

Standard Methods for the Examination of Water and Wastewater

Standard Operating Procedures (SOPs)
2023 revision

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Abbreviations

58
59 ANSI – American National Standards Institute
60 COI – Conflict of interest
61 EPA – Environmental Protection Agency
62 JEB – Joint editorial board
63 JTG – Joint task group
64 SM – Standard Methods
65 SMC – Standard Methods committee
66 SMVC - Standard Methods voting committee
67 PC – Part coordinator
68 SOP – standard operating procedure
69

Definitions

70
71
72 General interest – category assigned to a member of a JTG who represents a voting interest
73 other than that of a producer or user
74
75 Joint editorial board – editors appointed by the partner organizations to develop and publish
76 *Standard Methods*; further defined in Section 2.2
77
78 Joint task group – group of 3 to 10 experts who are charged by the JEB with writing or updating
79 a specific method; further defined in Section 2.4
80
81 Joint task group chair – the member of a joint task group who is chosen by the JEB and PC to
82 guide the drafting of a new or revised method; further defined in sections 2.2, 2.3, and 2.4
83
84 Part coordinator – an editor who assists the JEB with substantive and editorial revisions of
85 methods in a particular part of *Standard Methods* (eg, Part 7000); further defined in Section 2.3
86

87 Partner organizations – the entities that cooperate to appoint editors and organize the
88 drafting and publishing of *Standard Methods*: American Public Health Association,
89 American Water Works Association, and Water Environment Federation
90

91 Producer – category assigned to a member of a JTG who represents a voting interest that
92 represents, produces, or sells materials, products, systems, or services covered in the method or
93 charge. This category may never represent more than one third of a JTG.
94

95 *Standard Methods* – the collection of methods developed by the SMC, published online or
96 in print, known collectively as *Standard Methods for the Examination of Water and*
97 *Wastewater*
98

99 Standard Methods – a group of individuals comprising editors, staff, and representatives of
100 the sponsoring partner organizations who work to develop and publish *Standard Methods*
101 *for the Examination of Water and Wastewater*
102

103 Standard Methods committee – the core group of individuals who participate in developing
104 and reviewing methods that are published in *Standard Methods*; membership in SMC is
105 free, requires an application, and is open to those with expertise in areas of science and
106 research that are applicable to water testing and water science; further details in Section 2.1.
107

108 Standard Methods voting committee – the set of the SMC that votes on a specific method; at
109 times, the SMVC is the full SMC; often the SMVC is a subset of voters who have expressed
110 interest in a particular topic area
111

112 User – category assigned to a member of a JTG who represents a voting interest that purchases
113 or uses materials, products, systems, or services.
114

SOP Use, Revision, and Approval History

116
117 Volunteers and staff members must follow this SOP and other applicable documents when
118 developing methods. These procedures generally align with the normative policies and
119 administrative procedures defined in the ANSI Essential Requirements: Due Process
120 Requirements. *Standard Methods* is not ANSI-accredited. However:
121

- 122 1) *Standard Methods* adopts and remains in compliance, to the extent possible, with the
123 current ANSI Patent Policy.
- 124 2) *Standard Methods* adopts and remains in compliance, to the extent possible, with the
125 ANSI Antitrust Policy.
- 126 3) *Standard Methods* adopts and remains in compliance, to the extent possible, with the
127 ANSI Commercial Terms and Conditions Policy
128

Revision

130 Responsibility for the Standard Methods SOPs and guidance documents, and any policies
131 contained herein, is vested in the JEB. The partner organizations review and approve changes.

132
133 The JEB reviews these SOPs biannually during regular meetings. The sections of the SOP may
134 be reviewed and approved separately.

135
136 Any member may suggest revisions of these procedures and guidance documents. Address any
137 suggestions for revision to the Standard Methods Manager.

138
139 If the JEB determines that changes to SOP sections are necessary, a ballot is issued to the PCs
140 and the responses addressed by the JEB. Any SOP changes adopted by the JEB become effective
141 after approval is granted from the sponsoring societies, on a date determined by the JEB. The
142 changes to the SOP are announced to all members via *Standard Methods Online*.

143

144 Approval history

145 A record of approval dates for the various sections of the SOP are maintained in the SOP
146 document (below).

147

148 Version naming protocol:

149

- 150 • Any changes to any SOP requires a change in the version number of the entire SOP
151 document. Adjust the last digit of the version number (in red below). Adjust the year
152 if necessary.

153

SM SOP-2023-2.1

154

- 155 • A change to the initial digit of the version number (eg, **2.1**) indicates a substantial
156 revision of the SOP. Such a change is only made when 2 or more procedures are
157 updated substantially. Whether changes are substantial is decided by the JEB at the
158 time of the approval of revisions.

159

160

Section Number	Section Name	Approval Date	Effective Date
Section 0	Use and Revision of SOPs	03 February 2023	03 February 2023
Section 1	Statement of Purpose	03 February 2023	03 February 2023
Section 2	Organization of Standard Methods	03 February 2023	03 February 2023
Section 3	Voting Terminology	03 February 2023	03 February 2023
Section 4	Method Development and Balloting	03 February 2023	03 February 2023
Section 5	Disclosure of Interest	03 February 2023	03 February 2023
Section 6	Code of Conduct and Responsibilities of Membership	03 February 2023	03 February 2023
Section 7	Antitrust Statement	03 February 2023	03 February 2023

Document: SM SOP-2023-2.0
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Section 8	Actions Before Developing, Revising, or Withdrawing Methods	03 February 2023	03 February 2023
Section 9	Procedural Appeals Policy	03 February 2023	03 February 2023
Section 10	Writing Standard Methods	03 February 2023	03 February 2023

Section 1. Statement of Purpose

These SOPs convey the policies and procedures related to the functioning of the Standard Methods organization and the requirements related to the development, review, and revision of methods. The SOPs were founded on fundamental principles that provide for:

- A. notice to all parties known to be affected by the standards development activity, at www.StandardMethods.org, and in addition by the Standard Methods Manager and JEB members who serve as official representatives of Standard Methods, or other officially designated representatives as needed;
- B. the opportunity to participate in standards development or modification;
- C. balanced interests so that standards development activities are not dominated by any single interest group;
- D. readily available access to essential information regarding proposed and final methods,
- E. processes that ensure substantial agreement be reached on all material points after the consideration of all views and objections;
- F. policies and processes to prevent dissemination of information about methods that have not been approved and published that may result in false, misleading, or uninformed information; and
- G. the right to express a position, to have it considered, and to appeal a decision.

1.1 Consensus

The Standard Methods organization operates with the purpose of crafting consensus methods. Action relating to the adoption, modification, or withdrawal of a method is effective only when it represents a consensus. A consensus is reached when substantial agreement is reached by concerned interests and implies the acceptance of a substantial majority, but not necessarily unanimity. Consensus is more specifically defined by each procedure where a consensus process is used.

1.2 Adherence to Due Process

The Standard Methods organization operates in a manner that maintains the integrity of development procedures, reduces the possibility of undue and outside influences, and protects the intellectual property of *Standard Methods*.

All existing methods, methods under development and other documents associated with these methods are the property of *Standard Methods*. *Standard Methods* members may not reproduce or circulate, in whole or in part, any documents outside of *Standard Methods* activities, or submit it to any other organization or regulatory and standards bodies (whether national, international, or other) without written permission from the Joint Editorial Board. When documentation and ballots associated with method drafts in process are distributed, the following statement is included:

204 “This document is the property of the Standard Methods partner organizations and is
205 intended for Standard Methods purposes only. Do not reproduce, circulate, or quote, in whole
206 or in part unless given written approval from the Joint Editorial Board.”
207

Section 2. Organization of Standard Methods

208
209
210 Standard Methods serves under and reports to the partner organizations of American Public
211 Health Association, American Water Works Association and Water Environment Federation.
212 The organization and its expert volunteers create and publish methods, procedures, and practices
213 for the global water and wastewater industry.

214 *Standard Methods for the Examination of Water and Wastewater* is a collection of these methods
215 that are available in digital and print formats.

216 The strength of *Standard Methods* comes from the participation of numerous volunteers across a
217 broad spectrum of water and wastewater professions. These individuals bring their technical
218 competency to the development of methods from commercial and public laboratories, federal
219 and state regulators, institutional and commercial research groups, private consultants, and
220 commercial providers of analytical chemicals, supplies, and instrumentation with the common
221 goal of providing technical scientifically-based methods.
222

223 2.1 Standard Methods Committee

224 The SMC is a voluntary consensus standards body (VCSB) and consists of willing individuals
225 who possess competence in the development and use of methods for water and wastewater
226 analysis.

227 The primary purpose of the Standard Methods Committee is to serve as a scientific-based
228 consensus body for the review and approval of existing and new laboratory and field procedures
229 that reflect sound science and benefit public health as it pertains to water quality.

230 Volunteer members are involved in the creation of new methods and the ongoing improvement
231 of current methods.

232 Returning at least 50% of SMC ballots over the course of five years is the primary criteria for
233 maintaining membership on the SMC.

234 Members who want to be more involved in the method development process or have expertise to
235 contribute may volunteer to participate in a JTG. Committee members who wish to serve on a
236 JTG are assigned a classification based on their specific interest category (user, producer, general
237 interest; see [Definitions](#)).

238

239 2.2 Joint Editorial Board

240 The JEB provides the guiding values, planning, content strategy, and overall process of
241 *Standard Methods*. These SOPs are prepared, maintained, and revised by the JEB, with final
242 approval by the sponsoring organizations.

243

244 **Appointment of the JEB**

245 The JEB is composed of three representatives, one each, from the three sponsoring
246 organizations:

- 247 • American Public Health Association (APHA)
- 248 • American Water Works Association (AWWA)
- 249 • Water Environment Federation (WEF)

250
251 Each JEB member is appointed by his or her sponsoring organization in a manner decided by
252 that organization.

253 Except for extraordinary circumstances, the position of JEB Chair rotates among the
254 organizations, and the JEB Chair serves in this capacity for one print Edition, by agreement of
255 the JEB.

256

257 *Specific duties of the JEB*

258 On a rotating basis, JEB members take turns presiding over JEB and JEB/PCs meetings, on a
259 frequency determined at their discretion.

260
261 Each JEB member serves as liaison to one or more Parts in *Standard Methods*. The JEB
262 members divide the Parts among themselves based on their respective expertise.

263
264 The JEB Chair acts as Standard Methods spokesperson, drafts correspondence or technical
265 responses for JEB review and publication, and related tasks on behalf of the JEB. Under certain
266 circumstances and when determined appropriate by all JEB members, one or more of these
267 responsibilities may be temporarily delegated to another JEB member.

