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AATCC Style Guide for Writing Test Methods and Procedures

1. Foreword

1.1 AATCC standards are used in many different ways, and by many different types of users. Hence, it is important that they be written in a precise manner.

1.2 The numerical results obtained by AATCC test methods and procedures may be used by interested parties to establish pass/fail criteria. AATCC policy does not allow the Association to establish such criteria.

2. Purpose and Scope

2.1 This style guide provides instruction for the organization and content of AATCC test methods, evaluation procedures, and laboratory procedures. AATCC monographs are not required to follow the style listed in this document though it may still serve as a useful guide.

2.2 This document includes general guidelines and examples to cover most cases. Committees should consult with AATCC RA99 and/or ECR to address special cases requiring modification of the guidelines.

3. Referenced Documents

3.1 AATCC M9, A Summary of ASTM Methods for Interlaboratory Testing (see 33.1).

3.2 AATCC M11, A Glossary of AATCC Standard Terminology (see 33.1).

3.3 ASTM D1776, Standard Practice for Conditioning and Testing Textiles (see 33.2).

3.4 ASTM D2906, Standard Practice for Statements on Precision and Bias for Textiles (withdrawn, see 33.2)

3.5 ASTM E1402, Standard Guide for Sampling Design (see 33.2).

3.6 *The ISCC-NBS Method of Designating Colors and Dictionary of Color Names*, K. L. Kelly and D. B. Judd, NBS Circular No. 553, 1955, U.S. Government Printing Office, Washington, DC, USA (available at https://archive.org/details/circularofbureau553unse/page/2).

4. Guide for: Sections

4.1 All AATCC test methods, evaluation procedures, and laboratory procedures are required to contain the sections identified in the list below by an asterisk. Standards may also contain the additional sections shown in the list. However, to promote uniform style, the additional sections may only be used in the sequence shown. Titles or headings of the sections may not be replaced with other terms.

4.1.1 The following is the prescribed order for the text of AATCC test methods and procedures:

*Title
Foreword
*Purpose and Scope
*Principle
Referenced Documents
Terminology
*Safety Precautions
Limitations
Apparatus, Reagents, Materials**
Verification, Calibration**
Sampling
*Specimens
Conditioning
Preparation of Apparatus, Reagents**
*Procedure
*Calculations, Evaluation**
*Report (not required for laboratory procedures)
*Precision and Bias (not required for laboratory procedures)
Notes
*History
Appendices
*Required section
**Use appropriate heading

4.2 Using the modified decimal system, number each series of sections and subsections serially and set off these numbers by periods (decimal points) to indicate the particular part of the standard from the largest section, down to the individual paragraphs. For example: "2." indicates the second principal section of a standard; "2.3 and 2.14" designate respectively the third and fourteenth subsections of primary section 2.; similarly, "2.14.10" designates the tenth paragraph of the fourteenth subsection of the second section of the standard.

4.3 Use no longer than three-place numbers. For example: A two-place number means 2.14; a three-place number means 2.14.1 or 2.14.10. This numbering not only shows at a glance the arrangement of the written material, but also permits simple and specific cross referencing. Numbers with more than three places defeat the purpose of simplicity.

5. Guide for: Designation

5.1 The official designation for the standard appears at the top of the first page, above the title.

5.2 All designations begin with "AATCC."

5.3 Designations include a 1- or 2-letter code indicating the type of standard. The words are *not* spelled out in the designation.

TM: Test Method
EP: Evaluation Procedure
LP: Laboratory Procedure
M: Monograph

5.4 Designations include a number (Latin numerals) immediately after the code. There is no space between code and number. Numbers are assigned chronologically for each type of standard. If a standard is withdrawn, that number is not reused unless the standard is reinstated. Numbers may be 1-, 2- or 3-digits. For example, AATCC TM6 or AATCC LP1.

5.5 The code and number are followed by a hyphen and the year the standard was approved or the year of the last technical revision. For example, AATCC TM6-2016.

5.6 If a standard is technically revised a second time in the same year, append the letter "t" to the year. For example, AATCC TM135-2018t was revised in June 2018, following a revision in January 2018.

5.7 If a standard is reviewed and reaffirmed with no changes, append the year of reaffirmation in parentheses. For example, AATCC TM198-2011(2013) was technically revised in 2011 and reaffirmed in 2013. No changes were made in 2013.

5.8 If a standard is editorially revised, append the letter "e." It is not necessary to indicate the year of the editorial revision in the designation. For example, AATCC TM61-2013e was technically revised in 2013 and editorially revised in 2016.

5.9 The same designation format should be used throughout the standard and in any external references to the standard. The portion after the hyphen may be omitted where is it clear that the reference is intended to indicate the most recent version of the standard. For example, AATCC TM6 indicates the most recent version published at the time it is read. AATCC TM6-2016 indicates the version of the standard published in 2016, regardless of when the reader comes across the reference, or how many times it has since been revised.

