CONVERSION FACTORS, SELECTED TERMS, SYMBOLS, CHEMICAL FORMULAS, AND ABBREVIATIONS

CONVERSION FACTORS

Multiply	By	To obtain
micrometer (μm)	3.937×10^{-5}	inch (in.)
	3.3×10^{-6}	foot (ft)
millimeter (mm)	0.03937	inch
centimeter (cm)	0.3937	inch
square centimeter (cm^2)	0.155	square inch (in^2)
meter (m)	3.281	foot
nanometer (nm)	3.93×10^{-8}	inch
liter (L)	0.264	gallon (gal)
milliliter (mL)	0.0338	ounce, fluid (oz)
gram (g)	0.03527	ounce, avoirdupois
microgram (μg)	3.527×10^{-8}	ounce, avoirdupois
milligram (mg)	3.527×10^{-5}	ounce, avoirdupois
kilopascal (kPa)	0.1450	pound per square inch (lb/in^2)

Temperature: Water and air temperature are given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by use of the following equation:

$$°F = 1.8(°C) + 32$$
$$°C = (°F/1.8) – 32$$

SELECTED TERMS

Distilled or deionized water: ASTM type 1 water or better.

Equipment blank: A quality control sample that consists of a blank solution processed sequentially through each component of the equipment system to be used in sample collection, processing, preservation, and handling in a controlled environment. The sample is prepared by passing sterile water or buffer through the sampling equipment (if applicable) and into a sterile sample container. Positive results for the equipment blank indicate sampling and analytical bias caused by contamination from equipment and supplies.

Field blank: A quality-control sample that consists of a laboratory-certified blank solution processed through all the equipment used in the various stages of sample collection, processing, preservation, and handling under field conditions. **For quality control of water samples for microbial analyses,** the blank sample is prepared by passing either sterile deionized or distilled water (DIW) or sterile buffered water through the sampling equipment (if applicable) into a sterile sample container. Positive growth on the field blank indicates sampling and analytical bias caused by contamination from equipment, supplies, and (or) ambient environmental conditions.

Field-generated sequential replicate and split replicate: Quality-control samples that measure the variability in all or part of the sampling and analysis system. Replicates—environmental samples collected in duplicate, triplicate, or higher multiples and collected close in time and space—are considered identical in composition and are analyzed for the same properties. **For quality control of water samples for microbial analyses,** two samples are collected sequentially in the field (sequential replicates) and each sample is analyzed twice (split replicate). The relative percent difference between the results is calculated as a measure of variability.

Filter blank (membrane-filtration): As applied to the quality control of water samples for microbial analyses, the filter blank measures the sterility of the equipment and supplies used during the membrane-filtration procedure for bacterial indicators. A 50- to 100-mL sample of sterile buffered water is passed through the filtration apparatus onto a sterile membrane filter before processing the sample. Positive growth on the filter after incubation on selective media indicates poor technique in analysis and positive bias (contamination) of results.

Matrix spike (laboratory matrix spike): A quality-control sample that determines the effect of the sample composition (matrix) on the recovery efficiency of the analytical method. For quality control of water samples for microbiological analyses, a sample is prepared in the laboratory by adding a known quantity of organisms to a specified amount of sample matrix for which an independent estimate of target analyte concentration is available.

Micrometer (µm): The millionth part of the meter. The pore diameter of filter media is expressed in micrometer units.

Negative control: A quality-control sample that measures the selectivity of the membrane-filtration medium for the test organism. A pure culture of nontarget organisms is passed through the filtration apparatus onto a membrane filter and cultured on a selective medium. The absence of growth on the filter after incubation on a selective medium indicates the selective medium is meeting its specifications for culture of the target organism.

Normality, *N* (equivalents per liter): The number of equivalents of acid, base, or redox-active species per liter of solution. Examples: a solution that is 0.01 *F* (formal) in HCl is 0.01 *N* in the hydronium ion (H^+). A solution that is 0.01 *F* in H_2SO_4 is 0.02 *N* in acidity.

Positive control: A quality-control sample that ensures the analytical method is correctly performed and that target organisms are correctly identified and detected. A pure culture of the target organism is passed through the filtration apparatus onto a membrane filter and cultured on a selective medium. Positive growth within a recommended range is considered indicative of the quality of the test medium and procedures to support growth under typical working conditions.

Procedure blank: A quality-control sample that measures the effectiveness of the analyst's rinsing technique during the membrane-filtration procedure for bacterial indicators. A 50- to 100-mL sample of sterile buffered water is passed through the filtration apparatus onto a sterile membrane filter after processing the sample. Positive growth on the filter after incubation on a selective medium indicates poor rinsing technique.

