

Updates to *Standard Methods for the Examination of Water and Wastewater* in advance of publication of the 24th edition--and beyond.

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General changes from the 23rd Edition to the 24th Edition book



NEW EASY-TO-READ
FORMAT



NEW PAGE DESIGN



APPROVAL DATE
PLACED ON TOP SO IT
IS EASIER TO FIND



TINY FOOTNOTES
INCORPORATED INTO
THE TEXT WHERE THEY
WILL NOT BE
OVERLOOKED

Every method in the 24th edition was edited



**FOR CLARITY BASED ON
COMMENTS AND QUESTIONS
THAT HAVE BEEN RECEIVED
FROM USERS**



**TO CONVERT TO PLAIN
LANGUAGE, SO THAT THOSE
WHO SPEAK ENGLISH AS A
SECOND LANGUAGE CAN
MORE EASILY TRANSLATE
THE GUIDANCE**



**TO REMOVE MANUFACTURER
SUGGESTIONS. THIS WAS TO
AVOID THE PERCEPTION OF A
CONFLICT OF INTEREST.**

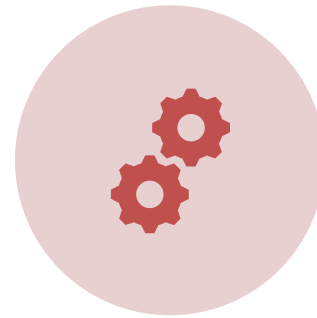
Summary of revisions for the 24th Edition book