6. Guide for: Title

6.1 Begin the title with the type of standard. For example, "Test Method

for…," "Evaluation Procedure for…" or "Laboratory Procedure for…" Monograph titles are not required to begin with the word Monograph.

6.2 Name the property to be measured, not some quality to be inferred. Keep the title explicit and terse. For example: "Strength Loss in Rayon Cloth by Exposure to Sulfurous Acid"; not "Resistance of Fabric to Acid Damage." "Biological Oxygen Demand in Textile Mill Effluents" not "Stream Sanitation."

6.3 To simplify finding standards in alphabetical listing, use key words that describe the general nature of the test or procedure in the beginning of the title, followed by more specific descriptive terms. For example, AATCC TM162, Test Method for Colorfastness to Water: Chlorinated Pool. Review existing standard titles and use similar wording where applicable. For example, "Colorfastness to…" not "Color Change in…"

7. Guide for: Foreword

7.1 A history of the rationale for the development of the standard may be included to help clarify the need for the standard, particularly if similar standards exist. Keep the source of all standards anonymous; individual companies should not be credited for AATCC standards.

8. Guide for: Purpose and Scope

8.1 Name the properties to be addressed (including any characteristics that may be related to those properties.

8.2 Name the material(s) to which the standard is applicable.

9. Guide for: Principle

9.1 Briefly state the technique covered in the standard, outlining the fundamental physical and chemical concepts involved.

9.2 Provide the metric or scale for reporting results.

9.2.1 EXAMPLE: Results are reported as a Gray Scale for Color Change grade of 5 to 1, with 5 representing no color change and 1 representing the most color change.

10. Guide for: Referenced Documents

10.1 Begin the section with instruction to use current publications. Place the statement prior to any numbered subsections.

10.1.1 EXAMPLE: NOTE: Use current versions of all publications unless otherwise specified.

10.2 List all references in alphabetical order.

10.3 List any AATCC, ASTM, ISO or other standard cited, by numerical designation, and title. Include a reference to the note indicating how to obtain the standard. For example, AATCC TM6, Colorfastness to Acids and Alkalis (see 15.1).

10.4 List any articles, chapters, or other publications cited, using the ACS format.

11. Guide for: Terminology

11.1 Define all terms not found in the ordinary desk dictionary, and all terms used in some specialized sense. Define terms that are used only in one restricted branch of the textile industry. If a definition is taken from some other publication, quote it in full and give due credit by complete attribution.

11.2 Define all key terms in titles to ensure that all persons referring to or using the standard understand its intent.

11.3 All terms listed in AATCC standards are compiled in AATCC M11. Review existing terms to avoid duplication or conflicting definitions. Consider if terms will be used beyond the standard. Whenever possible, write definitions that may be used more broadly. If definitions are specific to the standard only, include limitations in italics.

11.3.1 EXAMPLE: **transmittance**, n.—*of light*, that fraction of the incident light of a given wavelength which is not reflected or absorbed but passes through a substance.

12. Guide for: Safety Precautions

12.1 Include a generic caveat on precautions in all test methods and procedures.

12.1.1 EXAMPLE:

X.X The safety precautions specified in the method/procedure are ancillary to the testing procedures and are not intended to be all inclusive.

X.X It is the user's responsibility to reference applicable safety data sheets, use safe and proper techniques, and wear appropriate personal protective equipment in handling materials in this standard.

X.X Users MUST consult manufacturers for specific details such as equipment operating instructions and other recommendations. Consult and follow all applicable health and safety regulations (e.g., OSHA standards and rules).

12.2 DO NOT include additional guidance regarding OSHA standards, safety glasses, or other precautions covered by the generic caveat.

12.3 If specific precautionary statement(s) are necessary, include them in the body of the test method or procedure. Do not prescribe specific remedial measures and actions. However, the text may reference authoritative sources where reliable information concerning remedial measures can be obtained.

12.4 When a specific precautionary statement(s) exists, reference the appropriate section(s) following the generic caveat.

12.4.1 EXAMPLE: See 6.7 for additional safety precautions related to handling acids.

13. Guide for: Limitations

13.1 State where the results are not useful and where they might be misleading.

14. Guide for: Apparatus, Reagents, Materials

14.1 Separate the subject into two or three separate sections if there will be more than 10 items per section.

14.2 At the beginning of the section(s), reference a text note regarding sources.

14.2.1 EXAMPLE (to appear in Notes section at end of document): For potential apparatus, reagents or materials sources, visit the AATCC Buyer's Guide at www.aatcc.org/bg. AATCC provides its Corporate members the option to list their items and services. AATCC does not qualify, or in any way approve, endorse or certify that any of the listings meet the specifications in its standards.

14.3 For items available directly from AATCC, reference a text note for contact information.

14.3.1 EXAMPLE (to appear in Notes section at end of document): Available from AATCC, PO Box 12215, Research Triangle Park NC 27709, USA; +1.919.549.8141; ordering@aatcc.org; www.aatcc.org.