SELECTED SYMBOLS AND CHEMICAL FORMULAS

>	greater than
≥	equal to or greater than
<	less than
≤	equal to or less than
±	plus or minus
g/L	gram per liter
µm	micrometer
µg/L	microgram per liter (equivalent to parts per billion)
$CaCl_2$	calcium chloride
Cu	copper
$FeCl_3$	ferric chloride
H_2SO_4	sulfuric acid
K_2HPO_4	potassium hydrogen phosphate
KH_2PO_4	potassium dihydrogen phosphate
$MgSO_4$	magnesium sulfate
Na_2SO_3	sodium sulfite
$Na_2S_2O_3$	sodium thiosulfate
$NaHPO_4$	sodium phosphate
NaOH	sodium hydroxide
Ni	nickel
NH_4Cl	ammonium chloride
Zn	zinc

ABBREVIATIONS

BOD	biochemical oxygen demand
BOD_5	biochemical oxygen demand (5 day)
CBOD	carbonaceous biochemical oxygen demand
$CBOD_u$	ultimate carbonaceous biochemical oxygen demand
col/100mL	colonies per 100 milliliters
DIW	deionized or distilled water
DO	dissolved oxygen
E. coli	*Escherichia coli*
EDI	equal-discharge increment

EDTA	ethylenediaminetetraacetic acid
EIA	enterococcus confirmation medium (esculin substrate)
+ ETFE	ethylenetetraflouroethylene
EWI	equal-width increment
FEP	fluorinated ethylene propylene
GWUDISW	ground water under the direct influence of surface water
IPR	initial precision recovery
KF	streptococcus medium
mCP	*Clostridium perfringens* medium
mE	membrane filter—Enterococci medium
mEI	enterococcus medium
mENDO	membrane filter—total coliform medium
mF	membrance filter technique
mFC	membrane filter—Fecal Coliform medium
MI	total coliform and *Escherichia coli* medium
MPN	most probable number
mTEC	membrane filter—Thermotolerant *Escherichia coli* media
N	normal
NA–MUG	nutrient agar-4-methylumbelliferyl-b-D-glucuronide
+ NFM	National Field Manual (*National Field Manual for the Collection of Water-Quality Data*)
NWIS	National Water Information System of the U.S. Geological Survey
OPR	ongoing precision recovery
OWQRL	USGS Ocala Water Quality & Research Laboratory, Ocala, Florida
PDF	personal flotation device
PFA	perflouroalkyoxy polymers
PTFE	polytetraflouroethylene polymers ("Teflon")
QC	quality control
TCMP	2-chloro-6-(trichloro methyl) pyridine
TD	to deliver
TNTC	Too Numerous To Count
TTC	triphenyltetrazolium chloride
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

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APPENDIX A7-A.

Parameter Codes Used in the National Water Information System (NWIS) of the U.S. Geological Survey

Table 1. Parameter code for 5-day biochemical oxygen demand

Determination	Parameter code	Comments
Five-day biochemical oxygen demand (BOD)	00310	Parameter codes for methods other than the 5-day BOD can be found by accessing "Support Files" in the QWDATA database and searching for "Parameter Code Dictionary."

Table 2. Parameter codes for fecal indicator bacteria

[mENDO, total coliform medium; MI, total coliform and *Escherichia coli* medium; mFC, fecal coliform medium; µm, micrometer; mTEC, *Escherichia coli* medium; NA-MUG, *Escherichia coli* medium; mEI, enterococcus medium; EIA, enterococcus confirmation medium; mE, enterococcus medium; KF, fecal streptococcus medium; mCP, *Clostridium perfringens* medium]

Fecal indicator bacteria type[1]	Medium	Parameter code[2]
Total coliform bacteria	mENDO	31501
	MI	90900
Fecal coliform bacteria	mFC, 0.65-µm pore-size filter	31625
	mFC, 0.45-µm pore-size filter	31616
Escherichia coli	mTEC followed by urea phenol	31633
	Modified mTEC	90902
	MI	90901
	NA-MUG	50278
Enterococci bacteria	mEI followed by EIA	90909
	mE	31649
Fecal streptococci bacteria	KF	31673
Clostridium perfringens	mCP	90915

[1]Membrane-filtration method: all units are in colonies per 100 milliliters.
[2]The parameter codes listed are those that are in common (2003) use in the National Water Information System (NWIS) of the U.S. Geological Survey.

Table 3. Parameter codes for somatic and F-specific coliphages

[SAL, single-agar layer; *E. coli*, *Escherichia coli*; mL, milliliter; L, liter]

Type of coliphage	*E. coli* host strain[1]	Parameter code[2]	Unit of measurement[3]
SAL method			
Somatic	*E. coli* CN-13	90903	plaques/100 mL
F-specific	*E. coli* F-amp	90904	plaques/100 mL
Somatic	*E. coli* C	90905	plaques/100 mL
Two-step enrichment method			
Somatic	*E. coli* C	99328	Presence or absence/100 mL
Somatic	*E. coli* C	99329	Presence or absence/1 L
Somatic	*E. coli* C	99330	Presence or absence/4 L
Somatic	*E. coli* CN-13	99331	Presence or absence/100 mL
Somatic	*E. coli* CN-13	99332	Presence or absence/1 L
Somatic	*E. coli* CN-13	99333	Presence or absence/4 L
F-specific	*E. coli* F-amp	99334	Presence or absence/100 mL
F-specific	*E. coli* F-amp	99335	Presence or absence/1 L
F-specific	*E. coli* F-amp	99336	Presence or absence/4 L

[1]Bacterial host strain used to detect the specified coliphage type.
[2]The parameter codes listed are those that are in common use (2003) in the National Water Information System of the U.S. Geological Survey.
[3]Parameter codes vary by the sample volume associated with the unit of reporting.

Table 4. Parameter codes for *Cryptosporidium* and *Giardia*

[**Parameter code:** Analysis by U.S. Environmental Protection Agency Method 1623]

Parameter name	Parameter code	Unit of measurement
Cryptosporidium	99599	oocysts per 10 liters
Cryptosporidium—spike efficiency	99600	percent recovery
Giardia	99597	cysts per 10 liters
Giardia—spike efficiency	99598	percent recovery