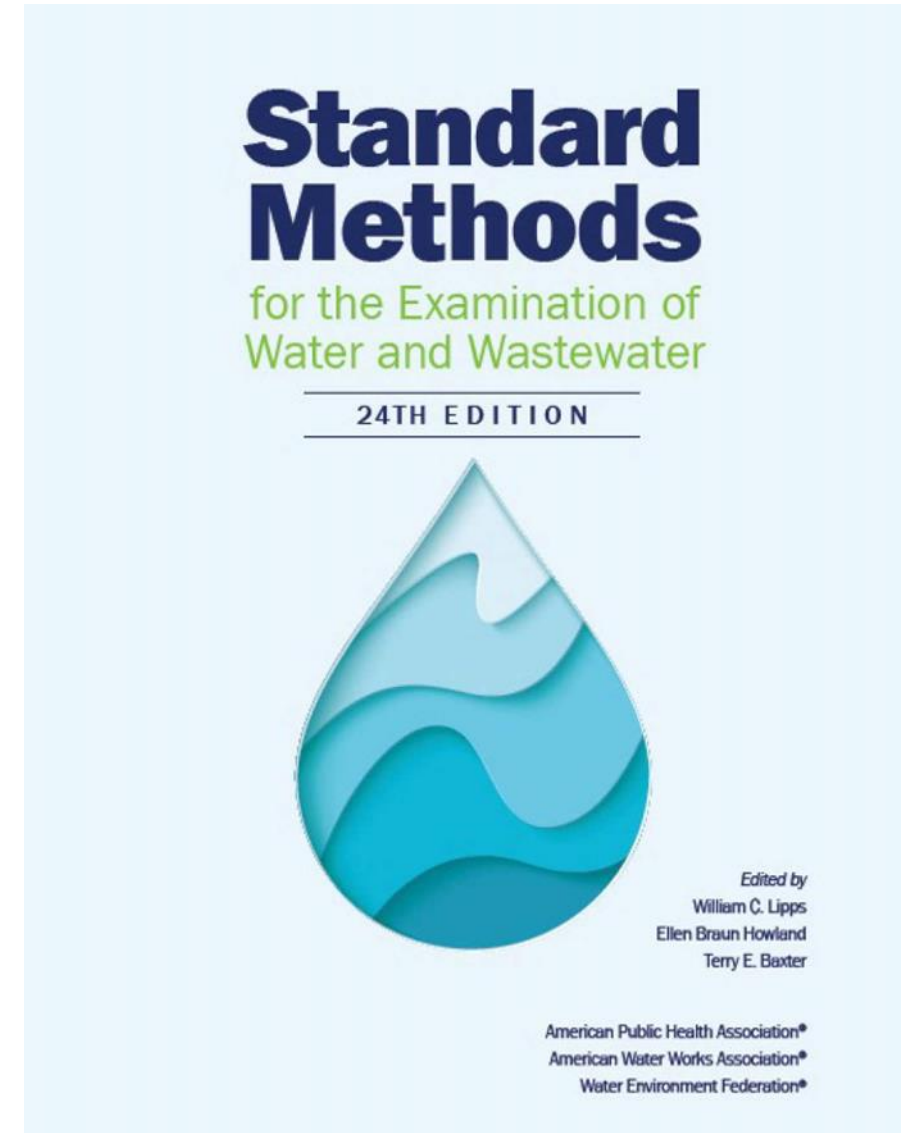
90% OF METHODS
REVISED



4 ENTIRELY NEW
SECTIONS



MAJOR
REORGANIZATION
OF 3 PARTS



Part 1000 Analytical and Data Quality Systems



Editorially revised throughout to clarify language. Collection and Preservation of Samples (1060) was edited to clarify acidification and refrigeration requirements and to update Table 1060:1 with new methods.



Expression of Results (1050) was clarified throughout, and references were updated. This section was also revised to provide greater clarity on determining equivalent weight, calculating equivalent concentrations, and using stoichiometric factors.



Quality Assurance (1020) was revised to stay current with quality assurance/quality control (QA/QC) requirements, particularly for MDL, and to ensure that it is consistent with Sections 2020, 3020, 4020, 5020, and 6020

Part 2000 - Physical and Aggregate Properties of Water and Wastewater



The language in Part 2000 was revised throughout to clarify procedural points and to achieve consistency with other Parts.




Each method was scrutinized in the context of procedural questions that have been asked on the online forum for the past several years. Many edits were made that did not rise to the level of updates but should be helpful to users.

Part 3000 - Metals in Water and Wastewater



Restructured to remove the section “Other Metals” and to order the metals alphabetically.



Minor clarifications were made to all sections, and references and bibliographies were updated. The language in methods 3030, 3111, 3113 and 3500-Se was edited to clarify procedures and make language consistent.



Metals by Inductively Coupled Plasma-Mass Spectrometry (3125) was edited to clarify spectral and nonspectral interference correction. In addition, the reagent water section was updated.



Metals by Anodic Stripping Voltammetry (3130) now includes information on updated reagents and apparatus to reflect current technology. The procedure has been clarified and calculations corrected.



Arsenic (3500-As) was edited to reflect the EPA drinking water standard MCL.

Part 4000 - Inorganic Nonmetallic Constituents of Water and Wastewater



Chloride (4500-Cl) was updated to add an oxidation step to remove high levels of reduced sulfur compounds in refinery or similar samples that would otherwise interfere.



4500-CN- P total cyanide by UV irradiation, gas diffusion amperometry. 4500-CN- Q available cyanide, also known as WAD cyanide, using ligand exchange followed by gas diffusion amperometry. 4500-CN- R free cyanide with gas diffusion amperometry.



Peracetic Acid (4500 PAA) and Hydrogen Peroxide (4500-H₂O₂) These methods are a result of a collaboration between Standard Methods and The US EPA Office of Water.

Part 4000 - Continued



Nitrogen (4500-N) was updated to describe a new total nitrogen method based on a high temperature catalyzed redox reaction with chemiluminescence detection.



4500-NO₃ J describes the determination of nitrate plus nitrite-nitrogen after a manual enzymatic reduction.




The pH method (4500-H⁺) was significantly updated, particularly the calibration section, the discussion on automatic temperature compensation, and buffer solutions section.