14.4 For items available from *only one known sourc*e, reference a note indicating the source. If multiple sources exist, include only the general reference to the AATCC Buyer's Guide.

14.5 List general name of each apparatus, reagent or material. Include descriptive details following a comma, or in an Appendix.

14.5.1 EXAMPLE: Bell jar, 4 L, with a glass plate base.

14.6 Do not include preparation of reagents or calibration of apparatus in this section.

14.7 Include as apparatus only special equipment that is not in the catalogs of laboratory supply houses, or apparatus that is rarely used. Include spectrophotometers and projection microscopes. Do not include such ordinary items as scissors. Common glassware, such as beakers, burettes, and flasks, need not be listed, but may be listed, if efficacy is enhanced.

14.8 List all reagents—acids, bases, salts, etc.—using chemical names not trade names.

14.8.1 EXAMPLE: sodium hydroxide. (not "caustic soda").

14.9 Include chemical formulae for all reagents. If a complex organic compound is used, the formula may be omitted but the proper name as accepted by the

Geneva Convention should be used.

14.10 List all dyes using CI numbers.

14.11 Unless otherwise stipulated, assume all chemical reagents are of ACS Reagent quality.

14.12 Include as materials, specialty items like multifiber fabric, standard color swatches, standard photographs of defects and reference spectra.

15. Guide for: Verification, Calibration

15.1 Instruments and equipment must be periodically verified to protect against any drift due to time, wear or accident. Checks may be made by the operator every time a test is performed. Include these checks in the Preparation or Procedure section.

15.2 The check may be rarely performed, as when installing new apparatus or setting up after a major relocation. Infrequent checks belong in a separate Appendix.

15.3 Checks may be performed daily, like checking the zero point of analytical balances. The check may be part of good laboratory management that is performed as weekly or monthly routine. Include in this section verifications that are part of laboratory routine and which should be put on a regular schedule.

15.4 Include only verification steps that are applicable to all suitable apparatus. For machine-specific verification or calibration, reference manufacturer's instructions.

15.5 Besides mechanical adjustments, include calibration curves, standard curves and verification of normality (or molarity) of standard solutions.

16. Guide for: Sampling

16.1 Include a generic caveat on sampling in all test methods and procedures. Include ASTM E1402 in the Referenced Documents section.

16.1.1 EXAMPLE:

X.X Test results are valid only when the samples are statistically representative (see ASTM E1402).

X.X Sampling must be random. Every unit of product must have a mathematically equal chance of becoming a sample; and every portion of each sample must be equally likely to become a test specimen.

X.X All specimens must be alike within the variations due to pure chance. There must be no differences within samples assignable to known causes.

17. Guide for: Specimens

17.1 Describe the size, shape and weight of specimens. Include any limitations on the location or choice of test material.

17.2 Indicate the preferred number of specimens per sample.

17.3 Include a generic statement regarding the number of specimens and a reference to the Precision subsection of the standard if desired.

17.3.1 EXAMPLE: Additional specimens may be used to increase the precision of the average (see Precision).

17.4 Include all preparatory or preliminary steps for specimens such as trimming edges, pulling threads to trace weave patterns or attaching multifiber fabric swatches.

18. Guide for: Conditioning

18.1 If specimens or other materials must be conditioned for testing in the standard atmosphere for textiles (or other atmospheric conditions), indicate the conditions and other details. Refer to ASTM D1776 for complete conditioning information. In most cases, a general summary of conditioning parameters (see 18.1.1) is sufficient. For testing moisture-sensitive properties, additional details or reference to ASTM D1776 may be required.

18.1.1 EXAMPLE: Condition specimens [and/or other materials] for at least 4 h in an atmosphere of 21 ± 2°C (70 ± 4°F) and 65% ± 5% RH by laying each specimen [and/or other materials] separately on a screen or perforated shelf of a conditioning rack.

18.2 If testing should be performed in the standard atmosphere for textiles, note this in the Procedure section.

19. Guide for: Preparation of Apparatus and Reagents

19.1 Include all preparatory steps for reagent preparation and apparatus set-up (e.g., leveling and adjusting). Do not include steps already described in Verification or Calibration sections. Reference, but do not repeat steps included in an Appendix. Include only those steps that are applicable to all suitable apparatus. For machine-specific verification or calibration, reference manufacturer's instructions.

20. Guide for: Procedure

20.1 Procedures are operating instructions for technicians and must permit trained technicians, working in separate laboratories, to obtain results that are comparable within agreed limits, with little or no other guidance.

20.2 State all operating instructions clearly, simply and unequivocally. Leave no room for differing techniques. Recite every needed detail in proper sequence.

