Designation: D4617 – 03

Standard Classification System for Phenolic Compounds (PF)[1]

This standard is issued under the fixed designation D4617; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This classification system covers phenolic compounds suitable for compression, transfer, or injection molding, or a combination thereof.

1.2 This classification system is intended to be 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 plastics 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 inherent properties of the material other than those covered by this classification system, and the economics.

1.3 The properties included in this classification system are those required to identify the compositions covered. There may be other requirements necessary to identify particular characteristics important to specialized applications. These will be agreed upon between the user and the supplier, by using the suffixes specified in Section 5.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 The following precautionary caveat pertains only to the test method portion, Section 13 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.*

NOTE 1—ISO 800-1992(E) is similar but not equivalent to this classification system. Product classification and characterization are not the same.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D256 Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
D570 Test Method for Water Absorption of Plastics
D618 Practice for Conditioning Plastics for Testing
D638 Test Method for Tensile Properties of Plastics
D648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
D695 Test Method for Compressive Properties of Rigid Plastics
D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
D796 Practice for Compression Molding Test Specimens of Phenolic Molding Compounds[3]
D883 Terminology Relating to Plastics
D1600 Terminology for Abbreviated Terms Relating to Plastics
D1896 Practice for Transfer Molding Test Specimens of Thermosetting Compounds
D3419 Practice for In-Line Screw-Injection Molding Test Specimens From Thermosetting Compounds
D3892 Practice for Packaging/Packing of Plastics
D4000 Classification System for Specifying Plastic Materials
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 *ISO Standard:*[4]

ISO 8000-1992(E)

[1] This classification system is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.16 on Thermosetting Materials.

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[2] 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.

[3] Withdrawn.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

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

3. Terminology

3.1 *Definitions*—For definitions of technical terms pertaining to plastics used in this classification system see Terminologies D883, or D1600, or both.

4. Classification

4.1 Phenolic compounds are classified into groups according to their application. These groups are subdivided into classes and grades as shown in Table PF.

NOTE 2—An example of this classification system is as follows:
The designation PF 111 indicates:

PF = Phenol-Formaldehyde (Phenolic) as found in Terminology D1600
1 = General Purpose (Group)
1 = Cellulose Filled, Type III (Class)
1 = Compression Molding Grade with Requirements given in Table PF. (Grade)

4.1.1 To facilitate the incorporation of future or special materials, the "other unspecified" category (0) for group, class, and grade is shown in Table PF. The basic properties can be obtained from Table A.

4.2 Specific requirements for special or new phenolic compounds shall be shown by a six-character designation. The designation will consist of the letter A and the five digits comprising the cell numbers for the property requirements in the order they appear in Table A.

4.2.1 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.

4.3 When the grade of the basic material is not known, or is not important, the use of "0" grade classification shall be used.

NOTE 3—An example of this classification system for a special phenolic compound is as follows:
The designation PF110A34130 indicates:

PF110 = General-purpose injection molding grade phenolic from Table PF,
A = Table A property requirements,
3 = 50 MPa Tensile strength, min,
4 = 75 MPa Flexural modulus, min,
1 = 15 J/M Izod impact strength; min,
3 = 150°C Deflection temperature, min, and
0 = Unspecified.

NOTE 4—Specific gravity of pigmented or colored phenolic compounds can differ from black or natural phenolic compound, depending on the choice of colorants and the concentration.

5. Suffixes

5.1 When additional requirements are needed, values that are not covered by the basic requirements or cell table requirements shall be indicated through the use of suffixes. Use Classification D4000 suffixes for additional requirements.

6. Basic Requirements

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

7. General Requirements

7.1 The material composition shall be uniform and shall conform to the requirements specified herein. The color and form of the material shall be as agreed upon by the supplier and the user. Specification changes due to the effects of colorants should be noted by both parties and, where necessary, covered by suffixes.

8. Detail Requirements

8.1 Test specimens for the various materials shall conform to the requirements prescribed in Table PF and Table A, and suffix requirements as they apply.

8.2 Observed or calculated values obtained from analysis, measurement, or test shall be rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limiting value in accordance with the rounding method of Practice E29. The value obtained is compared directly with the specified limiting value. Conformance or nonconformance with the specification is based on this comparison.

9. Sampling

9.1 Unless otherwise agreed upon between the user and the supplier, sample the materials in accordance with generally accepted sampling techniques. Adequate statistical sampling shall be considered an acceptable alternative. A lot of compound shall be considered as a unit of manufacture as prepared for shipment, and may consist of a blend of two or more production runs or batches of material.

10. Number of Tests

10.1 Conduct the number of tests specified in the appropriate ASTM test methods, or as agreed upon between the user and the supplier.

11. Specimen Preparation

11.1 Mold the test specimens by compression in accordance with Practice D796, by transfer in accordance with Practice D1896, by injection in accordance with Practice D3419, or as specified by the compound supplier.

12. Conditioning

12.1 Condition test specimens in the standard laboratory atmosphere in accordance with Procedure A of Practice D618 before performing the required tests.

12.2 Conduct tests in the standard laboratory atmosphere of 23 ± 2°C and 50 ± 5 % relative humidity in accordance with Practice D618.

13. Test Methods

13.1 Determine the properties enumerated in this classification system by means of the ASTM test methods as they apply, unless otherwise stated herein.

14. Rejection and Rehearing

14.1 Material that fails to conform to the requirements of this classification system may be rejected. Rejection should be reported to the supplier promptly, and in writing. In case of dissatisfaction with the results of the test, the supplier may make claim for a rehearing.