268
269 The JEB meets as many times per year as deemed necessary, but no fewer than twice per year. It
270 is permissible to hold closed meetings of the JEB when technical matters relating to the
271 development of specific methods are not discussed.

272 The JEB gives final approval to JTG ballots during JEB balloting after ensuring SOPs were
273 correctly implemented and due process followed during method development. This due
274 process ensures all interested parties have a voice and balance is maintained among
275 competing interests.

276 The JEB gives final approval of SMC ballots, not on technical content, but ensuring all processes
277 were adequately followed and documented.

278 The JEB oversees the content of the SM web site including methods publication,
279 announcements, guidance to users, and notices.

280

281 2.3 Part Coordinator

282 In general, the PCs manage JTGs and facilitate communication between the JTG and the JEB.
283 The PC ensures methods within the Part are published, revised, or updated in a timely manner.
284 The PC is also a technical expert for methods in that Part and is able to, with assistance from
285 other experts, provide method interpretation and clarification as needed. PCs need to possess
286 interpersonal skills, be highly organized; and have time to manage administrative tasks (eg,
287 overseeing JTG schedules).

288 A primary function of the PC is to collaborate with JTGs to ensure their smooth and efficient
289 operation. The PC should be skilled in creating schedules and tracking data. A central
290 responsibility of the PC role is to ensure validated methods are developed and published and that
291 existing methods are revised and updated.

292

293 Appointment of a PC

294 A PC is appointed by the JEB for each Part of *Standard Methods*. The selection is based on the
295 individual's relevant expertise and demonstrated performance as a SMC member or JTG
296 member.

297 PCs are appointed for a 5-year term by the JEB Chair, subject to the approval of the full JEB.
298 PCs are eligible for additional terms when recommended by the JEB liaison and approved by the
299 full JEB. A PC may be removed from their position at their own request or at the discretion of
300 the JEB.

301
302 If a PC becomes nonresponsive for 6 months or longer, the JEB liaison or SM Manager contacts
303 the PC by email or phone to determine whether they are able to participate fully as a PC. If a PC
304 expresses interest in continuing but continues to be otherwise unresponsive in terms of fulfilling
305 the obligations of a PC, the JEB notifies them by email or letter that a replacement will be
306 appointed so that the necessary work of a PC can continue. At that time, the PC will compile all
307 relevant communications and documentation related to the work completed while they served as
308 PC and transmit that information to the SM Manager.

309

310 General duties of a PC

311 The PC is responsible for ensuring a review of each method in their respective Part every five
312 years for the purpose of:

- 313 • determining whether an update is necessary
- 314 • updating apparatus requirements to reflect current technology
- 315 • clarifying procedures, and
- 316 • updating terminology or taxonomy.

317 At the request of the PC, the Managing Editor in consultation with the PC and the JEB liaison,
318 can construct a schedule of review that apportions the methods across a 5-year timeline. This
319 timeline does not necessarily correspond to print publication.

320 The PC is responsible for ensuring JTG Chairs are aware of these SOPs and other guidance
321 documents applicable to the performance of the JTG. In addition, the PC is responsible for
322 ensuring the JTG operates under the principles of openness, balance, transparency, consensus,
323 and due process.

324 The PC facilitates operation of a JTG by acting as a liaison between the Chair and the JEB
325 liaison. It is a PC's responsibility to ensure timely work by the JTG, that letter balloting is
326 conducted, and that the final product is within the scope of the charge and of benefit to *Standard*
327 *Methods*. The PC may have multiple JTGs ongoing and should therefore minimize any active
328 roles as part of the JTG.

329 Each PC submits a report to the JEB at the annual JEB/PC meeting covering the progress of
330 work and the recommended actions. If a verbal report is presented, a written report (or minutes)
331 is sent to the SM Manager. If a PC fails to present a report at 2 consecutive meetings, the PC is
332 deemed unresponsive, and another PC appointed as a replacement.

333 If a PC is unable to fulfill their duties due to conflicts of interest the PC notifies the JEB or the
334 SM Manager of their resignation.

335

336 **PC duties and responsibilities regarding method development**

337 If a PC determines that a method update is necessary (the method includes a technical change as
338 defined by this SOP rather than simply editorial changes), the PC enlists a JTG to accomplish
339 these tasks.

340 A PC, along with the respective JEB liaison, recruits JTG Chairs (referred to as Chairs) and JTG
341 members for sections or methods.

342 Along with the JEB liaison, the PC writes a charge to direct a JTG in scope and requirements for
343 a successful project. A charge provides information supplied by the JEB liaison, a designated
344 representative, or the PC and concerns the scope of work for the intended product and timeline
345 for completion. The final charge may be negotiated between the PC, JEB liaison, and the JTG
346 before the JTG begins work.

347 The PC may not, except in rare circumstances and approved unanimously by the JEB, serve as
348 the Chair of a JTG. If Chair, the PC is a nonvoting member.

349 The PC may serve as a nonvoting member to provide technical expertise in the JTG and at the
350 request of the Chair with the approval of two thirds or more of the JTG.

351 The PC maintains a record of JTG proceedings. Copies of all aspects of the record, including but
352 not limited to correspondence, meeting minutes, drafts, ballots, ballot results, ballot comments,
353 resolution or disposition of negative votes and ballot comments, and other related material are

354 transmitted as they are obtained to the designated JEB liaison or SM Manager for use and filing
355 as deemed appropriate by the SM Manager.

356 The JEB may grant an extension of time beyond the 5 years allotted to method development,
357 upon written request of the PC, provided the committee is actively working on a revision,
358 reaffirmation, or withdrawal and provides a schedule for completion which is acceptable to the
359 JEB. The written request is provided to the JEB preferably at least 1 year before the end of the 5-
360 year period and includes a proposed plan for revision, reaffirmation, or withdrawal and a
361 schedule of completion. If the assigned committee fails to develop, by the end of the period 5
362 years after the effective date of the method, a proposed plan and schedule acceptable to the JEB,
363 the SM Manager processes the method for balloting a withdrawal.

364 At the PC's recommendation, the JEB may decide to abandon or postpone the processing of a
365 proposed new or revised methods project.

366

367 2.4 Joint Task Groups

368 A JTG is charged with an integral and significant activity—the review, revision, and approval of
369 a specific proposed section within *Standard Methods*.

370 This section describes when and how a JTG is formed, and how the JTG conducts its charge.

371 A deviation from this procedure may occur if deemed necessary by the JEB due to unexpected or
372 unique problems that may occur during the JTG's review, revision, or approval of a section's
373 method. Deviations are discussed, agreed to, and documented by the JEB and maintained by the
374 SMM as an amendment to the SOP that is then incorporated when the SOP itself is updated.
375 Standard Methods will strive to maintain a balance of interests on the JTG. The JTG may consist
376 of members of the SMC, nonmembers, official representatives, or designated members of
377 organizations, and others who have volunteered and are willing to participate. JTG members
378 must have a substantial concern and competence in the scope of the work of the committee.

379 The JEB is committed to maintaining due process regarding JTG activities described below. Any
380 member of a JTG may appeal, in writing, to the JEB or the SM Manager if they feel that items in
381 the JTG section have not been followed.

382

383 Formation of a JTG

384 The JEB liaison and the PC for the related Part form or reactivate a JTG when a new section or
385 method is to be written or an existing section or method to be reviewed and revised. The JTG
386 consists of a Chair and members recruited from the SMC membership.

- 387 • Reactivation and reformation of a JTG may be done with available previous members or
388 with new members and in accordance with this procedure. Attempts to first contact
389 previous members is highly encouraged to maintain continuity but is not required.
- 390 • The JEB liaison, in consultation with the PC and Chair, determines the JTG scope of

391 activity, develops a charge, and determines a schedule for completion.

392

393 *JTG Chair*

394 Recruiting a Chair is the joint responsibility of the JEB liaison and the PC. Only the JEB liaison
395 can formally appoint someone as a Chair. This appointment must be reported to the SM
396 Manager.

- 397 • Chairs do not need to be a member of a sponsoring society.
- 398 • Chairs are chosen from among persons eligible for classification as User or General
399 Interest members (refer to Definitions).
- 400 • Persons having a declared material conflict of interest are not eligible to serve as Chair,
401 except when their expertise justifies an appointment that will benefit the scientific
402 integrity of the work to be completed and is unanimously approved by the JEB.
- 403 • A person having a declared material conflict of interest may serve as Chair as a
404 nonvoting member.

405

406 *JTG members*

407 Recruiting JTG members is the joint responsibility of the JEB liaison, the PC, and the Chair.
408 Only the JEB liaison can formally appoint someone as a JTG member. All appointments must be
409 reported to the SM Manager.

- 410 • JTG members do not need to be a member of a sponsoring society.
- 411 • There is no predetermined upper limit to the number of members on a JTG, and it is the
412 role of the Chair to determine the number they believe can be managed to accomplish the
413 work. While the JTG may contain both voting and nonvoting members, a minimum of 3
414 total voting members is required.
- 415 • Persons appointed to a JTG are required to update their professional information
416 submitted for SMC membership and to reaffirm their conflicts of interest declaration.
- 417 • The PC may be a nonvoting member of a JTG when their contribution is considered
418 necessary and appropriate. Despite this, the PC's primary role is that of coordinating the
419 JTG activities through the Chair.

420

421 *JTG Balance*

422 It is the joint responsibility of the Chair, the PC, and the JEB liaison to ensure that the
423 composition of JTG membership is balanced to the extent possible with regard to relevant
424 expertise and experience, and competitive commercial or other interest organizations. No single
425 commercial or other interest organization may have a dominant number of members.

- 426 • The Chair, the PC, and the JEB liaison must strive to establish balance of the JTG and
427 take steps to ensure lack of dominance by one interest group (general interest, user,
428 producer; see [Definitions](#). This may include allowing only one person per company to
429 have an official vote.
- 430 • The JTG consists of a balance of members from the primary interest categories. Balance
431 means that no single interest category constitutes more than one half of the membership

432 (one third or less for the Producer category). The PC of a JTG that does not meet the
433 criteria for balance works with the SM Manager to publicize the need for new members
434 from under-represented interest categories, using appropriate outreach methods.
435 • When an exception of membership balance occurs for any reason, the Chair, the PC, and
436 the JEB liaison must prepare a Letter of JTG Membership Exception that presents a
437 rationale in support of the need or reason for the imbalance. This letter is submitted to,
438 and must be unanimously approved by, the JEB before the JTG is allowed to operate
439 under this exception.