20.3 Write procedures in the second person imperative format.

20.3.1 EXAMPLE: Cut specimens… (not "Specimens shall be cut…")

20.4 If the container is a critical item, name it.

20.4.1 EXAMPLE: a 250-mL wide-mouthed Erlenmeyer flask.

20.5 If time is important, state narrow limits.

20.6 Specify temperature (and other measures) objectively.

20.6.1 EXAMPLE: water at 140-160°F (not "hot water.")

20.6.2 EXAMPLE: water at room temperature (not "rinse in cold water.")

20.7 Include tolerances (or minimum/maximum) for all measurements.

20.7.1 EXAMPLE: add 10.00 ± 0.02 mL (not "add exactly 10 mL.")

20.8 Indicate the number of significant figures to record in observations. Be sure the accuracy is mathematically justified.

20.9 When two equally acceptable procedures give statistically interchangeable results, spell out each procedure and state that either may be used.

21. Guide for: Calculation, Evaluation

21.1 Calculation involves straightforward computation without exercise of opinion. Include as calculation all requisite algebra and arithmetic. State exactly what is to be computed and how. State the number of significant figures required in all calculations.

21.2 For subsequent reference in texts, number each equation in a sequence by "Eq." and a numeral in parentheses at the right margin of the line.

21.3 Indicate multiplication by parentheses (( )) and division by the solidus (/).

21.3.1 EXAMPLE: $x = 100\ (A - B)/C$ *(Eq. 1)*

21.3.2 EXAMPLE: $y = 100\ (0.00587)\ (A - B)/C$ *(Eq. 2)*

21.4 Keep formulas on one line of typescript if possible.

21.5 Use symbols in current use.

21.5.1 EXAMPLE: For x is less than or equal to y, write: $x \leq y$

21.6 Restrict equations to symbols and numerals.

21.6.1 EXAMPLE:

$x = 100\ (A - B)/C$ *(Eq. 1)*

where:

x = iron as Fe, percent of oven dry specimen weight.

21.7 Keep all numerals at the left side of expressions that contain both numerals and letters.

21.7.1 EXAMPLE: $x = 100\ (0.00587)\ (A - B)/C$

21.8 Do not condense chemical or physical equations. It makes checking of computations difficult.

21.8.1 EXAMPLE $x = 100\ (0.00587)\ (A - B)/C$ (not $0.587\ (A - B)/C$

21.9 Confirm the position of the decimal point in all decimal fractions by putting a zero in the units column.

21.9.1 EXAMPLE: $a = 0.3010B$

21.10 When a mathematical development requires two or more lines, place

the statements in column, repeating only the equality sign.

21.10.1 EXAMPLE:

$n = (t^2)(v^2)/(e^2)$ *(Eq. 3)*

$= (1.96^2)(7.5^2)/(5^2)$

$= 8.6$

= 10 (to the nearest higher multiple of 5)

21.11 Show the basis of percentage statements.

21.11.1 EXAMPLE: Moisture content, % of conditioned weight.

21.12 Include a sample computation whenever an equation is long, involved or in the least degree difficult to reduce to English.

21.13 Use the heading "Evaluation" in place of or in addition to "Calculation" when the results are expressed in descriptive form, relative terms or as abstract values. Such results may be expressed in terms of a 5 to 1 rating scale with 5 being best and 1 being worst.

22. Guide for: Report

22.1 Require the tested sample to be described or identified.

22.2 Require that the standard be cited, including the option or test used if there is a choice.

22.3 Indicate the testing conditions to be reported.

22.4 Indicate the test results to be reported.

22.4.1 Include a sample work sheet or report form if data collection, reporting or calculation may be misunderstood based on the written text.

22.4.2 Most reports containing numerical data should include, as a minimum:

(a) Arithmetic mean or average (X)

(b) The number of tests (n)

(c) Standard deviation (s) or coefficient of variation ($\%CV$)

Statement of a mean without the number of tests and precision is essentially useless.

22.4.3 AATCC policy prohibits endorsement of specifications or pass/fail criteria. The ratings suggested in some of the standards serve as a guide; but they are not intended for and must not be construed as pass/fail criteria.

22.5 Require any modifications of the standard to be reported.

22.6 EXAMPLE:

X. Report

X.1 Describe or identify the sample tested.

X.2 Report that the sample was tested using AATCC TM15-2018.

X.3 Report the testing conditions:

X.3.1 Wet pickup (%).

X.3.2 Evaluation procedure for color change (AATCC EP1 or AATCC EP7).

X.3.3 Evaluation procedure for staining (AATCC EP2, AATCC EP8, or AATCC EP12).

X.4 Report the test results:

X.4.1 Color change grade for tested specimen.

X.4.2 Staining grades for each fiber type in the multifiber fabric and undyed adjacent fabric, if used.

X.5 Describe any modification(s) of the published standard, including use of an alkaline perspiration solution.

