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## Standard Guide for Annual Review of Test Methods and Specifications for Plastics<sup>1</sup>

This standard is issued under the fixed designation D 4968; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope\*

1.1 This guide is intended to assist the subcommittees and sections of Committee D20 on Plastics with the process of standards evaluation during the five-year review mandated by ASTM or when changes to test methods and specifications are required.

NOTE 1—There is no known ISO equivalent to this guide.

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D 883 Terminology Relating to Plastics

D 5033 Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics

E 456 Terminology Relating to Quality and Statistics

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

### 3. Terminology

3.1 *Definitions*— For definitions of terms that appear in this guide, refer to Terminology E 456.

3.2 Guidelines for terminology in standards which are referenced in BOCA National Codes are given in Appendix X3.

### 4. Significance and Use

4.1 It is the intention of this guide to provide information to persons revising test methods and specifications in Committee D20 to ensure that all required elements are included and that the revised document is presented in the most user-friendly manner possible.

4.2 This guide is intended for use by Committee D20 when test methods and specifications under its jurisdiction are revised due to technical changes or upon five-year review.

4.3 The flowchart in Annex A1 shows the review process in outline form.

4.4 Specific instructions to be followed when revising Committee D20 documents are given in this guide.

4.5 The model precision and bias (P and B) statements included in Appendix X1-Appendix X3 were developed to standardize the presentation of data.

### 5. Evaluating the Need for Revisions

5.1 Society regulations require that all D20 standards be reviewed in detail every five years. Ballots to revise individual sections of a document (which may change the date of issue) do not absolve the responsible D20 subcommittee from the requirement to conduct the detailed review every five years. Begin the review for revision, reapproval, or withdrawal at least one year prior to the required revision year, that is, four years after the last full review. The date of the last complete document review must be listed in the Summary of Changes section at the end of the document.

5.2 The first step in the review process is to determine if the document under review should to be balloted for:

5.2.1 Reapproval without change,

5.2.2 Reapproval with editorial changes,

5.2.3 Revision with technical changes, or

5.2.4 Withdrawal.

5.3 *Using the Flowchart:*

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.90 on Executive. Current edition approved March 15, 2006-1, 2008. Published April 2006-March 2008. Originally approved in 1989. Last previous edition approved in 2002-2006 as D 4968 - 02 $\epsilon$ .

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

\*A Summary of Changes section appears at the end of this standard.

5.3.1 The flowchart for review of standards is found in Annex A1. The following describes the details for each step of the flowchart.

5.3.2 *Is Any Action Advisable?*—If the review of the standard using the guidelines in this guide and the current version of the *ASTM Form and Style for ASTM Standards* (Blue Book) indicate no needed changes, ballot the standard for reapproval without change.

5.3.3 *Should the Standard Be Withdrawn?* —If the examination of the standard indicates that it is obsolete or basically flawed in light of more recent knowledge, ballot for withdrawal. Ballot for withdrawal should also be done if the document is replaced by a more current document.

5.3.4 *Is a Task Group Required?*—If changes to the document are to be considered, the subcommittee or section chairperson may appoint a task group to recommend revisions.

5.3.5 *Are Changes Editorial?*—If the subcommittee, section, or task group considers the intended changes to be editorial in nature, the appropriate standards editor at ASTM Headquarters should be consulted. If the changes meet the qualifications for editorial revision, the document can be changed without balloting. However the document must still be balloted for reapproval at least every five years regardless of editorial changes.

5.3.6 *Is Technical Revision Necessary?* —If it is decided that the changes needed in the standard modify the technical content in any way, or if the review using this guide finds missing elements, technical changes must be balloted. If major changes are needed, a subcommittee ballot is suggested. Otherwise a concurrent subcommittee, Main Committee, and Society ballot may be circulated for vote.

5.3.7 *Model Precision and Bias (P and B) Statement:*

5.3.7.1 It is a requirement of ASTM that all test methods have a precision and bias section. For test methods that produce a numerical test result, an interlaboratory study should be conducted in accordance with Practice E 691.

NOTE 2—Practice E 691 requires a minimum number of six laboratories generating usable data for a round robin for an acceptable round robin. As a result, Practice E 691 may not be applicable in all cases. Other statistical practices may be used if they yield equivalent information and have been reviewed by Subcommittee D20.13 on Statistics.