441 **JTG member duties**

442 JTG members are expected to actively participate and respond to the directions and requests
443 from the Chair.

444
445 JTG members perform their duties in the best interest of Standard Methods and without
446 exhibiting bias in favor of any other interest group they may represent.

448 **JTG member voluntary departure or removal**

449 At the request of the Chair, the JEB liaison may remove a JTG member from the JTG for lack of
450 adequate participation (eg, not returning multiple JTG ballots), having attempted to coerce a
451 specific vote or another action or behavior determined inappropriate by the JEB (refer to Code of
452 Conduct Section). The member must be officially notified of their pending removal by mail or
453 email.

- 454
- 455 • A JTG member notified of their pending removal from the JTG may appeal the decision
- 456 directly to the JEB within 30 days of the notification date.
- 457 • All JTG member removals must be reported to the SM Manager.
- 458 • A member's removal from a JTG does not affect their membership on the SMC.
- 459

460 Any JTG member who finds it necessary or appropriate to leave the JTG for either personal or
461 professional reasons may do so by notifying the Chair of their decision. The Chair in turn
462 notifies the PC, who then notifies the JEB liaison and SM Manager.

463
464 As long as a member has actively participated on the JTG before leaving the JTG for what the
465 Chair considers substantial in time and contribution, the individual remains listed as a JTG
466 member when the new or revised method is published.

468 **Retiring a JTG**

469 A JTG is considered inactive once the task of developing or revising a section or method is
470 completed and has been approved by SMC ballot.

- 471
- 472 • The Chair remains active and available to assist with addressing future questions
- 473 regarding the method and to participate in the method's 5-year review cycle, and when
- 474 possible, ensures the eventual transition to a new Chair.

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- JTG members remain largely inactive, but in certain circumstances the Chair may contact one or more members to assist with addressing questions that require specific knowledge held by the JTG members.

479 2.5 Staff Members

480 Standard Methods Manager

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- The SM Manager, who is a staff member at one of the sponsoring organizations, acts as Secretary to the JEB.
 - The SM Manager arranges all JEB meetings and takes and distributes minutes.
 - The SM Manager receives and retains for future use all records of SMC proceedings. This includes, but is not limited to correspondence, meeting minutes, drafts, ballots, ballot results, ballot comments, resolution or disposition of negative votes and ballot comments, and other related material. All Standard Methods-related information must be transmitted to the SM Manager as it is completed.
 - The SM Manager monitors the online discussion forum and transmits questions from members to PCs and JEB members.
 - The SM Manager posts information that is provided by the JEB on the online platform.
 - The SM Manager also performs all Standard Methods-related duties, as required by the sponsoring organization and the JEB.

495 Managing Editor

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- The Managing Editor, who edits *Standard Methods* manuscripts for readability, consistency, grammar, sense, and style, works with the SM Manager to provide timely edits before and after the balloting of new or revised methods.
 - The Managing Editor works with the JEB, PCs, and JTG chairs to maintain and improve Standard Methods technical accuracy and works with the typesetting vendor to prepare accurate pages for print and web publication.
 - The Managing Editor suggests updates to the guidance for writing methods ([Section 10](#)).
 - The Managing Editor maintains records of permissions and other materials relevant to the publication of *Standard Methods*.

Section 3. Voting Terminology

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507

508 Voting occurs on ballots that are distributed at three stages:

- 509 • a JTG vote occurs on one or more drafts of a method;
 - 510 • a JEB vote occurs after the review of a method that has exited the JTG drafting process;
 - 511 and
 - 512 • the SMC voting occurs after the JTG and JEB have voted.
- 513

3.1 Ballot Types

514 Balloting is the process of sending ballots to voting members (ie, JTG, JEB, SMVC) for a vote.
515 Ballots result in comments and votes. Described below are the various types of ballots, possible
516 vote types, and comment classifications. For voting procedures, see [Section 4 Method](#)
517 [Development and Balloting](#).

518 *Comment ballot:* A comment ballot is any nonvoting ballot sent out to either the entire SMC or a
519 particular subgroup, such as SMC members who have expressed interest in a specific method. A
520 comment ballot solicits comments on proposed actions [develop, revise, or withdraw a method]
521 or changes to a general information section, or to determine potential interest in new method
522 development areas. The comments returned in these ballots are used by the JEB in determining
523 whether or not to proceed with the proposed activity and to assist in soliciting volunteers.

524 *Voting ballot:* A voting ballot is used to establish consensus. Ballots are returned with one of the
525 following vote options selected by the voter:

- 526 • affirmative
 - 527 • affirmative with comments
 - 528 • negative with comments and supporting data
 - 529 • abstain
- 530
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534 *Letter Ballot:* A letter ballot is a voting ballot that is prepared specifically for a JTG in a letter
535 format. It describes one or more discrete technical edits made to a balloted method that has
536 received a negative vote with a persuasive comment and supporting data. The explicit intent of
537 the letter ballot is to address and resolve a negative vote..

538 *Override ballot:* Final ballot that is sent to SMVC to resolve negative votes that were not
539 resolved by the JTG.

540
541

3.2 Ballot Comment Classification

542 Comments received on ballots are classified as one of three types:

543 *Editorial comment* – A comment provided on a ballot that expresses concern or disagreement
544 with one or more areas of written information regarding the background, method application, or
545 other nontechnical aspects of the language used. The comment does not affect the technical or
546 procedural performance of the method. A persuasive editorial comment must contain supporting
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548

549 information or explicitly provide the preferred language to resolve the issue described in the
550 comment.

551
552 *Persuasive comment* – A comment provided on a ballot with a negative vote is persuasive when
553 it is substantive and supported with data or other technical information. A negative voting ballot
554 that does provide a substantive comment with supporting data or information is not persuasive.

555
556 *Unrelated comment* – A comment provided on a ballot with an affirmative, negative, or abstain
557 vote is unrelated if it refers to existing, previously approved material that the current voting
558 ballot is not addressing.

559
560 Ballot comments may result in editorial or technical changes:

561
562 *Editorial changes* – Editorial changes are not submitted to the SMVC for approval. Editorial
563 changes may be made at any time without a ballot.

564
565 Editorial changes are of three types:

- 566 1) comments which introduce no change in technical content, but correct typographical
567 errors, modify editorial style, change non-technical information, or reduce ambiguity,
568 and,
569 2) those which corrections of typographical errors in substance (essential information that
570 could be misused). In this case, the year designation of the standard is updated to reflect
571 the date of the editorial revision, and.
572 3) updates to tables within the -020 QA/QC sections to reflect newly approved QA/QC
573 requirements in an approved method.

574 If there is doubt as to whether a change is editorial or technical, it is considered a technical
575 change.

576
577 *Technical Changes:* Technical changes are modifications of procedural steps or other changes to
578 a method that may affect the outcome of the method. Examples of technical changes are
579 additions, deletions, or revisions of requirements, or addition of mandatory compliance with
580 referenced standards or methods.

- 581 • If there is doubt as to whether a change is editorial or technical, it is considered a
582 technical change.
583 • Technical changes made to resolve negative votes and all substantive changes are
584 submitted to the JTG in the form of a letter ballot.

585

586 3.3 Negative Vote Classification

587 Ballots returned with negative votes require action. The action taken depends on the
588 classification of the negative vote. Vote classifications and their associated action are:

589 *Persuasive (technical)* – A persuasive technical comment accompanied by a negative vote
590 remands the balloted item to the JTG

591 *Persuasive (editorial)* – The JEB liaison along with the Managing Editor determines whether a
592 comment accompanied by a negative vote is editorial rather than technical according to the

593 criteria contained in this SOP (see [Ballot Comment Classification](#)). A persuasive editorial vote is
594 reclassified as an editorial revision.

595 *Not related* – A negative vote that refers to existing, previously approved material in a method
596 that the JTG was not charged with addressing is not related. A persuasive-not-related negative
597 vote must be addressed by a future JTG formed soon after approval of the method by the SMC.

598

599 **Section 4. Method Development and Balloting**

600

601 Any interested party (whether an SMC member or not) may propose or suggest a new section or
602 method, or the revision of an existing section or method. Criteria developed for submission of
603 new methods must be followed.

604

605 **4.1 Method Development**

606 The following due process standards apply to method development at the JTG and SMC Level.

607

608 **Participation in method development**

609 Any qualified person, or representative of an organization, company, or government agency,
610 with a direct and material interest has a right to participate.

611 Participation is open to all persons who are directly or materially affected by the activity in
612 question. Voting membership is not conditional on membership in AWWA, WEF, APHA, or any
613 other organization. Notice of any action to revise, withdraw, or develop a new method is made to
614 SMC members who have previously expressed an interest in that method. Notices are provided
615 on *Standard Methods* Online with a description of the purpose of the proposed activity.

616

617 **New and updated method requests**

618 A request for a new or revised method includes a written application (email is acceptable) with
619 full information to support the proposal. Preliminary data, which can be readily verified, must be
620 submitted with the request.

621 A method may be developed to help identify and quantitate new compounds of emerging
622 concern or to use a new or improved technique to measure compounds already measured by
623 existing methods.

624 Upon receipt of the completed application and the JEB Liaison along with the appropriate PC,
625 reviews it for completeness and, in consultation with the full JEB, decides whether the proposed
626 new method or revision falls within the scope of *Standard Methods* and if there is benefit to the
627 water and wastewater testing community gained from the new or revised method. The JEB also
628 decides whether a comment ballot is necessary to move the proposal forward.

629 Within 30 days of receipt the JEB determines whether to authorize the development or revision
630 of the method, to issue a comment ballot, to authorize preparation or revision of a method, to
631 consider withdrawal of the method, or to reject the request.

632 Based on the decision of the JEB, the JEB either returns the request to the requester for
633 additional data or moves it forward with the appropriate PC to develop a charge and establish a
634 JTG.

635

636 Charge to the JTG

637 Before beginning method development, the JEB liaison and the PC provide a charge to the JTG
638 that defines the purpose, intended use, and scope of the method. The charge is agreed to by the
639 JEB Liaison, the PC, and the Chair (refer to JTG Charge in [Section 4.2](#))

640 Method development activities may differ depending on whether the method is measuring new
641 compounds for which there are no existing methods or existing compounds for which there are
642 existing methods.

- 643 • Often for existing compounds, the method validation includes a comparison between the
644 older and new method.
- 645 • For new compounds, method development and optimization start from scratch, or
646 potentially from information received by a manufacturer. This is the more complicated
647 method development process because there are no criteria to judge acceptable
648 performance. Preliminary acceptance criteria, such as expected detection limits,
649 precision, and bias, need to be established in the charge as method performance goals.
- 650 • For existing compounds with existing methods, the generally accepted performance
651 criteria would be to meet or do better than performance limits already defined in the
652 existing method. If there are no criteria, the PC or JTG can sample the SMC at large for
653 laboratories already using the existing method to establish industry expected
654 performance.

