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Standard Classification System and Basis for Specifications for Acrylonitrile–Styrene–Acrylate (ASA) and Acrylonitrile–EPDM–Styrene (AES) Plastics and Alloys Molding and Extrusion Materials¹

This standard is issued under the fixed designation D6865; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This classification system covers ASA and AES materials, and ASA and AES alloys suitable for injection molding and extrusion. This classification system does not cover recycled ASA and AES materials, and recycled ASA and AES alloys.

1.2 The properties included in this standard are those required to identify the compositions covered. Other requirements necessary to identify particular characteristics important to specialized 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 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.

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 requirements prior to use.*

NOTE 1—This classification system and ISO 6402 cover and ISO 19065 address the same subject matter but are not technically equivalent. differ in technical content.

2. Referenced Documents

2.1 ASTM Standards:²

[D883 Terminology Relating to Plastics](#)

[D1600 Terminology for Abbreviated Terms Relating to Plastics](#)

[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 Standards:³

[ISO 179-1 Plastics—Determination of Charpy Impact Strength—Part 1: Non-Instrumented Impact Test](#)

[ISO 291 Plastics—Standard Atmospheres for Conditioning and Testing](#)

[ISO 294-1 Plastics—Injection Moulding Test Specimens of Thermoplastics Materials—Part 1: General Principles, and Moulding of Multipurpose and Bar Test Specimens](#)

[ISO 306 Plastics—Thermoplastic Materials—Determination of Vicat Softening Temperature \(VST\)](#)

[ISO 527 Plastics—Determination of Tensile Properties—Part 1: General Principles and —Part 2: Test Conditions for Moulding and Extrusion 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 Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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

ISO 1133 Plastics—Determination of the Melt Mass Flow Rate (MFR) and the Melt Volume Flow Rate (MVR) of Thermoplastics

ISO 3451-1 Plastics—Determination of Ash—Part 1: General Methods

ISO 6402 Plastics—Impact-Resistant Acrylonitrile/Styrene (ASA, AES, ACS) Moulding and Extrusion materials, Excluding Butadiene-Modified Materials—Part 1: Designation System and Basis for Specification and —Part 2: Preparation of Test Specimens and Determination of Properties

ISO 19065-1 Plastics—Acrylonitrile-styrene-acrylate (ASA), acrylonitrile-(ethylene-propylene-diene)-styrene (AEPDS) and acrylonitrile-(chlorinated polyethylene)-styrene (ACS) moulding and extrusion materials—Part 1: Designation system and basis for specifications

3. Terminology

3.1 The terminology used in this classification system is in accordance with Terminologies D883 and D1600.

4. Classification

4.1 ASA and AES materials, and ASA and AES alloys are classified into groups according to their composition. These groups are subdivided into classes and grades as shown in Table ASA/AES.

NOTE 2—An example of this classification system is given as follows:
The designation ASA0111 indicates the following:

ASA = acrylonitrile-styrene-acrylate, as found in Terminology D1600,
01 = injection molding resin (group),
1 = medium impact (class), and
1 = requirements given in Table ASA/AES (grade).

4.1.1 To facilitate incorporation of future or special materials, the “other” category for class (0), and grade (0) is shown in Table ASA/AES. The basic properties of these materials are obtained from Table A, B, or C as they apply.

4.2 Reinforced, filled, and lubricated versions of ASA and AES materials, and ASA and AES alloys that are not in Table ASA/AES are classified in accordance with Table A, B, or C. Table ASA/AES is used to specify the group of the material and Table A, B, or C 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 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 Table 1 the following table:

Symbol	Material	Tolerance
C	carbon and graphite fiber reinforced	±2%
G	glass-reinforced	±2%
L	lubricants (such as PTFE, graphite, silicone, and molybdenum disulfide)	depends upon material and process to be specified
M	mineral-reinforced	±2%
R	combinations of reinforcements or fillers, or both	±3% for total reinforcement level

NOTE 3—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 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).

4.2.2 Specific requirements for reinforced, filled, or lubricated ASA and AES materials, and ASA and AES alloys shall be shown by a six-character designation. The designation will consist of the letter “A,” “B,” or “C” and the five digits comprising the cell numbers for the property requirements in the order as they appear in Tables A, B, or C. Although the values listed are necessary to include the range of properties available in existing materials, not every possible combination of the properties exists or can be obtained.

TABLE 1 Reinforcement-Filler and Tolerances

Symbol	Material	Tolerance
C	carbon and graphite fiber reinforced	±2%
G	glass-reinforced	±2%
L	lubricants (such as PTFE, graphite, silicone, and molybdenum disulfide)	depends upon material and process to be specified
M	mineral-reinforced	±2%
R	combinations of reinforcements or fillers, or both	±3% for total reinforcement level

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.

NOTE 4—An example of this classification for a reinforced ASA/AES material is given as follows. The designation ASA 0120G30A55130 would indicate the following material requirements:

ASA 0120 = Acrylonitrile-styrene-acrylate, molding resin,
 high impact, from Table ASA/AES,
 G30 = Glass reinforced at 30 % nominal level,
 A = Cell Table A property requirements,
 5 = 80 MPa Tensile Stress at Yield, min,
~~5 = 7500 MPa Modulus of Elasticity in Tension, min,~~
~~5 = 6000 MPa Modulus of Elasticity in Tension, min,~~
~~1 = 4 kJ/m² Charpy Impact Strength of Notched Specimens, min,~~
~~3 = 90°C Vicat softening temperature, min, and~~
~~3 = 80°C Vicat softening temperature, min, and~~
 0 = unspecified

If no properties are specified, the designation would be ASA 0120G30A00000.

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 D4000 (Table 3) and are to 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 ASA/AES, A, B, C, 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 E29.

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 is allowed to consist of a blend of two or more “production runs.”

TABLE ASA/AES ASA/AES Minimum Requirements

Group	Description	Class	Description	GradeDescription	Vicat Softening Temperature, °C, ISO 306/B50	Melt Volume-Flow Rate (MVR), ISO 1133 Condition U (220°C/10kg)	Charpy Impact Strength of Notched Specimens, kJ/m ² , Test Method ISO 179-1/1eA	Tensile Stress at Yield, MPa, Test Method ISO 527-2/1A/50	Modulus of Elasticity in Tension, MPa, Test Methods ISO 527-2/1A/1
01	Injection Molding	1	medium impact	1	85	2.5	5	35	1900
				2	85	5	5	35	1700
				3	90	2.5	5	45	2200
				4	90	10	7.5	40	2000
				5	90	15	5	40	2000
		2	high impact	1	85	2.5	10	30	1700
				2	85	2.5	10	35	1700
				0	other				
		3	high heat	1	95	2.5	5	35	2100
				2	100	2.5	5	45	2100
				0	other				
		0	other	0	other				