5.3.7.2 If a round robin cannot be accomplished prior to initial balloting of a test method, single-laboratory data must be used in the P and B statement. Use the model statement in Appendix X1 as a guide. No test method may be published without at least a single-laboratory P and B statement.

5.3.7.3 The American Society for Testing and Materials requires that a round robin be performed, if possible, within five years of the test method's initial publication. If insufficient laboratories are available to complete a round robin by the five-year review, the statement in Appendix X1 may still be used, but the statement in Appendix X2 must be added.

5.3.7.4 When acceptable round-robin data is developed, it shall be written using Appendix X3 as a guide and balloted for approval as a technical change. Documentation for the round robin shall be assembled in a technical report and submitted to the staff manager. A footnote documenting the report number should be included in the standard.

## 6. Revising the Standard

6.1 Keep the audience in mind.

6.1.1 There are many different users of ASTM standards. When revising documents, write the standard to be of use to the proper audience. This may seem difficult since a standard can be used by such diverse users as design engineers, product specifiers, quality control persons, testing laboratory managers, and technicians who will perform tests.

6.1.2 Keep in mind, however, that certain sections of the documents are directed at different audiences. For example, the procedures section of a test method will primarily be used by the technician who does the test. Write this section in an imperative mood giving direct instructions on how to do the test, just as you would if you were speaking to the person. Do not add extra explanations, and so forth. Be direct and to the point. Think about where the explanations might better be included as, for example, in an appendix.

6.1.3 Sections such as the scope are to give direction to the user on how and for what the standard is to be used. Setup and calibration will be used by a test laboratory manager, and so forth. For each section, think about who the user will probably be and write that section to give the most direct and usable information to the potential user in the most concise and understandable manner possible.

6.2 Upon request, your staff manager can provide a copy of the standard to be revised on disk for use in revisions. It is best to **strikeout** deleted portions of the existing text and to **use bold type for insertion of new text**. Another good method is to cut and paste by placing the original text in the left column of a page and placing the revision notes in the right column of the page. See Examples 1 and 2 in the appendix of this guide.

6.3 Whenever a document is revised and circulated for ballot, it must be accompanied by a cover letter that explains the purpose of the ballot.

6.4 When circulating a standard for ballot, the standard shall have the following working caveat in bold print on the front page of the revision draft:

*This document is not an ASTM Standard. It is under consideration within an ASTM Technical Committee, but has not received all approvals required to become an ASTM standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of ASTM Committee activities except without the approval of the Chairman of the Committee having jurisdiction and the President of the Society. Copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.*

6.5 Reference *Form and Style for ASTM Standards* for further guidance in the preparation of standards not referenced by this guide.

## 7. Reviewing Test Methods

7.1 Use the following assessment sections as an aid in test method review. Committee D20 test methods can become more complex than necessary. One of the advantages to be gained in the five-year review is to make them very user friendly. Read each section. If it is not clear and does not contain the points mentioned in this section, rewrite it!

7.2 *Assessing the Title*—Determine if the title accurately defines the test method described. Change it if it does not.

7.3 *Assessing the Scope*—The scope should contain the following essential items:

7.3.1 Clearly state the purpose of the test method in one or two sentences.

7.3.2 If there are any cautions or concerns regarding the use of the results of the test method or how it is performed, insert the following sentence in the Scope: See the Significance and Use section for cautions in using this test method.

7.3.3 Committee D20 considers SI units to be primary. The scope must include the sentence shown in 7.3.3.1 in accordance with Blue Book instruction; or if the subcommittee chairperson gives permission, the sentence shown in 7.3.3.2 can be used instead. Make these numbered paragraphs in either case.

7.3.3.1 “The values stated in SI units are to be regarded as standard.”

7.3.3.2 “The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.”

7.3.4 Ensure that the test method has the following mandatory caveat included as a numbered paragraph in the scope.

*This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

7.3.5 If specific hazards are known, put them in a Hazards section and cite any appropriate additional warnings.

7.3.6 All test methods must have an ISO equivalency statement. A note must be added to the end of the scope (or revised to comply) with an ISO equivalency statement. See Annex A2 of this guide for the proper formats and instructions.

7.4 *Referenced Documents*:

7.4.1 Ensure that all ASTM standards (including the document designation and title) that are cited in the text of the standard are referenced in this section.