655
656 Given the complexity and variety of methodologies included in Standard Methods, there are no
657 clear cut or definitive set of instructions for development, optimization, and validation of a
658 method.

- 659 • When planning the development, define the specific analyte or set of analytes in a
660 defined matrix or matrices.
 - 661 • The determination on what matrices and associated variables to include in the method
662 depends on the intended use and application of the final method and should be
663 contemplated during method development activities.
 - 664 • Keep in mind that the higher the number of analytes or matrices included, the more
665 complex the validation can be.
 - 666 • Generally, Standard Methods restricts methods to water and wastewater and other
667 environmental matrices.
- 668

669 Development of a method is an empirical series of steps that determine the most efficient steps to
670 set up and run a test.

- 671 • Optimization of a method is a series of experiments consisting of systematic variations to
672 define critical steps of a new or modified test method in which important errors can be
673 made. Optimization helps define the exact steps an analyst must take to ensure data
674 obtained meets the accuracy and precision requirements of the method.
- 675 • Validation of an analytical method is confirmation, by the provision of objective
676 evidence and examination, that a method meets performance requirements and is suitable
677 for its intended use.
- 678 • The final evaluation, or multiple laboratory study, measures how well the method
679 operates at different laboratories and locations and to quantify acceptable differences in
680 different laboratories. The data collected provides guidance to users of the method on
681 how well different instrument setups and users function on various materials. For some
682 methods, it may also be useful to collect data on variation associated with day-to-day
683 effects or for different calibration times.
- 684 • The multiple laboratory study includes the range of matrices, and analyte concentrations
685 specified in the charge and verified during method optimization.
- 686 • Results of the development and optimization, often referred to as a single lab study, and
687 the results of the multiple laboratory study are compiled by the JTG in a final report
688 submitted to the JEB for use in evaluating the method against the charge.
689

690 Method validation is a practice performed by laboratories to demonstrate their capability of
691 obtaining results that meet the specifications of the method.

- 692 • In environmental testing, method validation usually consists of establishing the
693 calibration range (if applicable), determination of minimum detectable concentration, and
694 determination of precision and bias.
- 695 • For established methods being revised, development and optimization steps are often
696 accomplished by method validation. The method is tested by a JTG laboratory before and
697 after modification and results are compared against the charge. For some modifications or
698 new methods that can be compared to an existing method measuring the same analyte,
699 comparing results of each method to establish equivalency may be sufficient.
700

701 Refer to Part 1000 or other texts which adequately describe approaches to method development.
702 Include these key components, as applicable, in each method:

- 703 1) Introduction and scope
- 704 2) Apparatus
- 705 3) Lower limit of detection
- 706 4) Calibration (if applicable)
- 707 5) Quantitation range
- 708 6) Selectivity
- 709 7) Ruggedness
- 710 8) Interferences
- 711 9) Sampling and sample preservation

- 712 10) Sample holding time and storage
- 713 11) Reagent preparation and storage
- 714 12) Procedure
- 715 13) Repeatability
- 716 14) Reproducibility
- 717 15) Bias

718

719 Standard Methods versus Proposed Methods

720 If a new method described in the proposed new or revised method has a period of documented
721 satisfactory use experience established by the water testing community for not less than five (5)
722 years, it is called a STANDARD Method. If less than 5 years, the method may still be developed
723 and will be labeled as PROPOSED. Once a PROPOSED standard is widely recognized and in
724 use, or has been published for 5 years, the PROPOSED label may be removed.

725

726 4.2 Joint Task Group Charges and Balloting

727 JTG Charge

728 The JEB Liaison, in consultation with the PC and Chair, determines a JTG's scope of work,
729 develops a charge, and determines a schedule for completion.

730

- 731 • The charge does not need to include the details of exactly how the JTG will
732 accomplish its work but is more general so that each JTG has the flexibility to
733 approach the work in a way that is most suitable.
- 734 • Work involving the development of a new method or a significant revision of the
735 method's technical procedure is required to follow the current method development
736 procedure given this SOP or in Section 1040 of *Standard Methods*, whichever is
737 more applicable.
- 738 • Either the PC (typically) or the JEB Liaison prepares an initial draft of the JTG
739 Charge. The draft is reviewed by the JEB Liaison or the PC, as appropriate, and is
740 jointly edited to arrive at a working draft.
- 741 • The working draft of the charge is submitted to the Chair for review and is then
742 jointly edited by the PC and Chair to arrive at the final draft.
- 743 • The final draft of the charge is returned to the JEB Liaison for final review and
744 approval. The JEB Liaison may edit this draft to include clarifications in wording or
745 regarding the deliverables. Any other edits that potentially alter the scope of work or
746 schedule must be returned to the PC and Chair for review and approval.
- 747 • Once approved, the JEB Liaison finalizes the approved JTG Charge on Standard
748 Methods letterhead and submits copies to the Chair, the PC and the SM Manager.

749

750 Executing the JTG Charge

751 The Chair distributes the charge to the JTG members and coordinates a conference call
752 meeting to discuss the charge and the JTG's plans for regular meetings and the overall
753 approach for completing the work.

- 754 • The JTG members review the charge before their first meeting and prepare to
755 participate in a discussion to decide whether any changes regarding additional work
756 or scheduling need to be made to the charge.
- 757 • Before ending this first meeting, the JTG must conclude and confirm that the JTG
758 has reached consensus. If a consensus agreement cannot be reached on either
759 accepting the charge or on any of the proposed amendments to the charge the JTG,
760 the PC, and JEB Liaison should meet again to determine a resolution. If by later vote,
761 a consensus cannot be reached the JTG is disbanded. (see Internal JTG Balloting
762 below).
- 763 • The Chair communicates to the PC in writing the outcome of the meeting and any
764 proposed amendments to the charge.
- 765 • The PC reviews any amendments submitted, seeks clarification from the Chair if
766 needed, and discusses with the JEB liaison if deemed necessary.
- 767 • The amendments are submitted to the JEB liaison for final approval. The JEB liaison
768 amends the original approved JTG Charge, and then reissues the charge as amended.
769

770 The management of the JTG and ensuring the timely completion of the work is the
771 responsibility of the Chair.
772

773 The Chair and the PC communicate on a regular basis, as determined by the Chair and the
774 PC, so that the PC understands the status of the JTG's work and whether there are any issues
775 that requires the help or intervention.
776

777 **Internal JTG Balloting**

778 Internal balloting is required for the JTG's approval of the final section or method developed or
779 revised.
780

781 Internal balloting may be necessary for other decisions in order to progress the JTG's work when
782 a unanimous decision cannot be reached. The Chair must balance the time required to reach a
783 unanimous agreement against when a ballot is necessary to reach consensus.
784

785 A two thirds majority of the combined total affirmatives, and negatives votes received is required
786 to reach consensus.
787

788 A JTG ballot on a new or revised section or method must be conducted by a written or email
789 ballot and the manuscript being balloted must clearly show the new content and revisions being
790 balloted.
791

- 792 • The first balloting of the new or revised section or method must be on the entire
793 proposed section or method.
- 794 • At least a 67% return rate for ballots from official voting members is required and at
795 least a 67% majority from the combined affirmative and negative votes received is
796 required to reach consensus regarding the new or revised section or method content
797 that has been balloted. At the Chair's discretion, subsequent balloting may be limited

- 798 to technical changes made since the previous ballot and may exclude the portions of
799 the section or method not contested during previous ballots.
- 800 • Votes cast may be either affirmative, negative, or abstain.
 - 801 • Each negative vote cast must be accompanied by a detailed explanation of why the
802 JTG member voted "no." This explanation must include a description of the changes
803 needed for the voter to change his/her vote to "yes" and include supporting data or
804 technical reference documents when appropriate.
 - 805 • Any negative vote lacking a detailed and supported explanation is considered
806 "nonresponsive" and treated as though no vote had been returned.

807
808 The period to complete a JTG final balloting is four weeks, unless the JTG unanimously
809 agrees otherwise before the ballot occurs.

- 810
811 • After 2 weeks the Chair must make a positive effort to correspond with any JTG
812 member who has not yet returned their ballot in order to obtain as many ballots as
813 possible by the closing date. Ballots not returned by the closing date are classified as
814 abstention votes.
- 815 • Also, after 2 weeks, the Chair must also notify any JTG member returning a negative
816 vote with insufficient explanation and supporting information to correct the
817 deficiency and to resubmit their ballot by the closing date.
- 818 • Any negative vote received less than 7 days before the closing date and requiring
819 additional explanation or information must be notified to complete and return the
820 ballot within 7 days after the closing date to avoid being considered a nonreturned
821 ballot and reclassified as an abstention.

822
823 After all ballots have been returned and no later than 7 days after the closing date, the Chair
824 must correspond with all JTG members having submitted a substantiated negative vote to
825 work toward resolving the negative.

- 826
827 • The JTG must make every attempt to resolve negative votes.
- 828 • A negative vote may be withdrawn by the negative voter at any time. A withdrawn
829 negative vote allows the item to proceed, in the absence of an unresolved or a
830 persuasive negative vote. A withdrawn negative vote is counted as affirmative unless
831 specified by the voter as an abstention.
- 832 • With consensus of the JTG, the JTG chair may find a negative vote to be unrelated to
833 the item being balloted. Negative votes found to be unrelated to the charge are not
834 factored into the affirmative percentage requirements for consensus. The JTG treats
835 the unrelated negative as an item of new business that may require a new charge and
836 JTG.
- 837 • When the JTG is unable to resolve a negative vote, the unresolved issue must be
838 clearly described so that the PC, and the JEB if necessary, can assist in its resolution.
- 839 • If the negative is not resolved, the prepared description of both sides of the issue is
840 included in the ballot submitted to the JEB.
- 841 • When a negative vote is not resolved by discussion between the PC, the JEB and the JTG,
842 the SMC ballot is accompanied including the exact negative statements from

843 unresolved JTG negative votes, along with the Chair's explanation of the reasons that
844 negative votes have not been resolved. The SMC ballot results provide the basis for
845 resolving the issue.

846
847 After the JTG's final balloting process is complete, the Chair submits the final draft of the
848 manuscript (hereinafter known as "JTG Draft"), along with the ballot results and related
849 explanations, resolutions, and commentary, to the PC and the SM Manager.