23. Guide for: Precision

23.1 *Precision.* A statement on precision allows potential users of the test method to assess in general terms its usefulness in proposed applications. A statement on precision is not intended to contain values that can be exactly duplicated in every user's laboratory. Instead, the statement provides guidelines as to the kind of variability that can be expected between test results when the method is used in one or more reasonably competent laboratories, and when the test method's use is in statistical control. No valid statement can be made about precision unless the use is in statistical control.

23.2 Refer to AATCC M9 or ASTM D2906 for details on conducting interlaboratory studies and analyzing data for a precision statement. File the data obtained in the interlaboratory study and the detailed analysis of the data at the AATCC Technical Center.

23.3 Every test method should contain a statement (1) about the precision of test results obtained in the same laboratory under specifically defined conditions of *within-laboratory* variability, and (2) about the precision of test results obtained in different laboratories. The specifically defined *within-laboratory conditions* may concern test results obtained on the same material by the same operator using the same equipment within a short period of time, or *within-laboratory* precision may be reported for other specific conditions; for example, between days or between operators. Describe the particular within-laboratory variability for which precision is reported in detail. The statement regarding *between-laboratory* variability must pertain to test results obtained in different laboratories on the same material.

23.3.1 Any new AATCC test method that produces data shall contain, as a minimum, a statement of single operator precision when first submitted to committee and TCR ballots, but full *within-laboratory* and *between-laboratory* precision statements are encouraged.

23.3.2 At its first 5-year review, any AATCC test method that produces data shall be brought into full conformance, including *within-laboratory* and *between-laboratory* precision statements prior to submission to committee and TCR ballots.

23.3.3 It is the policy of AATCC that no longstanding test methods will be dropped due to the lack of a precision statement.

23.3.4 In any AATCC test method that produces data in which more than one testing option is allowed, a precision statement based on the most used option satisfies the requirement. A committee may include precision for the other options, and is encouraged to do so, especially single laboratory precision for each option available.

23.4 If the test result data are continuous variates, give the standard deviation or coefficient of variation, whichever is appropriate, and the applicable components of variance for each type of precision that is reported. In any case, the precision statement shall give the 95% critical difference for *within-laboratory* and for *between-laboratory* test data. If the precision is not the same for all materials, then give the precision for each material used in the interlaboratory test that was used to obtain the precision measurements.

23.5 If the precision varies with the test level, describe this variation.

23.6 Include other related information that may help users assess the degree of applicability of the statement to the materials of interest to them. It may be desirable to note the presence of other types of variability in test results on which information can be derived by supplemental studies.

23.7 Many rating scales in AATCC methods are limited and not continuous. If analysis of variance is used with such data, statistical errors may occur and the possibility should be noted in the precision statement. A subjective basis for evaluation the precision of test results may be offered as an alternative.

23.7.1 EXAMPLE:

X.1 *Interlaboratory Test Data*—An interlaboratory test was run in 20XX in which randomly-drawn samples of 2 materials were tested in each of 5 laboratories. Each laboratory used 2 operators, each of whom tested 4 specimens of each material. Calculation of components of variance was thought to be inappropriate due to the restricted and discontinuous rating scales, the non-linear relationships between the rating scales and color difference units, and the increased variability in color difference units as the true value of the ratings decrease.

X.2 *Precision*—Based on the observations described in X.1 and on general practice in the trade, a lot or consignments is generally considered as having a rating that is significantly worse than a specified value when a specimen from the lot or consignment has a rating for (insert here the name of the property) that is more than one-half step below the

specified rating on the Gray Scale for Color Change.

23.8 *Precision Statement Format.* The precision statement included in a test method must contain three basic sections: (1) a brief description of the testing plan from which the data set was derived, citing the number of materials tested, the number of laboratories participating, the number of operators per laboratory, the number of tests per operator, and any other pertinent information; (2) a listing of the components of variance derived from the data set; and (3) a listing of the precision parameters calculated from the components of variance, usually in the form of critical differences, or confidence intervals.

23.9 The required statement of precision shall contain the information specified above or an explanation as to why a statement is not practicable. The absence of a statement on precision is not warranted if the reason is that an interlaboratory test has revealed that the precision is poor.

23.9.1 EXAMPLE: A precision statement is not applicable because data are not generated by this procedure.

23.9.2 EXAMPLE: Precision and Bias statements are not applicable because data are not generated by this test method.

23.10 Test methods that do not contain full precision statements should note the status and explanation.

23.10.1 EXAMPLE: Precision for this test method has not been established. Until a precision statement is generated for this test method, caution should be used when testing materials with this method. In most cases the use of standard statistical techniques in making any comparisons of test results for either *within-laboratory* or *between-laboratory* averages have been found to be generally accepted.

23.10.2 EXAMPLE: *Between-laboratory* precision has not been established for this test method. Until such precision information is available, users of the method should use standard statistical techniques in making any comparison of test results for *between-laboratory* averages.