7.4.2 Also list other organizations’ standards if they are referenced in the text.

7.5 *Terminology*:

7.5.1 A terminology section is now mandatory. If the document does not have this section, it must be added.

7.5.2 Determine from the text a list of terms used which the user may not understand.

7.5.3 Check Terminology D 883 for the terms. If any terms appear in the document which appear in Terminology D 883, include a reference to Terminology D 883 in the Terminology section.

7.5.4 Check the subcommittee chairperson for specific terminology documents which may apply to the standard. Reference these if a term is included.

7.5.5 If a term is listed in the document which is not found in the terminology documents, develop a definition and include the term in the Terminology section of the update to be balloted. In addition, submit the definition to the chairperson of Subcommittee D20.92 for review and possible inclusion in Terminology D 883.

7.6 *Summary of Test Method (Optional)* —Include a brief outline of the test method. Describe essentially how the test method is performed without any details of the procedure or sequence.

7.7 *Significance and Use*—Examine the Significance and Use section. Ensure that it includes the following and write it in the imperative mood.

NOTE 3—The imperative mood is one in which direct instructions are given as if you were speaking to a person. An example would be: “Results from this test are intended for use in quality control. Do not use them as criteria for design.”

7.7.1 State when, where, and why the test method should be used.

7.7.2 State how the test method is to be used by industry.

7.7.3 State how suitable the test method is for use in specifications.

7.7.4 For test methods where appropriate, add the following statement:

Before proceeding with this test method, reference should be made to the specification of the material being tested. Any test specimen preparation, conditioning, dimensions, or testing parameters, or combination thereof, covered in the relevant ASTM materials specification shall take precedence over those mentioned in this test method. If there are no relevant ASTM material specifications, then the default conditions apply."

7.7.5 State what are the significant features of the test method.

7.7.6 State any appropriate warnings which restrict the use of the results of the test method.

7.8 *Interferences*— If the successful execution of the test method requires explanatory statements on interference effects, briefly list the constituents or properties that are most likely to cause interference, and the amounts that they are known to interfere.

7.9 *Apparatus*:

7.9.1 If the required equipment for performing the test method is no longer available, ballot the test method for withdrawal.

7.9.2 If the equipment is available from only one manufacturer, the source for obtaining the equipment must be listed.

7.9.3 If there are two or more sources of the equipment for performing the test method, no mention of the equipment manufacturer or where the equipment can be obtained may be mentioned.

7.9.4 In some cases the following statement may be used:

It is believed that the instrument specified in this test method is no longer commercially available.

7.10 *Hazards*:

7.10.1 Point out safety precautions in this section or in the notes where appropriate in the text if specific hazards are known.

7.10.2 Cite any precautions or warnings at the end of the generic safety hazards caveat.

7.11 *Sampling, Test Specimens, and Test Units*—Give instructions for any sampling techniques in the imperative mood.

7.12 *Preparation of Apparatus*—Give instructions in the imperative mood.

7.13 *Calibration and Standardization* —Give instructions in the imperative mood.

7.14 *Conditioning*:

7.14.1 Specify, in the imperative mood, the conditioning atmosphere required during the test and the time of exposure to the atmosphere.

7.14.2 If the wording of the conditioning section contains the term "...for those tests where conditioning is required...", replace this wording with "...unless otherwise specified by contract or relevant ASTM material specification..."

7.15 *Procedure*—Give instructions in the imperative mood. It is important that this be a step-by-step instruction which could be used to perform the test method.

7.16 *Calculation*— State the directions for calculating the results in the imperative mood.

7.17 *Report*—State detailed information required in reporting the results of the tests.

7.18 *Precision and Bias*:

7.18.1 All test methods must have a precision (P) and bias (B) section.

7.18.2 The precision data presented in this test method are representative of the conditions defined in the standard. However, material preparation and specific test conditions in the ASTM material specification may result in a deviation from the P & B, requiring separate study.

7.18.3 If the test result is a nonnumerical report of success or failure or other categorization or classification based on criteria specified in the procedure, use the following statement of P and B: No information is presented about either the precision or bias of Test Method XXXX for measuring (insert here the name of the property) since the test result is nonquantitative.

7.18.4 If a round robin has been conducted, refer to the instructions for including the P and B in Appendix X3 of this guide, including appropriate wording.

7.19 *Keywords*—List in alphabetical order appropriate terms for indexing, selected from both the title and body of the document and including general, vernacular, and trade items.