Phosphorus (4500-P) revision to mention that an alkaline digest can be used for total nitrogen, and to incorporate an EPA ATP letter that allows unpreserved samples to be stored 28 days prior to digestion for total phosphorus

Part 5000 - Aggregate Organic Constituents in Water and Wastewater




Chemical Oxygen Demand (5220) was revised to update references and clarify specific procedural steps and QA/QC practices.

In Total Organic Carbon (5310), method E was added for Supercritical Water Oxidation and sections A and B were revised to update method introduction, method selection, clarify QA/QC practices, and references, and to add method validation data.


The language in all methods was edited to clarify procedures.

Part 6000 - Individual Organic Compounds in Water and Wastewater

Method 6040 retitled Taste and Odor Compounds to better reflect the scope of these methods. In 6040 D analysts are now allowed to use smaller sample vials and sample volumes provided the QC criteria and detection limits are met.



Specific operational specifications could not be changed; however, where possible, methods now reference capillary columns to better reflect the columns used by laboratories when running these methods.



All methods have been revised editorially for greater consistency between sections

Part 7000 - Radioactivity in Water and Wastewater



Sections 7110 (Gross Alpha and Gross Beta Radioactivity), 7120 (Gamma-Emitting Radionuclides, and 7500-3H (Tritium) were significantly revised by providing detailed rationale underlying the preparation and measurement of samples, and by revising the language to minimize ambiguity.



Calculations in these methods now include the specific formulas for combined standard uncertainty, expanded uncertainty, critical level and minimum detectable concentration, and the Safe Drinking Water Act Detection Limit.

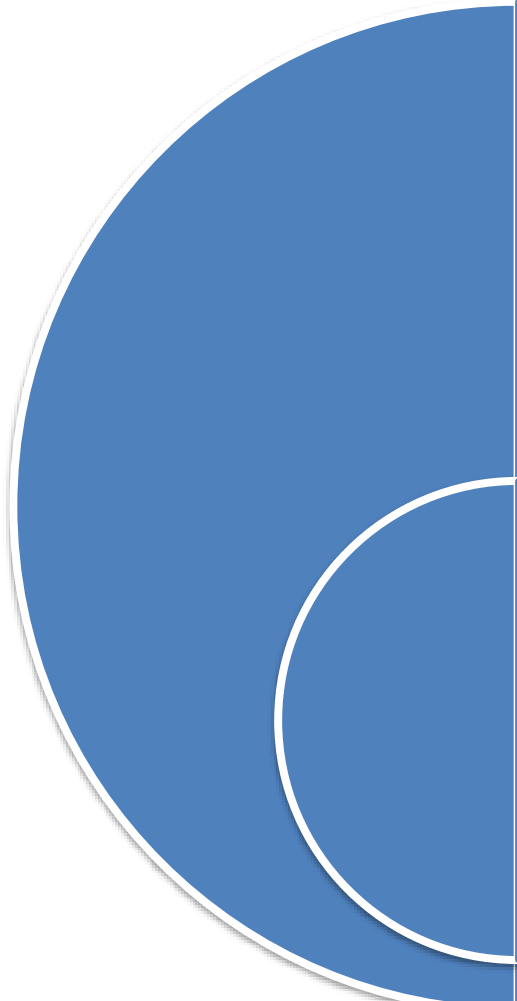


Method 7120 was also updated with a more detailed description of how to set up and operate the gamma spectrometer and associated software and the steps needed to carry out quality control in a manner that facilitates robust and defensible spectrometry.



A new introduction to 7500-Sr provides more background for the analysis

Part 7000 - Continued



A new method, Method 7110 E (Evaporation Method for Simultaneous Gross Alpha-Beta), was added to describe the counting and provide the specific equations needed to calculate pulse-height/shape discriminated results that are not addressed in 7110 B. Method 7110 E is substantially equivalent to 7110 B up to and through sample measurement, but also provides the details and equations that support simultaneous measurements of gross alpha and gross beta as performed in most laboratories where gas flow proportional counters have been equipped with pulse-height/shape discrimination that permit simultaneous determination of gross alpha and gross beta in a single count.

