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

This standard is issued under the fixed designation D 5740; 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 (ε) indicates an editorial change since the last revision or reapproval.

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.

~~Standard Classification System for _____ Molding and Extrusion Materials (_____)~~ Standard Classification System for and Basis for Specification for _____ Molding and Extrusion Materials (_____)

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~~ Other requirements necessary to identify particular characteristics important to specialized ~~applications. These may~~applications are to 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~~can be made by those having expertise in the plastic field only 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:*[2]
D 618 Practice for Conditioning Plastics for Testing
D 883 Terminology Relating to Plastics
D 1600 Terminology for Abbreviated Terms Relating to Plastics
D 3892 Practice for Packaging/Packing of Plastics
D 4000 Classification System for Specifying Plastic Materials
~~D4066~~Specification for Nylon Injection and Extrusion Materials (PA)[3]
~~D5033~~Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics 5205 Classification System for Polyetherimide (PEI) Materials

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

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

D 5630 Test Method for Ash Content in Plastics

D 6779 ~~Classification System for Polyamide Molding and Extrusion Materials (PA)~~[4] Classification System for Polyamide Molding and Extrusion Materials (PA)

D 7209 Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products

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

2.2 *ISO Standards:*[3]
ISO 3451–1 Plastics—Determination of Ash Content—Part 1: General Methods

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 ~~D4066~~D 6779. The property table ~~should contain~~contains a footnote referring to Section ___ for reference to specimen source and preparation.

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

_	= ___ as found in Terminology D 1600,
_	= ___ (group),
_	= ___ (class), and
_	= requirements given Table __ (grade).

4.1.1 Reinforced, filled, and lubricated versions of ___ materials that are found in Table _____ are classified according to the reinforcement used and the nominal level, by weight percent, of the reinforcement. The grade is identified by a single letter that indicates the filler or reinforcement used and two digits, in multiples of 5, that indicate the nominal quantity in percent by weight. Thus, a grade containing 35 % glass reinforcement would be indicated by _____ G35. This designation indicates

_	= ___ as found in Terminology D 1600,
_	= ___ (group),
_	= ___ (class), and
_	= 35 % glass reinforcement and requirements given Table __ (grade).

The reinforcement letter designations and associated tolerance levels are shown in the following table:

TABLE 1 Reinforcement-Filler[A] Symbols[B] and Tolerances

Symbol	Material	Tolerance
C	Carbon and graphite	±2 %
D	Alumina trihydrate	±2 %
E	Clay	±2 %
F	Cellulose	±2 %
G	Glass	±2 %
H	Aramid	±2 %
J	Boron	±2 %
K	Calcium carbonate	±2 %
L	Lubricants (for example: PTFE, graphite)	Depends upon material and process—to be specified.
M	Mineral	±2 %
N	Natural organic (for example: cotton, sisal, hemp, flax)	±2 %
P	Mica	±2 %
Q	Silica	±2 %
R	Combinations of reinforcements and/or fillers	±2 %
S	Synthetic organic	±2 %
T	Talcum	±2 %
V	Metal	±2 %
W	Wood	±2 %
X	Not specified	To be specified

[A]Ash content of filled and/or reinforced materials ~~may~~is to be determined using either Test Method D 5630 or ISO 3451-1 where applicable.
[B]Additional symbols ~~may~~will be added to this table as required.

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~~are sometimes shown on the supplier's technical data ~~sheet unless they are proprietary in nature.~~sheet. If necessary, additional callout of these reinforcements and additives can be accomplished by use of the suffix part of the system (see Section 5).

NOTE 5—Materials containing reinforcements or fillers, or both, at nominal levels not in multiples of five are included in the nearest grade designation. For example, a material with a nominal glass fiber level of 33 % is included with Grade G35 as shown in 4.1.1.

4.1.2 To facilitate incorporation of future or special materials the "other" category for group (00), class (0), and grade (0) is shown in Table __.

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 or the group and class of ___ and Table A or B is used to specify the property requirements.

4.2.1 Reinforced, filled, and lubricated variations of the basic materials are identified by a single letter from Table 1 that indicates the filler and/or reinforcement used and two digits that indicate the nominal quantity in percent by weight. A second letter, from Table 1a, when desired, is used to indicate the form or structure of the reinforcement and/or filler, but is not used for functional mixtures. Thus, a letter designation G for glass, E for beads or spheres or balls, and 33 for percent by weight, GE33, specifies a reinforced or filled material with 33 percent by weight in the form of glass beads, spheres, or balls. The reinforcement letter designations and associated tolerance levels are shown in the previous table. Form and structure letter designations are shown in the following table:

TABLE 1a Symbols for the Form or Structure of Fillers and Reinforcing Materials

Symbol	Form or Structure
C	Chips, cuttings
D	Fines, powders
E	Beads, spheres, balls
F	Fiber
G	Ground
H	Whisker
K	Knitted fabric
L	Layer
M	Mat (fabric, thick)
N	Non-woven (fabric, thin)
P	Paper
R	Roving
S	Flake
T	Cord
V	Veneer
W	Woven fabric
Y	Yarn
X	Not specified

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 "0" grade classification shall be used for the reinforced materials in this system.