24. Guide for: Bias

24.1 A statement on bias furnishes guidelines as to whether the test method can be used when comparisons with accepted reference values are to be made. If the bias is known, the method can be modified to include a correction for the bias, and thus the corrected method would be without known bias.

24.1.1 EXAMPLE: *Bias.* The <property name> can be defined only in terms of a test method. There is no independent method for determining the true value. As a means of estimating this property, the method has no known bias.

24.2 If bias varies with the test level, describe the bias.

24.3 Any statement on bias shall describe the bias and how the method has been modified to provide corrected test results. If bias cannot be determined, include a statement to this effect.

24.4 File the data and details of the experiment to determine bias at the AATCC Technical Center.

24.5 For test methods that do not generate data, the statement on bias should state this.

24.5.1 EXAMPLE: *Bias.* A bias statement is not applicable because data are not generated by this test method.

25. Guide for: Notes

25.1 Notes should contain only explanatory matter, never any mandatory detail of performing the test or procedure.

25.2 Number notes in sequence as they appear in the text.

25.3 Place notes in a separate section at the end of the method, before the appendices. *Exception:* Notes that are part of tables belong with the tables.

26. Guide for: History

26.1 State the last date revised and a brief description of the revision. Indicate any subsequent reaffirmations or editorial changes in the same subsection.

26.2 List all revisions, editorial, revisions, and reaffirmations, in reverse chronological order. Where applicable, indicate title changes in parentheses.

26.3 Where applicable, list the year in which the AATCC standard was adopted by ISO.

26.4 State the number of the committee that developed the standard and the first year of publication. If jurisdiction was transferred to another committee, include the year and committee in the same section.

27. Guide for: Tables

27.1 Use tables to avoid repetition in the text.

27.2 Number tables in sequence by Roman numerals.

27.3 Place tables in proper sequence in the text, not in the appendices.

27.4 Head each table with a terse explicit title, in title case.

27.5 Head each column of figures with a pertinent legend.

27.6 Below the table, add all necessary notes. Identify the notes by lower case letters. Put the corresponding letter in the body of the table within parentheses.

28. Guide for: Figures

28.1 Title every line drawing or photograph, using sentence case and ending with a period.

28.2 Number figures and photographs in sequence, with Arabic numerals.

28.3 Preferably, use line drawings, with all lettering and the figure drawn to double scale. Drawings usually are clearer than photographs, and have the advantage of showing dimensions and interior surfaces. The printer will size the illustration to fit the printed page.

28.4 Use photographs of 300 dpi or more. All photographs will be printed in grayscale. Ensure that critical features are visible.

28.5 Place figures and photographs in proper sequence in the text, not in an appendix.

29. Guide for: Appendices

29.1 Include in appendices, supplementary information that might be needed but which is too voluminous to put in the text for fear of interrupting the sequence of thought.

29.2 The following are typical information for appendices:

Flow charting of test methods.

Glossaries of special terms.

Lists of chemical or mathematical symbols.

Detailed descriptions of apparatus of specialized nature.

Verification or calibration procedures.

Derivations of mathematical equations.

Charts and monographs.

Report forms.

30. Guide for:Flow Charts (Optional Appendix Item)

30.1 A flow chart is not a replacement for a written test procedure, but is a diagram illustrating the flow and logic of any process, or system (i.e., test procedure, interlaboratory studies, etc.). It is a drawing made up of various, but specific, shapes of boxes connected by directional straight lines. Flow charting (1) gives a bird's-eye view of the flow and logic of a procedure in a pictorial fashion, (2) facilitates communication and understanding among individuals having different areas of expertise, (3) makes more obvious some of the strong and weak points of a system, (4) helps to generate ideas and provides a basis of discussion for improving a system, and (5) aids in the writing of new standards.

30.2 The box shapes of a proper flow chart are simple, but specific. The start and stop of a flow chart are denoted by a horizontal ellipse, with the appropriate word, START or STOP, within the ellipse. A process step, where no decision (yes or no) is required, is denoted by a

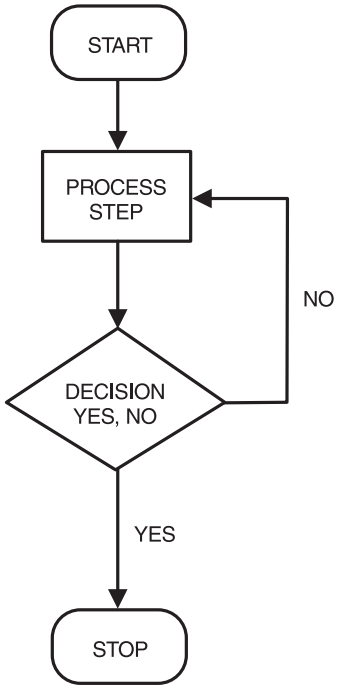

Fig. 1—Sample flow chart.

rectangle. A process box usually has just one output arrow. If a decision is required, a diamond is used and two output arrows are required (yes or no). Fig. 1 is an example of a flow chart.