7.20 *Summary of Changes*:

7.20.1 List all changes from the last revision so that persons reading the standard will know what items are different from previous additions.

7.20.2 List the year of the last complete review/revision of the standard.

## 8. Reviewing Specifications

8.1 *Assessing the Scope*—Clearly state the purpose of the specification in one or two sentences.

8.1.1 State whether SI units or other units are preferred.

8.1.2 If the specification contains test methods within the body of the document include the following caveat in the scope:

The following safety hazards caveat pertains only to the test method described in this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

8.1.3 *Assessing the Referenced Documents Section*—Ensure all ASTM standards cited in the text are referenced in this section.

Include the ASTM designation and title. Also list other organizations' standards if they are referenced in the text and are available to the public.

8.1.4 All specifications must have an ISO equivalency statement. A note must be added to the end of the scope (or revised to comply) with an ISO equivalency statement. See Annex A2 for the proper formats and instructions.

8.1.5 If the specification includes recycled plastics, insert a sentence in the scope which mentions the extent to which the document deals with these materials. It may also be appropriate to include reference to recycled plastics in the title, the Referenced Documents section, and in the Keywords section.

NOTE 4—Recycled plastics is defined by terms and sub terms in Guide D 5033.

## 8.2 Terminology:

8.2.1 If terms used in the specification are defined in Terminology D 883 or other definition standards, list the standards here.

8.2.2 List definitions of terms that are specific only to the standard in which they are used and have no application outside of that context.

## 8.3 Classification:

8.3.1 *Types*—When more than one material, product, or system is specified, they may be separated first by types, which are distinguished by roman numerals (I, II, III, and so forth).

8.3.1.1 The first subdivision shall be based upon some major property, composition, or application of the item.

8.3.1.2 *Grades*—Designate further subdivision by grades in accordance with some pertinent property or properties and identify by Arabic numbers.

8.3.1.3 *Classes*—If necessary, make additional division into classes, identified by capital letters (A, B, C, and so forth).

NOTE 5—The precedence of type, grade, and class, as well as the method of designation, is the ASTM preferred style, and it should be used in the absence of any established preference.

8.3.1.4 When a type, grade, or class has been deleted, do not use this designation again, to avoid confusion with earlier specifications.

## 8.4 Ordering Information (Optional) :

8.4.1 When the specification covers options for purchase, such as various types, grades, classes, alloys, sizes, mass, and so forth, the purchase order or inquiry should state which particular types, alloys, sizes, and so forth, are desired.

8.4.2 A listing of each such optional feature, together with a reference to the applicable section of the specification, will be of assistance in the wording of orders.

8.4.3 After the attention of the purchaser is directed to all of the options in the specification, attention might be directed to what would be furnished by the supplier, if the purchaser fails to specify one or more of the options.

8.4.4 It is recommended that this section be included in all specifications as a checklist of items to be included in a purchase order or contract.

8.4.5 If the list includes the ASTM designation, it is desirable to include “year of issue” to avoid misunderstandings between contractual parties.

8.5 *Materials and Manufacture*—In this section, include any general requirements about the materials and manufacturing process to be used, especially when reference is made to a specific manufacturing process, such as injection molding, and so forth.

## 8.6 Chemical Composition (Optional) :

8.6.1 Give detailed requirements for chemical composition to which the specified material, product, or system must conform.

8.6.1.1 This information is usually presented in a table.

8.6.1.2 When presenting these requirements, clearly indicate the following:

- (a) Name of each specified constituent, given sequentially,
- (b) Whether a requirement is the maximum, minimum, or a range,
- (c) Whether an allowance for measurement error is included,
- (d) Applicable units,
- (e) Notes and footnotes appropriate for clarification, and
- (f) Appropriate analytical methodology.

8.6.1.3 Begin this section with the preferred statement:

The material shall conform to the requirements prescribed in Table 1

8.6.1.4 Add the following statement to the tables of chemical requirements when applicable for nonspecified elements:

By agreement between the purchaser and the supplier, analysis may be required and limits established for elements or compounds not specified in the table of chemical composition.

NOTE 6—This instruction and others like it in this instruction which refer to agreements between the purchaser and the supplier are intended for clarification but must be addressed with care. It is not the intention of these statements to negate the requirements which are included as part of the specification.

