; a group of low molecular weight molecules which can result from chlorination of organics typically found in surface water **D6161**

THMP—trihalomethane precursors; organic molecules found in water which have the potential of reacting with chlorine to form THMs **D6161**

TMP—see **transmembrane pressure (TMP) D6161**

TOC—see **total organic carbon (TOC) D4839, D5127, D5904, D5997, D6317**

TOC—total organic carbon, a measure of the level of organic constituents in water **D6161**

TOCl—total organic chlorine **D6161**

TOD—see **total oxygen demand (TOD) D6238**

TOX—total organic halides **D6161**

TOXFP—total organic halide formation potential **D6161**

TRC—total residual chlorine **D6161**

TSP—see **trisodium phosphate (TSP) D6161**

TSS—total suspended solids. Concentration of undissolved solids in a liquid, usually expressed in mg/L or ppm. **D6161**

TTHM—total trihalomethane **D6161**

USEPA—U.S. Environmental Protection Agency **D6161**

UCL—see **upper counting limit (UCL) D5392**

UCL—a generic term to represent the aggregate quantity of material that causes an incident light beam to be scattered. The value can be correlated to either turbidity or to specific particle count levels of a defined size. **D6161**

UCL—a generic term to represent the aggregate quantity of material that causes an incident light beam to be scattered. The value can be correlated to either turbidity or to specific particle count levels of a defined size. **D6908**

UF—see **ultrafiltration (UF)** **D6161**

UV—see **ultraviolet (UV) radiation** **D6161**

VOC (viable organism count)—a measure of biological activity (living or growing) in water **D6161**

VOC (volatile organic compound)—an organic compound with a vapor pressure higher than water **D6161**

WQA—water quality association **D6161**

WP—see **wetted perimeter (WP)** **D5130, D5243**

XRF—see **X-ray fluorescence (XRF) spectroscopy)** **D6502**

y—see **depth** **D5129**

Y—conversion, recovery **D6161**

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