30.3 Flow charts should be used to illustrate major pieces of equipment, all inputs to processes (i.e., raw materials, utilities, etc.), all points where measurements are taken, and all points where adjustments can be made. The step number within the test method should be in the appropriate box or diamond of the flow chart.

31. Manuscript Format

31.1 Submit all manuscripts to the AATCC Technical Center in electronic format, Word document, doubled spaced.

31.2 Designation of Colors.

31.2.1 In presenting textile color data, use the method of color nomenclature developed by the Inter-Society Color Council and the National Bureau of Standards, commonly referred to as the ISCC-NBS method. See *The ISCC-NBS Method of Designating Colors and Dictionary of Color Names*.

31.2.2 Identify colors by the three attributes of hue, lightness and chroma. Do not use the words shade, tint, depth of color or intensity. For example: rose and vermillion are hues of red, not tints or shades.

31.3 Units of Measurements.

31.3.1 Use metric or SI units wherever feasible. Use English units only where they are the accepted trade practice.

31.3.2 Do not mix systems in one paragraph.

EXAMPLE: DO NOT USE "a specimen 2 × 3 in. and weighing 2.0-2.5 g."

31.3.3 State measurements in both systems when both are in current American usage. Round off conversions to comparable accuracy.

EXAMPLE: 1.0 in. becomes 2.5 cm, not 2.54 cm; but 1.00 in. is converted to 25.4 mm not 25 mm.

31.3.4 For liquid measure and for volumetric glassware, use milliliter (mL), not the obsolete (cc) cubic centimeter. For measures of capacity or volume, use the cubic centimeter, for which the accepted abbreviation is cm^3.

31.3.5 Laboratory procedures require metric measurement and Celsius temperatures. Fahrenheit temperature is permissible for physical testing. Mill and dyehouse practices govern units for process control, even if they are obsolescent or obsolete, such as Baumé, Twaddell, Brix and Rohmer in place of specific gravity hydrometers.

31.3.6 For cases when it is necessary to express measurements when range and accuracy must be included.

EXAMPLE: weigh to within ± 0.001 g a specimen with weight in the range of 4-6 g.

31.4 Numbering.

31.4.1 Use numbers instead of words in every case, unless confusion will ensue.

EXAMPLES: 4 samples; 5 days; 15.43 g.

31.4.2 Designate tables by Roman numerals, and figures or drawings by Arabic numerals.

EXAMPLES: Table IV; Fig. 6.

31.4.3 Do not begin a sentence with a numeral.

31.4.4 Use decimal fractions.

31.4.5 Place a zero before decimal numbers to ensure that no digit has been omitted or misplaced.

EXAMPLE: 0.36 cm (not ".36 cm.")

31.4.6 Point off numbers in excess of 4 digits with commas in the text (1,234,567) but with spaces in tabulated material (1 234 567). Do not point off numbers of 4 digits except when they occur in columns containing numbers of more than 4 digits.

31.5 Spelling

31.5.1 In general, use the preferred spelling in the Merriam-Webster *International Dictionary.*

31.5.2 Use American forms.

EXAMPLES: "color" not "colour," "liter" not "litre."

31.5.3 Hyphenate compound adjectives, particularly such forms as "2-g specimens."

31.6 Punctuation

31.6.1 Use a comma in a series of words but not before a conjunction.

EXAMPLE: wash, dry and condition specimens.

31.6.2 Always place commas and periods *inside* of quotation marks.

31.6.3 Place semicolons and colons *outside* quotation marks.

31.7 Capital Letters

31.7.1 When in doubt, use lower case letters.

31.7.2 Capitalize the principal words in headings and titles of standards, names of books or papers. Use lower case for prepositions and conjunctions in titles.

31.7.3 Use initial capital "C" for "committee" when used as a title, but not when used as a collective noun.

EXAMPLES: "Committee RA60" or "Committee on Industrial Pollution"; but "the committee recommends."

31.7.4 Use capital letters in referring to tables, figures, inserted plates and volumes.

EXAMPLES: Table III, Fig. 2, Plate VI, Vol. 25.

31.8 Abbreviations

31.8.1 Use abbreviations in the singular number only. An exception is abbreviations preceding numerical values.

EXAMPLES: "2 in." not "2 ins; Figs. 1 and 2, Vols. I and II, Nos. 1 and 2.

31.8.2 Use abbreviations only after numbers denoting a definite quantity, except in tabulations.

EXAMPLES: Do not say "mix rinse liquor in a *bbl.*" nor, "wash in H_2O."

31.8.3 Abbreviate "percentum" or "percent" with the symbol (%), which is far easier to read.

31.8.4 Do not use the symbol (#) to mean "pounds" or "number."

31.8.5 Put a period (.) after an abbreviation only when the omission would cause confusion.

EXAMPLES: "in." not "in" for inches, "no." not "no" for number, "Fig." not "Fig" for figure, and "vol." not "vol" for volume.