- 850
- 851 • The PC reviews the JTG draft, make editorial changes if necessary, and then
852 transmits a copy of the manuscript and any applicable comments, suggestions, or
853 questions, and descriptions of unresolved negative votes to the JEB Liaison.
 - 854 • The JEB Liaison reviews the JTG Draft and make editorial changes if necessary. If
855 either the PC or the JEB Liaison finds the JTG Draft unsuitable in form (e.g.,
856 excessive length) or technical content, then they return it to the Chair with a
857 statement of concerns and suggested revisions.
 - 858 • Once the JTG Draft is complete, the JEB Liaison transmits a copy of the manuscript
859 and any applicable comments, suggestions, or questions and any descriptions of
860 unresolved negative votes to the Managing Editor, copying the SM Manager.

861
862 After the JTG draft is finalized and JTG voting is complete, the Managing Editor edits the
863 JTG Draft for grammar, style, clarity, and readability.

- 864
- 865 • If the Managing Editor has questions regarding the clarity of the technical content or
866 context, the JTG Draft is returned to the JEB Liaison for resolution.
 - 867 • Once all questions are resolved, the Managing Editor completes editing the
868 manuscript (thereafter called "JEB Draft") and transmits a copy to the SM Manager
869 for JEB balloting.

870

871 Post-ballot JTG Responsibilities

872 The Chair and JTG members remain available until the new or revised section or method
873 has been approved by the general balloting of the SMC.

- 874
- 875 • Attempts to resolve all negative JEB or SMC votes must be made by the PC.
 - 876 • When a resolution requires input from the JTG, the PC must consult with the JTG
877 through the Chair.
 - 878 • The Chair and the JTG members assist the PC in developing an acceptable resolution
879 that can be presented to the JEB or SMC member having submitted the negative
880 ballot.
 - 881 • All JEB negatives must be resolved.
 - 882 • When one or more negative SMC votes cannot be resolved, the section or method is
883 approved when the affirmative votes are 90% or more of the combined affirmative
884 and negative votes.
 - 885 • Unresolved negatives are reserved for future consideration.

886
887 After a section or method is officially approved, the JTG is considered inactive.

888

889 **4.3 Joint Editorial Board Balloting**

890 The JEB reviews and approves the JEB Draft and any supplemental documents, such as
891 validation data, study plans, or reports for completeness in relation to the charge and the
892 procedural requirements of this SOP and other Standard Method Guidance documents before the
893 manuscript is submitted for general balloting. Reviewed copies with JEB comments or
894 suggestions are to be sent to the relevant PC and the Managing Editor.

895 The JEB Draft is also accompanied by:

- 896
- 897 • the numerical results of the JTG ballot,
 - 898 • the name and affiliation of all negative voters,
 - 899 • the statements accompanying negative votes,
 - 900 • the JTG's disposition of all negative votes including reasons, and the member
901 classification of each voting member demonstrating JTG balance.

902 If applicable, the JEB Draft is accompanied by the exact statements from any unresolved JTG
903 negative votes, along with the Chair's explanation of why negative votes have not been resolved.

904 The JEB votes on the JEB Draft via written or email ballot. Each negative vote cast must be
905 accompanied by a detailed explanation of why the JEB member voted "no." This explanation
906 must include a description of the changes needed to change the vote to "yes." Any negative vote
907 lacking such a detailed explanation is considered "nonresponsive" and treated as though no vote
908 had been returned.

909 The JEB cannot adjudicate on a technical nature. In cases where the JEB has technical expertise
910 and provides technical comments, they are submitted to the Chair for consideration by the JTG.
911 If the JTG agrees with the JEB's technical comments, then the JTG incorporates them, repeats
912 the JTG ballot, and then submits the method again as a revised JTG Draft to the Managing
913 Editor.

914 The JEB voting period is four weeks. JEB ballots are submitted to the SM Manager.

915 The SM Manager makes a positive effort (via correspondence, e-mail, or telephone) to obtain
916 completed ballots from any JEB member who has not returned a vote by the ballot closing date.

917 The Managing Editor (with JEB and PC assistance, as needed) incorporates the JEB ballot
918 results into the JEB Draft and transmits the resulting draft (hereinafter referred to as "SMC
919 Draft") to the SM Manager for general balloting.

920

921 **4.4 Standard Methods Committee Balloting**

922 The SM Manager submits the SMC Draft to the SMVC for balloting.

- 923
- If applicable, the SMC Draft is accompanied by the exact negative vote statements from
924 unresolved JTG negative votes, along with the Chair's explanation of the reasons that
925 negative votes have not been resolved.
 - For sections in Part 2000 through 10000, ballots of SMC Drafts are only issued to the
926 SMC members who previously agreed to review new and revised sections for that Part.
927
 - For Part 1000, ballots for the SMC Draft are issued to the entire SMC.
928
- 929

930 SMC members vote on the SMC Draft via email ballot.

931

932 **SMC Voting Requirements**

933 The SMC voting period is four weeks.

934 An affirmative vote of at least 90% of the combined affirmative and negative votes cast by
935 official voting members is required with not less than 50% of the official voting members
936 returning ballots.

937 SMC member "no" votes in a general ballot are only considered persuasive when they have
938 specific, substantive technical objections that, if uncorrected, will compromise the method's
939 validity.

- Each negative vote must be accompanied by a detailed explanation of the technical (not
940 editorial) reasons for the negative vote.
- This explanation must include a description of the changes required for the voter to
942 change their vote to "yes".
- Any negative vote lacking a detailed explanation is considered nonresponsive and treated
944 as though no vote had been returned.
945

946

947 The SM Manager makes a positive effort (via correspondence, email, or telephone) to obtain
948 completed ballots from any SMC member who does not return the ballot by the closing date or
949 does not provide detailed explanations for a negative vote. SMC members who do not return
950 ballots or provide detailed explanations with negative votes within two weeks of such positive
951 effort are reported as "not voting despite follow-up."

952

953 **Addressing comments associated with affirmative or abstain votes**

954 If an affirmative or abstain vote includes comments, then the JEB, PC, and Chair must evaluate
955 them to determine if the SMC Draft needs to be modified accordingly. However, they are not
956 obligated to make changes associated with affirmative or abstain votes. The JEB or PC may
957 choose to respond to SMC members who submitted comments in their affirmative or abstain
958 votes.

959

960 **Addressing negative votes**

961 If the JEB Liaison determines that a SMC member's negative vote addresses editorial issues
962 (according to the definitions in this SOP) rather than technical issues, then the negative vote is
963 reclassified as a proposed editorial revision. The SMC member must be notified of this
964 reclassification. If there is doubt whether a negative is editorial, it is considered technical.

965 All SMC members who return a negative vote with a detailed explanation must receive a written
966 response from the JEB Liaison stating how that negative vote was resolved. Options include
967 informing the member:

- 968 • that the comment was reclassified as an editorial revision
- 969 • of the technical revisions there were made to the SMC draft

970
971 The JEB, in consultation with the PC and Chair, determines whether negative votes address valid
972 issues, and if so, change the SMC Draft accordingly and informs the voter.

- 973 • If the negative voter is satisfied by the changes, they can withdraw the negative vote. If
974 the negative voter does not respond within four weeks or other mutually agreed upon
975 time, then the corrections stand.
- 976 • If the negative voter responds and is not satisfied by the changes, then the SMC Draft is
977 remanded back to the JTG for further revision, editing, and balloting.

978
979 If an SMC Draft has undergone technical changes to resolve a negative vote, the altered section
980 is resubmitted to the SMC members in the form of a written ballot. The topic of the written ballot
981 may be limited; the SMC members have 30 days to respond, and only those who responded
982 previously are included. The ballot includes the revisions necessary to satisfy the negative voter,
983 a statement from the JEB Liaison or Chair explaining the changes, and any other supporting
984 material deemed appropriate by the JEB.

985 If the SMC Draft was sent back to the JTG for revision, editing, and balloting then the JTG
986 revised manuscript (called "Revised JTG Draft") is submitted for another JEB vote.

- 987 • If the Revised JTG Draft is approved by the JEB, then a revised ballot is sent to the SMC.
988 Revised manuscripts submitted for re-ballot are only submitted to the SMC members who
989 voted in the original general ballot.
- 990 • The re-ballot includes (as background information) previous ballot results and the
991 negative vote issues that arose.

992
993 If a negative vote cannot be resolved, the SMC Draft is resubmitted to the SMC members in the
994 form of an override ballot.

- 995 • The topic of the override ballot may be limited.
- 996 • The override ballot includes the voter's negative vote statement, a statement from the JEB
997 Liaison explaining why the negative vote has not been resolved, and any other material
998 deemed appropriate by the JEB.
- 999 • The override ballot may include multiple unresolved negative votes, with each presented

- 1000 as a separate voting issue.
- 1001 • Revised manuscript submitted for override ballot are only submitted to the SMC
 - 1002 members who voted in the original general ballot.
- 1003

1004 If unresolved negatives have been submitted for an override ballot and at least two thirds of the
1005 SMC members vote "yes" on the matters, then the original negative votes are considered
1006 resolved.

1007

1008 **Review and comment ballots**

1009 At the JEB's discretion, select sections may be issued to the SMC as Review and Comment
1010 Ballots. These ballots typically are issued to determine whether existing sections need to be
1011 updated to reflect the current state of the science. The voting period for Review and Comment
1012 Ballots is four weeks.

1013

1014 **Procedures after SMC Balloting**

1015 All changes resulting from the general ballot and re-ballots are transmitted to the JEB for a final
1016 procedural approval and then transmitted to the Managing Editor for incorporation into the final
1017 manuscript.

1018 After the final manuscript is edited, the draft returns to the entire JEB and SM Manager who
1019 verify:

- 1020 • that applicable procedures were followed,
 - 1021 • that the proposed standard is within the scope of the charge and is consistent with the
 - 1022 goals of Standard Methods,
 - 1023 • that there is a roster of the consensus body that indicates the vote of each member
 - 1024 including abstentions and unreturned ballots
 - 1025 • that there are no appeals, or that all appeals have been completed,
 - 1026 • that the ANSI patent policy and ANSI commercial terms policy are met, and that there is
 - 1027 a record of all unresolved negative views and objections, with names of the objectors, and
 - 1028 a report of attempts toward resolution.
- 1029

1030 **4.5 Editorial Changes and Deletion of Sections or Methods**

1031 Any interested party may suggest or propose editorial changes.

1032

- 1033 • Editorial changes are text modifications that correct linguistic errors or clarify existing
 - 1034 language in *Standard Methods*.
 - 1035 • Editorial changes must not change the technical basis or steps in a method.
 - 1036 • Editorial changes need not be submitted to the SMC for approval.
- 1037

1038 Sections or methods may be deleted from future editions of *Standard Methods* or from *Standard*
1039 *Methods Online*. Standards may be withdrawn at the discretion of the JEB if the patent policy
1040 was violated, it is contrary to Standard Method interests, it lacks adequate validation data, or it
1041 contains unfair provisions. The reasons for deleting such sections or methods must be stated and
1042 recorded.