8.7 *Physical Properties*—Present requirements for electrical, thermal, optical, and similar properties, usually in a table.

8.8 *Mechanical Properties*—Present requirements for tensile strength, yield strength, elongation, and similar properties.

8.9 *Performance Requirements*—Present functional, environmental, and similar requirements.

8.10 *Other Requirements*:

8.10.1 Give detailed requirements as to characteristics to which the material, product, or system shall conform.

8.10.2 Include the following in the requirements:

8.10.2.1 Name of each property or requirement,

8.10.2.2 Whether a requirement is the maximum, minimum, or a range,

8.10.2.3 Whether limits allow for measurement error,

8.10.2.4 Applicable units,

8.10.2.5 Notes and footnotes for clarification, and

8.10.2.6 Appropriate test methodology.

8.11 *Dimensions, Mass, and Permissible Variations*:

8.11.1 Include details as to standard shapes, mass, and size ranges.

8.11.2 Present in tabular form with brief reference in the text.

8.11.3 Indicate in the tables where the various size ranges are divided (for example, ranges from 0 to 250 mm, 250 to 500 mm, and 500 to 750 mm shall be more properly stated as 250 mm and under, over 250 to 500 mm, inclusive, over 500 to 750 mm, inclusive, and so forth).

8.11.4 Include permissible variations in dimensions, mass, and so forth, in the same tables with the nominal sizes. State whether the tolerances specified are both plus and minus or apply in only one direction.

8.12 *Workmanship, Finish, and Appearance* :

8.12.1 Include general requirements, such as type of finish and general appearance of color, uniform quality and temper (for metals), and whether the item is clean, sound, and free of scale and injurious defects. To avoid misunderstanding, these requirements should be spelled out clearly.

8.12.2 State provisions for removal or repair of minor surface imperfections that are not considered cause for rejection.

8.12.3 For some products, it is customary to specify absence of defects such as fractures, large or deep cracks, checks, blisters, laminations, and surface roughness. The finish and shape of the ends should also be specified.

8.13 *Sampling (Optional)*:

8.13.1 If a specification applies to a unit of product or material from which specimens are to be taken for testing, the procedure for obtaining these specimens shall be described.

8.13.2 If a specification pertains to individual units of a lot and sampling inspection is likely to be the normal procedure, it is desirable for the specification to reference or include in a supplementary section a sampling procedure for determining acceptability of the lot.

8.13.3 If a specification pertains to the mean value of a lot, in particular to the mean of a lot of bulk material, the procedure for sampling the lot or the formation of sample test units, or both, shall be described or referenced. The criterion for determining conformance of the lot shall be specifically stated.

8.13.4 If a specification applies to a lot of bulk material, state the number of increments required to create a sample test unit and the number of test units to be taken to determine conformance of the lot.

8.13.5 Indicate the minimum amount of material required to conveniently carry out all the tests in the specification for the convenience of the user of the specification.

8.14 *Number of Tests and Retests* :

8.14.1 State the number of test units and the number of test specimens that are required to determine conformance of the material or product to the specifications. In the sampling of a lot of bulk material, state the size of the sample in terms of the number of primary (first stage) sampling units that is required to determine conformance to the specifications.

8.14.2 When a specification pertains to several different properties of a material to be determined by a variety of test methods, a test unit is defined as a unit or portion of the material that is sufficient to obtain a single, adequate set of test results for all properties to be measured.

8.14.3 If a specification allows retesting in cases where the material or product fails to pass the specification, state the rules for the retesting and the conditions under which the retesting would be permitted.

8.15 *Specimen Preparation*:

8.15.1 Include this section when special preparation is required (for example, in specifications for molding materials).

8.15.1.1 Refer to a standard test method if possible.

8.15.1.2 If no standard test method exists, include sufficient detail in the specification to ensure acceptable reproducibility of test results.

8.15.2 State that specimens are to be prepared in accordance with the recommendations of the manufacturer only if neither 8.15.1.1 nor 8.15.1.2 is feasible.

8.16 *Test Methods or Analytical Methods*:

8.16.1 List standard test methods for measurement of all requirements of a specification. Refer to the ASTM test methods used in testing the material to determine conformance with the specification. This includes sampling; chemical analysis; and mechanical, electrical, thermal, optical, and other testing procedures. When alternative procedures are given in the test methods, it is important