31.8.6 A list of acceptable conventional abbreviations is shown in Appendix A.

31.8.7 Besides the conventional abbreviations, frequently repeated series of words may be abbreviated if the words are spelled out before the abbreviation at the first use.

EXAMPLES: TNT (trinitrotoluene); BOD (biochemical oxygen demand); TCE (trichloroethylene).

31.8.8 Use chemical symbols only to represent chemical entities, never as abbreviations.

EXAMPLES: "water" not H_2O unless water is used as a reagent. Write "rinse in water," not "rinse in H_2O; say "platinum crucible," not Pt crucible."

31.8.9 Spell out the names of unusually complex or of uncommon organic or inorganic reagents if the chemical for-

mula will waste space or obscure clarity of text.

EXAMPLES: $CuSO_4 \cdot 5H_2O$ rather than cupric sulfate pentahydrate. "Aspirin" is simpler than "acetylsalicylic acid" and certainly simpler than to write the structural formula.

31.8.10 Do not, as a general rule, abbreviate terms that are infrequently used without spelling out the entire word or phrase the first time the expression appears.

32. History

32.1 Revised in 2020 to include Designation and History sections, along with various updates and clarifications.

32.2 Numbered July 2018. Revised January 2018.

32.3 Developed by AATCC Committee RA99.

33. Notes

33.1 Available from AATCC, PO Box 12215, Research Triangle Park NC 27709, USA; +1.919.549.8141; ordering@aatcc.org; www.aatcc.org.

33.2 Available from ASTM International, www.astm.org.

Appendix A
Abbreviations

absolute	abs
alternating current (noun)	ac
(adjective)	a-c
ampere	amp
angstrom unit	Å
anhydrous	anhyd
average	avg
barrel	bbl
Birmingham wire gage	Bwg
British thermal unit	Btu
Brown and Sharpe (gage)	B&S
calorie	cal
Celsius	°C (Note 1)
centigram	cg
centimeter	cm
centipoise	cp
centistoke	cs
chemically pure (discontinued)	CP
coefficient of variation	*%CV*
Colour Index	C.I.
concentration	conc.
cubic centimeter (volume)	cm^3 (Note 2)
day	Spell out
degree	deg (Note 3)
diameter	diam
direct current (noun)	dc
(adjective)	d-c
equation	Eq
Fahrenheit	°F (Note 1)
figure	Fig.
foot	ft
foot-pound	ft-lb
formula weight	FW
gallon	gal
grain	gr
gram	g
horsepower	hp
hour	h
inch	in.
inside diameter	ID
Kelvin	K (Note 1)
kilocycle	kc
kilogram	kg
kilojoule	kJ
kilometer	km
kilovolt	kV
kilowatt	kW
kilowatt-hour	kW-h
linear	lin
liter	L
logarithm (common)	log
lux	lx
maximum	max.
meter	m
microamperes	µa
microgram	µg
microliter	µL
micromicron	µµ
micron (micrometer)	µm
microvolt	µV
microwatt	µW
mile	mi
miles per hour	mph
milliampere	ma
milliequivalent	meq
milligram	mg
milliliter	mL (Note 2)
millimeter	mm
millivolt	mV
minimum	min.
minute	min (Note 4)
molal	*m* (Italic)
molar	*M* (Italic)
molecular weight	MW
nanometer	nm
Newton	N
normal	*N* (Italic)
number	No.
ohm	ohm or
on weight of fiber	owf
ounce	oz
ounces per square yard	oz/sq yd
outside diameter	OD
page	p
pages	pp
parts per billion	ppb
parts per million	ppm
per	Spell out or use solidus (/)
percent	%
pint	pt
pound	lb
pounds per square foot	lb/sq ft
pounds per square inch	psi
quart	qt
radian	rad
relative humidity	RH
revolutions per minute	rpm
second	s
solution	soln.
specific gravity	sp gr
square	sq
standard deviation	*s*
ton	T
Twaddell	Tw
United States (wire gage)	US
United States Pharmacopeia	USP
volt	V
volume	vol.
watt	W
watt-hour	W-h
week	wk
yard	yd
year	yr

Notes

Note 1. Always use the abbreviation for the temperature scale °F, °C or K in statements of numerical temperatures, but omit the abbreviation "deg" for "degrees." Write "69°F," not "69 deg F."

Note 2. Use the abbreviations "cm^3" rather than "cc" as the unit of capacity. Use "mL" for milliliter" as the unit of volume.

Note 3. Restrict the use of the degree symbol (°) to °API, °BRIX, °Baumé, °Twaddell, °C, °F, °Rohmer and to degrees of angle or of arc.

Note 4. Spell out "minute" and "minimum" if there is any danger of confusion by use of the abbreviation "min."