The 24th Edition also incorporates corrections to address errata specifically for 7020 B.2 and 7500-Ra B.4e in the 23rd edition, and for the equations in steps 5g, 5h, and 5i in the 2017 online version of 7110 D.

Part 8000 - Toxicological Assessment of Water and Wastewater



Bacterial Bioluminescence (8050) was updated



Sediment Pore Water Test (8080) was updated to more fully describe sediment collection and storage, to outline ex situ and in situ methods for porewater extraction, and to better outline the confounding factors when testing for toxicity and when interpreting the results of toxicity tests.



All other methods were revised to include up-to-date nomenclature of organisms

Part 9000 - Microbiological Analysis of Water and Wastewater

Laboratory Apparatus (9030) was substantially revised to clarify and update the specifications for laboratory equipment and to add a section for PCR equipment.

Washing Labware (9040, formerly Washing and Sterilization) incorporates multiple updates to the processes necessary for washing, disinfecting, sterilizing labware.

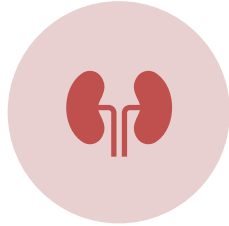
Preparation of Media and Buffered Dilution Waters (9050, formerly Preparation of Culture Media) has undergone a substantial rewrite with specific guidance regarding the preparation of media and buffered dilution waters.

Stressed, Injured, or Viable but Nonculturable Bacteria (9212, formerly Stressed Microorganisms) was revised to update information on bacteria in the viable but nonculturable state and the effect of the presence of these bacteria on method selection.

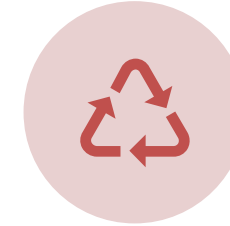
Part 9000 - Continued



Recreational Waters (9213) was updated to provide a new method for detecting *Pseudomonas aeruginosa* using a substrate enzyme test.



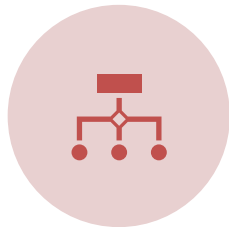
Heterotrophic Plate Count (9215) revised.



The introduction of Biodegradable Organic Carbon (9217, formerly Assimilable Organic Carbon) was updated

