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Standard Guide for Writing Material Standards in the Classification D 4000 Format[1]

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INTRODUCTION

This guide has been prepared to aid in the writing of material standards using the Classification D 4000 format. The following template is included which might be used directly for a draft document simply by filling in the blanks. See appendixes for additional explanatory information.

1. Scope *

1.1 This classification system covers ___ materials suitable for _____. The inclusion or exclusion of recycled plastics in this classification system must be addressed here.

1.2 The properties included in this standard are those required to identify the compositions covered. There may be other requirements necessary to identify particular characteristics important to specialized applications. These may be specified by using the suffixes as given in Section 5.

1.3 This classification system and subsequent line callout (specification) are intended to provide a means of calling out plastic materials used in the fabrication of end items or parts. It is not intended for the selection of materials. Material selection should be made by those having expertise in the plastic field after careful consideration of the design and the performance required of the part, the environment to which it will be exposed, the fabrication process to be employed, the costs involved, and the inherent properties of the material other than those covered by this standard.

NOTE 1—Insert Note 1 here to show the appropriate ISO equivalency statement.

1.4 The following precautionary caveat pertains only to the test method portion, Section 11, of this classification system: *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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing[2]

D 883 Terminology Relating to Plastics[2]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[2]

D 1999 Guide for the Selection of Specimens and Test Parameters for International Commerce[2]

D 3892 Practice for Packaging/Packing of Plastics[3]

D 4000 Classification System for Specifying Plastic Materials[3]

D 4066 Specification for Nylon Injection and Extrusion Materials (PA)[3]

D 5033 Guide for the Development of Standards Relating to the Proper Use of Recycled Plastics[4]

NOTE 2—Omit if use of recycled plastic is not allowed.

D 5630 Test Method for Ash Content in Thermoplastics[4]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[5]

3. Terminology

3.1 Except for the terms defined below, the terminology used in this classification system is in accordance with Terminologies D 883 and D 1600.

4. Classification

4.1 ___ materials are classified into groups according to their composition. These groups are subdivided into classes and grades as shown in the Basic Property Table (Table __). An example of a basic property table can be found in Specification D 4066.

NOTE 3—An example of this classification system is given as follows: The designation ___ indicates the following:

_ = ___ as found in Terminology D 1600,

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[2] *Annual Book of ASTM Standards*, Vol 08.01.
[3] *Annual Book of ASTM Standards*, Vol 08.02.
[4] *Annual Book of ASTM Standards*, Vol 08.03.
[5] *Annual Book of ASTM Standards*, Vol 14.02.

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

_ = ___ (group),
_ = ___ (class), and
_ = requirements given Table __ (grade).

4.1.1 To facilitate incorporation of future or special materials the "other" category for group (00), class (0), and grade (0) is shown in Table __. The basic properties of these materials can be obtained from Tables A or B as they apply. Cell tables found in Specification D 4066 can be used as examples.

4.2 Reinforced, filled, and lubricated versions of ___ materials that are not in Table __ are classified in accordance with Tables __ and A or B. Table __ is used to specify the Group of ___ and Table A or B is used to specify the property requirements after the addition of reinforcements, pigments, fillers, or lubricants at the nominal level indicated (see 4.2.1).

4.2.1 Reinforced versions of the basic materials are identified by a single letter that indicates the reinforcement used and two digits that indicate the nominal quantity in percent by weight. Thus, a letter designation G for glass-reinforced and 33 for percent of reinforcement, G33, specifies a filled material with a nominal glass level of 33 %. The reinforcement letter designations and associated tolerance levels are shown in the following table:

Symbol	Material	Tolerance
C	carbon and graphite fiber reinforced	± %
G	glass-reinforced	
L	lubricants (such as PTFE, graphite, silicone, and molybdenum disulfide)	Depends upon material and process—to be specified.
M	mineral-reinforced	± %
R	combinations of reinforcements or fillers, or both	± %

NOTE 4—This part of the classification system uses the percent of reinforcements or additives, or both, in the callout of the modified basic material. The types and percentages of reinforcements and additives should be shown on the supplier's technical data sheet unless they are proprietary in nature. If necessary, additional callout of these reinforcements and additives can be accomplished by use of the suffix part of the system (see Section 5).

4.2.2 Specific requirements for reinforced, filled, or lubricated___ materials shall be shown by a six-character designation. The designation will consist of the letter "A" or" B" and the five digits comprising the cell numbers for the property requirements in the order as they appear in Tables A or B.

4.2.2.1 Although the values listed are necessary to include the range of properties available in existing materials, users should not infer that every possible combination of the properties exists or can be obtained.

4.2.3 When the grade of the basic material is not known, or is not important, the use of the "o" grade classification shall be used for the reinforced materials in this system.

NOTE 5—An example of this classification for a reinforced ___ material is given as follows. The designation ___ would indicate the following material requirements.

_____ = _____ from Table ___,
_ = _____,
_ = _____,
_ = _____,
_ = _____,
_ = _____, and
_ = _____.

If no properties are specified, the designation would be___ .

5. Suffixes

5.1 When additional requirements are needed that are not covered by the basic requirements or cell-table requirements, they shall be indicated through the use of suffixes.

5.2 A list of suffixes can be found in Classification System D 4000 (Table 3) and may be used for additional requirements as appropriate. Additional suffixes will be added to that standard as test methods and requirements are developed and requested.

6. General Requirements

6.1 Basic requirements from the property tables or cell tables are always in effect unless superseded by specific suffix requirements, which always take precedence.

6.2 The plastics composition shall be uniform and shall conform to the requirements specified herein.

7. Detail Requirements

7.1 The materials shall conform to the requirements in Tables __, __,__ , and suffix requirements as they apply.

7.2 For purposes of determining conformance, all specified limits for a specification (line callout) based on this classification system are absolute limits, as defined in Practice E 29.

7.2.1 With the absolute method, an observed value or a calculated value is not rounded, but is to be compared directly with the limiting value. Conformance or nonconformance is based on this comparison.

8. Sampling

8.1 Sampling shall be statistically adequate to satisfy the requirements of 12.4.

8.2 A batch or lot shall be constituted as a unit of manufacture as prepared for shipment and may consist of a blend of two or more "production runs."

9. Specimen Preparation

9.1 The test specimens shall be molded ___ in accordance with ___.

10. Conditioning

10.1 Test specimens shall be conditioned in the standard laboratory atmosphere in accordance with Procedure A of Practice D 618 before performing the required tests.

NOTE 6—If another conditioning procedure is used, replace the previous one.

10.2 Conduct those tests influenced by ambient conditions in the standard laboratory atmosphere of 23 ± 2°C and 50 ± 5 % relative humidity in accordance with Practice D 618.

11. Test Methods

11.1 Determine the properties enumerated in this classification system by means of the test methods referenced in Section 2.

NOTE 7—The test methods for international commerce in Guide D 1999 are recommended. However, any needed test method may be referenced.

11.1.1 The number of tests shall be consistent with the requirements of Section 8 and 12.4.