1043 Methods with mature technology or practices, long-term widespread use, known acceptable
1044 performance, or incorporated by reference into legislation, are not withdrawn except by full
1045 SMC balloting. However, they must be reviewed every 5 years to affirm they are still in use.
1046 Questions received on these methods by Standard Methods on a technical nature imply a revision
1047 is needed.

1048

1049 4.6 Response Rate and Consensus Requirements at Each Balloting Stage

1050 Required response rates for balloting:

- 1051 • JTG ballots - greater than or equal to 67% affirmative with 67% return.
- 1052 • JEB ballots - 100% affirmative with 100% return.
- 1053 • SMC ballots – 90% affirmative and negative with 50% return.

1054

1055 SMVC ballots remain open until a 50% response is achieved.

1056 If upon repeated contact, a member is deemed nonresponsive, and this is recorded by the SM
1057 Manager. A member who is deemed nonresponsive for more than 50% of ballots in a single
1058 calendar year is removed from the SMVC; response rate calculations for ballots in process at that
1059 time are then recalculated.

1060

Section 5. Conflict of Interest: Disclosure and Procedures

1061
1062

1063 All volunteers active in the Standard Methods organization, including the JEB, PCs, and
1064 those who participate in the SMC and the JTGs must declare conflicts of interest and
1065 adhere to the guidance in this section.

1066 This policy provides for identifying interests, disclosing interests, procedures to be
1067 followed in the event that multiple interests exist, and an appeals process.

1068 Direct any questions about conflict of interest procedures and process to the SM
1069 Manager.

1070

1071 5.1 Definition of Interest

1072 An interest is a role, duty, commitment, obligation or goal. Interests are personal,
1073 professional, financial, and social.

1074 Examples of interests that are separate from the role inherent in participating in the
1075 development of *Standard Methods* include, but are not limited to:

- 1076 • Employment or consultancy with any entity that manufactures or distributes items that
1077 are used by those who implement Standard Methods.
- 1078 • Family relationship or other close personal connection with those employed by producers
- 1079 • Creator or inventor of technology related to a method under consideration or possessing
1080 an interest in a specific apparatus or method that offers a personal or career
- 1081 • Owning stocks or stock options or receiving grants (including speakers' fees,
1082 sponsorships, or gifts) from producers
- 1083 • Representatives (either volunteer or paid) of entities that evaluate methods in the water or
1084 environmental industry

1085

1086 5.2 Definition of Conflict

1087 A conflict exists when a volunteer possesses two or more separate interests that compete,
1088 or could potentially compete, with each other.

1089 Possessing two separate interests of any sort represents a conflict. A conflict does not
1090 imply intent nor error, but the factual existence of circumstance.

1091

1092 5.3 Disclosing Interests

1093 All volunteers must be aware of this conflict of interest policy and must disclose interests
1094 that may result in a conflict or the appearance of a conflict.

- 1095 • A [Disclosure of Interest Form](#) must be completed when a volunteer is requesting
1096 appointment to the SMC. The form must be updated or reaffirmed when joining a JTG or

1097 if being promoted to a PC or JEB member role.
1098 • Standard Methods volunteers must disclose and promptly identify new interests that
1099 could give rise to conflicts of interest regarding projects ongoing at Standard Methods.

1100
1101 Volunteers must complete a new [Disclosure of Interest Form](#) if their funding,
1102 sponsorship, employment, or other interest category changes, before they cast their next
1103 vote.

- 1104 • SM Manager sends a copy of this policy and a COI form to each new member of the
- 1105 SMC and to each member of a newly formed JTG.
- 1106 • SM Manager sends a copy of this form and the COI form to JTG members that have been
- 1107 active for more than one year, when the final JTG vote is taken.
- 1108 • SM Manager requests that PCs and members of the JTG review their COI form that is on
- 1109 file on a yearly basis, most conveniently at the annual meeting.
- 1110 • In the event of an override ballot, the SM Manager sends a COI policy and form to all
- 1111 SMC voters.
- 1112

1113 The SM Manager shares all forms on which interests are reported with the JEB for their
1114 action.

1115 For each interest disclosed, the JEB decides on one of four possible outcomes:

- 1116 1. The JEB requires the volunteer with the conflict abstain from all voting, but still allow
- 1117 the volunteer to participate in technical discussions.
- 1118 2. The JEB requires the volunteer with the conflict abstain from all voting and technical
- 1119 discussion on matters for which there is a conflict.
- 1120 3. The JEB decides the interest creates a situation that disallows participation in JTG or
- 1121 SMC voting. These instances are rare and only when the competing interests may not be
- 1122 mitigated by lesser means (listed below)
- 1123 4. The JEB allows full voting and technical discussion based on a determination that the
- 1124 interest represents a conflict unlikely to result in a material bias (eg, the method is
- 1125 unrelated to a producer's interest, the method is only tangentially related to a specific
- 1126 producer, the material exposed to a conflicting interest is in a context so minor as to be
- 1127 negligible to the discussion)
- 1128

1129 Within 30 days, the volunteer is informed if any of their voting or technical rights are
1130 limited, via email, by the SM Manager after the JEB makes a determination.

1131 No action is taken to inform members who do not have their voting or discussion rights
1132 limited, and these volunteers can assume they have full participation rights.

1133

1134 5.4 Consequences of Behavior Exhibiting Bias or Violating the Code of Conduct

1135 The JEB, as requested by the PC or Chair, may reclassify a volunteer's vote as an abstention if
1136 their behavior indicates bias, including

- 1137 • obstruction of the revision/balloting process,
- 1138 • private calls made to other members to sway or solicit votes,
- 1139 • slanting or failing to report evidence which by omission favors their interest,
- 1140 • ad hominem arguments, and
- 1141 • behaviors that are not consistent with accepted scientific processes (eg, failing to provide
- 1142 evidence of adequate controls, experimental design features that happen to benefit the
- 1143 interest of the volunteer)
- 1144 • violating the code of conduct listed in Section 6 of these SOPs

1145
1146 Explanation of the reclassification with accompanying documentation is sent to the volunteer
1147 within 7 days of the JEB being made aware of the behavior. The explanation is made via email
1148 by the SM Manager.

1149
1150 Appeals of vote reclassification may only be made once.

- 1151 • The appeal is sent to the SM Manager and must be made within 7 days of the
- 1152 reclassification of abstention.
- 1153 • An appeal is forwarded to the SM Partner organizations for resolution.

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Section 6. Code of Conduct and Responsibilities of Membership

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Open participation and the consensus process are core values and the principal strengths of standards development. The consensus process depends on the ability of members to work together with an attitude of collaboration where all interactions are professional. Each member is expected to participate and contribute in good faith to standardization activities and the consensus process.

The Standard Methods organization and partners are committed to serving global water testing needs to positively impact public health and safety, consumer confidence, and overall quality of life. This is achieved by development of consensus standards among our international membership of volunteer technical experts.

The following guidelines are intended to assist volunteers in executing their respective roles and responsibilities. All volunteers must behave in a manner that is consistent with the mission of Standard Methods and its policies, even when the guidelines do not specifically address a given situation.

Standard Methods volunteers work for the benefit of all Standard Methods stakeholders and should recognize that the development of standards is for the benefit of the worldwide water quality community, over and above the interests of any individual, company, or representative organization. Volunteers may represent an individual interest and must be prepared to accept consensus decisions.

Volunteers must uphold the consensus process through openness, transparency, balance, and respect in accordance with the policies set forth by Standard Methods and the JEB.

Volunteers must advocate their position and opinion in a courteous, respectful, and professional manner focusing statements on the scientific, technical, and procedural issues and not on the views of a specific individual or organization. Volunteers must also allow others to present their position and be respectful of their viewpoints.

To remain active, volunteers must perform all duties required of them by the JTG or the SMC, or both. This includes completing and returning ballots, conducting themselves in a professional and respectful manner, and expressing viewpoints courteously in formal debate or through participation in the balloting process. All volunteers must refrain from knowingly disseminating false or misleading information.

Volunteers must read, become familiar with, and adhere to the Standard Operating Procedures and policies governing their specific roles at Standard Methods. JTG chairs, PCs and the JEB must act in an impartial manner in the performance of their duties.

Voting interests and any conflicts of interest of volunteers must be declared for Standard Methods to operate fairly and effectively.

1200 Volunteers must take reasonable steps to ensure that any statements made regarding the
1201 operation or position of Standard Methods are the opinion or position of that individual volunteer
1202 and not representative of Standard Methods.
1203
1204 The Standard Methods logo must not be used by volunteers for making statements or responding
1205 to inquiries.
1206
1207 Official statements may only be made by members of the JEB or by the JEB via the SM
1208 Manager.
1209

Section 7. Antitrust Policy

- 1210
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- 1212 Standard Methods consists of a diverse range of individuals (some of whom may represent
1213 companies and industries) who come together by consensus to develop water and wastewater
1214 standardized methods.
- 1215 Volunteers are subject to federal (including Sherman Act, Clayton Act, Federal Trade
1216 Commission Act, and Robinson-Patman Act), state, and possibly antitrust or competition laws of
1217 countries other than the United States.
- 1218 Volunteers must be aware that they may be held liable for antitrust conspiracy by merely
1219 attending a meeting with inappropriate discussion (i.e., illegal price-fixing) even if not an active
1220 participant. Volunteers should formally object whenever an inappropriate topic is discussed.
- 1221 All Standard Methods activities must be conducted in strict conformity with applicable antitrust
1222 laws. Standard Methods does not condone any violation of its policy in this regard, and any
1223 volunteer who violates this policy is subject to expulsion.
- 1224 Membership in the Standard Methods Committee is not denied to any qualified individual. No
1225 person is unreasonably excluded from participating.
- 1226 JTG meetings are scheduled in advance and members are notified. There must be no discussion
1227 or exchange of any information by or among competitors concerning:
- 1228 1. Prices, price changes, price quotations, pricing policies, discounts, payment terms, credit,
1229 allowances, or terms or conditions of sale.
 - 1230 2. Profits, profit margins or cost data.
 - 1231 3. Market shares, sales territories, or markets.
 - 1232 4. The allocation of customers or territories.
 - 1233 5. Selection, rejection, or termination of customers or suppliers.
 - 1234 6. Restricting the territory or markets in which a company may resell services or products.
 - 1235 7. Restricting the customers to whom a company may sell.
 - 1236 8. Unreasonable restrictions on the development or use of materials or technologies.
 - 1237 9. Any matter which is inconsistent with the proposition that each individual must exercise its
1238 independent business judgment in pricing its services or products, dealing with its customers and
1239 suppliers and choosing the markets in which it will compete.
- 1240
- 1241 Records should reflect a factual, objective, and business-like account of activities.
- 1242 No volunteer of Standard Methods must make any effort to bring about the standardization of
1243 any method for the purpose or with the effect of:
- 1244 a) preventing the manufacture or sale of any product or service not conforming to a specified
1245 standard, or
 - 1246 b) artificially (without legitimate business justification) inflating the price at which a product or
1247 service may be offered for sale or sold.
- 1248

1249 Any volunteer or participant having any questions or concerns regarding the propriety of any
1250 activity being conducted by or on behalf of Standard Methods in light of this Antitrust Policy is
1251 obligated to contact the SM Manager. It is the intent and policy of Standard Methods to comply
1252 with this antitrust policy.
1253

Section 8. Required Actions Before Method Development, Revision, or Withdrawal

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1256

8.1 Proposing a Method or Revision

1258 Any interested party may propose or suggest a new section or method, or the revision of an
1259 existing section or method. Criteria developed for submission of new methods must be followed
1260 and can be found within [Section 4](#) Method Development and Balloting.