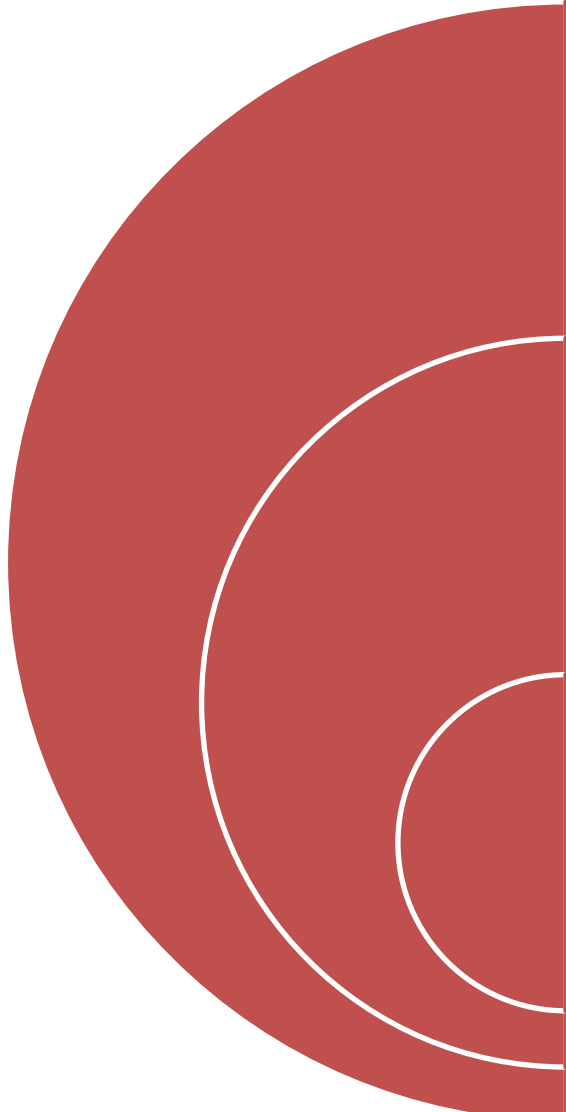


Aerobic Endospores (9218) was updated with significant changes to the membrane filter technique and the references pertaining to that method.



Membrane Filter Technique for Members of the Coliform Group (9222) was substantially updated to revise and clarify procedures

Part 9000 - Continued



Detection of Coliphages (9224) was substantially revised to remove outdated sections B, C, and D. New methods 9224 G (Commercial Procedures—Fast Phage), and 9224 H (Membrane Filter Procedure) were added. The single agar layer procedure (9224 E) and the two-step enrichment procedure (9224 F) were significantly revised to clarify sampling, procedures, quality control, and reagents and to update the references.

Fecal Enterococci (9230, formerly Fecal Streptococci and Enterococci Groups) was revised to update sampling information, quality control processes, clarify all procedures, and update the references. Further, it includes a new method (9230 E) Quantitative PCR for Enterococci.

Legionella (9268) and Leptospira (9270) were reorganized as stand-alone methods and their contents updated to reflect updated information on isolation and detection.

Part 9000 - Continued

Detection of *Naegleria fowleri* (9750) is a new method that provides information on the detection of *N. fowleri* in waters using culture, PCR, and molecular methods.

Pathogenic Bacteria (9260) section was split into its component parts and now comprises separate methods, 9260 through 9280.

All sections were revised to clarify language and update nomenclature, where needed

Part 10000 - Assessment of Aquatic Biology



New section on algal toxins. 10110 Algal Toxin Analysis— Microcystins and Nodularins with ELISA method and LC-MS/MS analysis for total microcystins and nodularins.

Section for special considerations for sampling cyanobacteria blooms for taxonomy and toxins was added to both Phytoplankton (10200) and Periphyton (10300).

Chlorophyll a (10150) was restructured to remove the section from 10200 to its own section. Calculation errors in the chlorophyll section were also corrected (previously 10200 H.3).

Taxonomy was updated in Identification of Aquatic Organisms (10900) for both the dichotomous keys and color algal plates using several reference online taxonomic databases

Part 10000 was revised to update references and bibliographies and to clarify specific procedural steps

And just like magic

- Many of these new and updated methods will be proposed in the coming MUR
 - Thank You EPA OW
 - Adrian Hanley
 - **Tracey Bone**
 - Lem Walker
 - Becca Burkett
 - And whoever else I missed

So, what is new and beyond?

Continuous Monitoring (in process)

Major updates to Part 6000

Updates and revisions to Part 3000

New methods (toxins) to Part 10000

PCR methods incoming

Organizational changes?

Less Emphasis on Book and more emphasis on web-based methods and access

- Affects how methods are named

Guidance documents updated to better describe roles and responsibilities of:

- Standard Methods Manager and Managing Editor
- Joint Editorial Board (JEB)
- Part Coordinators (PC)
- Joint Task Groups (JTG) and JTG Chair

Guidance documents revisions to better define balloting process

And finally, but not least

a systematic
review process of
all methods (5-
year cycle)

updates will
show up with
new revision
dates (if
needed) on the
web access

EPA approved
versions will
remain on-line

Questions?

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Standard Methods

for the Examination of
Water and Wastewater

24TH EDITION



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American Public Health Association®
American Water Works Association®
Water Environment Federation®