1261

8.2 Notice of Intent

1263 The SM Manager publishes a notice of Intent on the *Standard Methods* website regarding any
1264 methods related activity, including but not limited to:

- 1265 • Intent to modify an existing method
- 1266 • Intent to develop a new method
- 1267 • Intent to withdraw a method
- 1268 • Intent to review a method

1269

1270 The notice must be accompanied by a contact for more information and a statement, such as:

1271 *“Notification of this proposed methods activity is being announced to*
1272 *demonstrate the opportunity for participation by all directly and materially*
1273 *affected persons. Any comments asserting that a proposed method conflicts*
1274 *with an existing consensus method developed by another recognized*
1275 *organization should be sent to [Joint Editorial Board Liaison or the Standard*
1276 *Methods Manager (email)] within thirty (30) days from the publication date of*
1277 *this announcement.”*

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Section 9. Procedural Appeals Policy

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Submit procedural appeals to the Standard Methods Joint Editorial Board (JEB) via the SM Manager and include whether an issue was afforded due process.

Appeals procedures provide for participation by all parties concerned without imposing an undue burden on them. Consideration of appeals is based on verification that due processes were followed. Parties who are directly and materially interested in and who have been or will be adversely affected by any procedural action or inaction by Standard Methods regarding the development of a proposed method or the revision, reaffirmation, or withdrawal of an existing method have the right to appeal. The burden of proof to show adverse effect is on the appellant. Appeals of actions must be made within 30 business days; appeals of inactions may be made at any time. Appeals are submitted in writing to the SM Manager, for the action or resolution of the JEB.

Section 10: Guidance for Writing Methods

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1295 10.1 Writing or Revising a Method

1296 When writing a new method refer to the [Section 4.1](#) for guidance. The charge to the JTG
1297 often includes a sample outline and the required elements. The Managing Editor can
1298 supply a styled template in which to write, once an outline is defined, upon request.

1299

1300 The Joint Task Group updates existing methods by reviewing the extant method's content
1301 provided by the SM Manager in Word format. Please do not use any version other than
1302 what is provided by the SM Manager.

1303

1304 Each member of a JTG must submit a [copyright release form](#) to the PC before beginning
1305 the writing or revision process.

1306

1307 10.2 Manufacturer or Supplier Suggestions

1308 To avoid the perception of bias, SMWW does not provide supplier information unless
1309 there is a compelling reason to do so. For example, provide a supplier name if there is
1310 only one supplier and its identity is not readily discoverable with an internet keyword
1311 search.

1312

1313 Use general terminology to describe an apparatus or reagent.

1314

1315 10.3 Suggested Outline

1316 In general, the following sample headings may be used for a newly written chemistry
1317 method. Refer to the charge for specific directions. The JTG chair may discuss the outline
1318 with the PC before writing to ensure appropriate topics are covered.

1319

1320

A. Introduction

1321

- 1321 1. General discussion. Principle about the analyte, why it is tested, what it is tested in.
- 1322 2. Selection of method. Reasons for method development.
- 1323 3. Interferences. Name interferences, particularly those that apply to all methods, and
1324 mitigation at sampling and storage. The validation report requires information
1325 demonstrating the interference, at what concentration it interferes, whether it is positive
1326 or negative interference, and data that show that the mitigation works. Errors in a
1327 procedure are not interferences. Include common procedural issues in limitations.
- 1328 4. Limitations. Compare the different methods with strengths and weaknesses of each so
1329 that people can decide which one to use or use the information when interpreting the
1330 data. In some cases, it may be good to compare with data from different methods. For
1331 example, compound X interferes with Method A but not method B.
- 1332 5. Operating conditions. Include conditions that are applicable for all methods. Otherwise,
1333 operating conditions goes in each specific method.
- 1334 6. Quantitation. Sensitivity, detection levels, and optimal concentration ranges of each
1335 individual method to follow. This information helps in choosing a method. Quantitation
1336 range and detection limits should be experimentally determined.
- 1337 7. Preparation of standards.

- 1338 8. Selectivity. This could also go with limitations or interferences
1339 9. Preparation and storage of samples (interferences may also be discussed)
1340 10. Quality control (applicable to all methods)
1341 11. References
1342

1343 B. Method Name

- 1344 1. General Discussion
1345 2. Apparatus
1346 *a. Apparatus 1*, description: details, if needed.
1347 *b. Apparatus 2*, description.
1348 3. Reagents
1349 *a. Reagent 1*, description. If there are new reagents, then a shelf-life study is
1350 needed.
1351 *b. Special reagents*:
1352 1) Step 1—to prepare reagent, as needed.
1353 2) Step 2—to prepare reagent.
1354 4. Procedure
1355 *a. Sample size*: details either the minimum sample size to achieve the detection
1356 limit and precision of the method, or use the exact size as used in the validation data.
1357 *b. Sample concentration and preservation*: If there is no existing method or
1358 literature, then a preservation study and holding time study is needed. This study may
1359 also need to study the correct containers.
1360 *c. Apparatus assembly*: description.
1361 1) Step 1—as needed.
1362 2) Step 2—description.
1363 *d. Calibration*: description. Describe the calibration range, the fit to be used, and
1364 how to determine whether a curve is acceptable.
1365 *e. Analysis*: Provide the steps needed and describe them in detail so that an
1366 analyst can run samples. Name crucial aspects of the method (things that cannot be
1367 modified). A ruggedness test may be necessary.
1368 5. Quality Control (method specific)
1369 Use experimentally determined limits or limits arbitrarily assigned if data show the
1370 limits can be met.
1371 *a. Blank samples: A maximum allowed concentration in the blank*
1372 *b. Duplicate samples: Maximum RPD*
1373 *c. Laboratory-fortified samples: Recovery limits*
1374 *d. Minimum quantitation levels: Describe how it is determined*
1375 *e. Reporting protocol: Description.*
1376 6. Calculations
1377 *a. Data collection*: description.
1378 *b. Calibration curve*: description.
1379 *c. Continuing calibration and check standards*: description.
1380 7. Precision and Bias
1381 Either a single lab study for repeatability or a multiple lab study for reproducibility and
1382 bias. A multiple lab study is preferred.
1383 8. References
1384

1385 10.4 Tables

1386 Tables may be created to display data that are easier to read in tabular format than
1387 running text. A table consists of a minimum of 3 rows of data.

1388
1389 Each column in a table must have a column heading, including the first one.

1390
1391 Tables are numbered consecutively throughout a section and titles use Arabic numerals
1392 rather than roman numerals. (This is a change from 23rd edition).

1393
1394 *Example:* Table 4500-N:4. Title of Table.

1395
1396 Required information for a new table:

- 1397 ○ Source, if not constructed by the author.
- 1398 ○ Spelling of all abbreviations.
- 1399 ○ References, if applicable.
- 1400 ○ Notes regarding the data that assists the reader's interpretation of the table (eg,
1401 experimental conditions).

1402

1403 10.5 Figures

1404 When updating a method, review the current figures and figure captions. If they appear blurry or
1405 out of date or in any other manner less than desirable, consider providing instructions for having
1406 a replacement figure and figure caption created.

1407
1408 New or replacement figures may be drawn upon request. Please submit the following
1409 information for a new figure request to the Managing Editor, preferably before the final vote of
1410 the JTG. This ensures that new figures are included in the JTG, JEB and SMC balloting material:

- 1411 ○ Source, if not the author.
- 1412 ○ Digital drawing or a photograph of a hand drawing.
- 1413 ○ Figure number, title, and caption. The title names the type of figure and its chief context. The
1414 caption is an explanation of the figure with interpretations.
- 1415 ○ Legend, if applicable.
- 1416 ○ Instructions to the artist.

1417
1418
1419 Images (photographs) are acceptable. Please note the following requirements for image
1420 submission.

- 1421 ○ Resolution: must be 300 dpi at 3" x 3". A photo cannot consist of a screen shot or other low-
1422 resolution image. High resolution images are typically several megabytes in size.
- 1423 ○ Submit as JPG or TIF.
- 1424 ○ Provide color images. The image will appear as grey scale in print and color online.
- 1425 ○ Fill out and submit the [image release form](#).
- 1426 ○ If there are more than two images, fill out and submit the [image submission form](#) so images and
1427 their captions can be appropriately matched.

1428
1429

1430 10.6 References

1431 Appropriate references are:

- 1432 ○ primary sources
- 1433 ○ peer-reviewed scientific literature
- 1434 ○ books, only if seminal and authoritative (as determined by JTG chair or PC)
- 1435 ○ other scientific literature that is reasonably available to peers (accessible via the
- 1436 internet or an interlibrary loan service or in other materials typically available to
- 1437 most readers).

1438

1439 Reference lists

1440 References in methods that are being updated (rather than newly written) must be
1441 reviewed by the task group and updated as necessary. Required updates are:

1442

- 1443 ● New book editions. Book references must reflect the most recent edition. JTG members
1444 should ensure that the information cited is in the new edition. Most books are available
1445 via interlibrary loan through a public or academic library (free of charge). If a book is not
1446 available via interlibrary loan, a source that is more accessible to readers should replace
1447 it, when available.
- 1448 ● Web pages. All web citations should be checked to see whether the page is live, and the
1449 referenced content is still available on the page.
- 1450 ● Delete retired documents from government or other sources from the reference list and
1451 replaced with a current source when available.

1452

1453 Reference format

1454 In-text citations are in the form of superscripted, sequential numerals and

- 1455 ● are appended to the sentence to which the reference refers
- 1456 ● are not attached to titles or headings

1457

1458 The general format of citations in a reference list are as follows:

1459

1460 *Journal article*

1461 Ferraz MA, Alvez AV, de Cassia Muniz C, Pusceddu FH, Gusso-Choueri PK, Santos AR,
1462 Choueri RB. Sediment toxicity identification evaluation (TIE Phases I and II) based on
1463 microscale bioassays for diagnosing caused of toxicity in coastal areas affected by
1464 domestic sewage. Environ Toxicol Chem. 2017;36(7):1820–1832.

1465

1466 *Book*

1467 Synnott JC, West SJ, Ross JW. Comparison of ion-selective electrode and gas-sensing
1468 electrode technique for measurement of nitrate in environmental samples. In: Pawlowski
1469 L, Verdier AJ, Lacy WJ, eds. Chemistry for protection of the environment. New York
1470 (NY): Elsevier Science Publishing Co.; 1984. p. 143-154.

1471

1472 *Web page*
1473 Title of homepage. Edition. Publisher; date of publication [date updated; date accessed].
1474 URL.

1475 Example of web page citation:

1476 [APSnet: Plant pathology. American Phytopathological Association; 2005 \[revised 2020;](http://www.apsnet.org/)
1477 [accessed 20 June 2005\]. http://www.apsnet.org/](http://www.apsnet.org/)

1478
1479 If a reference does not fall in the category listed above, please provide the document or
1480 its URL. The Managing Editor will format the reference appropriately.

1481

1482 10.7 Bibliography

1483 When updating a method, references in a bibliography should be moved to the reference
1484 list and cited in the text or deleted. New and updated *Standard Methods* no longer contain
1485 bibliographies because an evidence based method should be connected to the evidence
1486 that supports it, rather than generally listed.

1487

1488 Exceptions to this guidance exist particularly in the biological sections where seminal reference
1489 works describing the identification and classification of organisms are helpful and beyond the
1490 scope of *Standard Methods*. Please discuss exceptions with the PC or Managing Editor.

1491 In a section where seminal references works are helpful for readers to review or consult,
1492 these may be included in the reference list using the example below.

1493

1494 *More information on [specific topic] can be found in relevant resources.*²⁻⁶

1495

Appendices

1496

1497

1498 [Components of a Method Validation](#)

1499 [Disclosure of Interest Form](#)

1500 [Copyright Release Form](#)

1501 [Image release form](#)

1502 [Image submission form](#)

Standard Methods Components of a Method Validation (Parts 3000, 4000, 5000, and 6000)

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The following data must be collected, if applicable, for new or revised methods and compiled in a validation report. The validation report must be submitted with a new or revised method.

If the new or revised method is being proposed for approval for compliance reporting, it must be submitted to the US EPA by the SM Manager at the request of the JEB.

1. Introduction and Justification

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Include a section or sections to explain what the analyte is and why it should be tested. Also identify the testing technique used in the method and the benefits of the technique compared to other techniques used for determining the analyte. Describe how the method was optimized or improved over other methods. For example, explain reasons for choosing specific operating conditions, particular reagents, or apparatus that contribute to the optimization or overall improvement of the method.

1520

2. Apparatus

1521

1522

Provide a detailed non-vendor specific description of the test apparatus including a brief description of how it works. This may be done using a figure or flow chart.

1523

3. Reagents and Materials

1524

1525

1526

Briefly describe any method-specific reagents or materials used. If method-specific reagents are used describe their preparation, storage, and shelf-life. Include a shelf-life study if there are no existing data.

1527

4. Sampling and Sample Preservation

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1529

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Describe the sample containers required, minimum volumes, and storage preservation including temperature and any chemicals added to extend the holding time. If the method analyzes new parameters or changes the preservation from an existing method, then include a holding time study.

1532

5. Linearity

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The first step in method validation is to ensure that in a non-interfering matrix (such as reagent water) a concentration proportional response can be established. For example: a linear curve of concentration versus signal, or an increasing volume of titrant with increasing concentration. If the method uses an instrument, a calibration curve is established. Linearity is the ability of the method to elicit test results that are directly, or by a well-defined mathematical transformation, proportional to analyte concentration within a given range. The validation report must state how linearity is established and how a user determines whether the system is calibrated correctly (acceptance criteria). For the study, perform 3 to 5 repeats of the calibration to demonstrate repeatability. For qualitative tests, linearity is not established. In

1543 addition, for expected US EPA approval of the method, include a minimum of 5
1544 points if the calibration is linear and 6 or more points for second order fits.

1545 **6. Limit of Detection and Limit of Quantitation**

1546 Seven replicates of the lowest calibration standard or 7 replicates of a blank
1547 interference-free matrix (usually reagent water) can be used to estimate the lower
1548 limit of detection (LOD). If the analyte is not found in blanks, it is not required to run
1549 blanks, however, data showing a lack of analyte in the blanks is required.

1550 Multiplication of the standard deviation of the 7 replicates by 3.14 estimates the
1551 detection limit. Multiplying the detection limit by 3.18 (standard deviation of the 7
1552 replicates times 10) estimate the limit of quantitation (LOQ). Other statistical
1553 methods may be used to estimate the LOD or LOQ as long as the approach is defined
1554 by the validation plan.

1555 **7. Repeatability and Recovery in a Non-Interfering Matrix (1040 B.1 modified)**

1556 Measure a low concentration, mid concentration, and high concentration in at least
1557 triplicate to determine precision and recovery across the expected range of the
1558 method. This requirement applies to all methods that are quantitative. It is permissible
1559 to use the LOD determination (7 replicates) for the low concentration. In addition, if
1560 establishing criteria to demonstrate analyst capability, perform 4 rather than 3
1561 replicates at the midpoint. Calculate the percentage of RSD and recovery for each
1562 concentration.

1563 **8. Interferences**

1564 Using knowledge of the technique or a literature search, determine or estimate
1565 expected interferences. Test the method by adding known concentrations of the
1566 suspected interference to the interference-free blank matrix and to the interference
1567 free-blank matrix containing the analyte at the LOQ. Measure the effect of or absence
1568 of interference up to the expected concentration of the interference in average
1569 samples or up to the point that the interference significantly affects results. Record the
1570 interference in the method and include potential mitigation. If the interference can be
1571 mitigated, include tests with and without mitigation

1572 **9. Procedure**

1573 Describe the steps necessary to perform the analysis.

1574 **10. Ruggedness (1040 B.3)**

1575 Ruggedness is the determination of aspects of the test that significantly alter test
1576 results if modified; or ruggedness determines which aspects of the test cannot be
1577 modified. Section 1040 B.3 describes a factorial design that can be used. However,
1578 the method developer can use other techniques if critical elements of the test are
1579 documented. The final method must include tolerance limits, such as for reagent
1580 volumes, sample weights and volume, digestion times and temperatures, or must
1581 strictly define steps of the method for which modifications are not allowed.

1582 **11. Repeatability and Recovery in Representative Matrices**

1583 Select 3 to 6 matrices similar to the matrices to be named in the applicability section
1584 of the method. For example: surface water, ground water, tap water, wastewater
1585 effluent, and wastewater influent. Measure the analyte in each matrix using the same
1586 method conditions that have been established in steps 1 to 5. If analyte is present
1587 perform replicate analyses to establish repeatability and spike at concentrations to
1588 approximate the concentrations tested in step 3. If there is no analyte (or very little
1589 analyte) in the samples, spike in triplicate at the same concentrations used in step 3.
1590 Compare recovery and repeatability. Alternatively, plot the expected concentration
1591 versus found concentration of the results from step 3 and step 6. Compare visually.
1592 Ideally, the lines are nearly identical with approximately the same slope. If one matrix
1593 has a significantly different slope and all calculations are correct, there is an
1594 interference. Either find the interference and repeat steps 4 to 6 for that matrix,
1595 remove the matrix from the method applicability, or caution users of the method of
1596 the potential interference in that matrix.

1597 **12. Collaborative Test (1040 C)**

1598 Use the same matrices tested in step 9. In a collaborative test, multiple laboratories
1599 use the new or revised test method to analyze the matrices to determine the method's
1600 bias and reproducibility as would occur in normal practice. Laboratories receive the
1601 completed method and are expected to follow the method as written. Because step 9
1602 demonstrated no interferences across the range of the methods, select matrices each
1603 with 1 concentration, but concentrations that bracket the range. For example: Matrix 1
1604 = 1 ppm, Matrix 2 = 2 ppm and so forth. Involve at least 3 (preferably more)
1605 laboratories and analyze at least 2 replicates of each matrix per lab. Additionally,
1606 each participating collaborative laboratory must determine their respective MDL and
1607 perform a demonstration of capability.
1608

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Standard Methods for the Examination of Water and Wastewater

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Disclosure of Interest Form

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1612 A conflict of interest exists when a volunteer possesses two or more separate interests that
1613 compete, or could potentially compete, with each other. Possessing two separate interests of any
1614 sort represents a conflict. A conflict does not imply intent nor error, but the factual existence of
1615 circumstance.

1616

1617 Competing interests do not necessarily preclude participation in the SMC (or a JTG, if relevant).
1618 However, any balloting or final work submitted is reviewed against the information provided
1619 below to determine whether voting processes require alteration (see SM SOP Section xx.
1620 Disclosure of Interest).

1621

1622 Please indicate whether you have an economic interest in, or act as an officer or a director of, any
1623 outside entity whose financial interests would reasonably appear to be affected by your
1624 appointment to the SMC (or to a JTG, if relevant). Also, disclose any personal, business, or
1625 volunteer affiliations that may give rise to a real or apparent competing interests.

1626

1627 Relevant federally and organizationally established regulations and guidelines in financial
1628 conflicts must be abided by.

1629

1630 Please describe below any relationships, transactions, positions you hold (volunteer or
1631 otherwise), or circumstances that could be perceived as holding a competing interest:

1632 I have no interest to disclose, apart from my role at *Standard Methods*.

1633 I disclose the following interests (role, relationship, position, responsibility, benefit):

1634 1. _____

1635 2. _____

1636 3. _____

1637 I hereby certify that the information above is true and complete to the best of my knowledge.

1638

1639 _____

1640 **Signature**

Date

1641 Name (print): _____



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