Designation: D4634 – 11

Standard Classification System and Basis for Specification for Styrene-Maleic Anhydride Molding and Extrusion Materials (S/MA)[1]

This standard is issued under the fixed designation D4634; 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.

1. Scope*

1.1 This classification system covers styrene-maleic anhydride materials suitable for molding or extrusion. This classification system does not apply to alloys or blends of styrene-maleic anhydride materials with non-elastomeric thermoplastics. Styrene-maleic anhydride materials, being thermoplastic, are reprocessable and recyclable. This classification system allows for the use of those materials provided that all the specific requirements of this classification system are met.

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 call out (specification) are intended to provide means of calling out properties of plastic materials used in the fabrication of end items or parts. It is not intended for the selection of materials. Materials should be selected 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, costs involved, and the inherent properties of the material other than those covered by this classification system.

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 methods 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.*

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

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D256 Test Methods for Determining the Izod Pendulum Impact Resistance 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
D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
D883 Terminology Relating to Plastics
D1525 Test Method for Vicat Softening Temperature of Plastics
D1600 Terminology for Abbreviated Terms Relating to Plastics
D3641 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials
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 *Military Standard:*[3]

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

2.3 *Underwriters Laboratories Standard:*[4]

UL 94 Standard for Tests for Flammability for Parts in Devices and Appliances

[1] This classification system is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic 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 Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://dodssp.daps.dla.mil.

[4] Available from Underwriters Laboratories (UL), 333 Pfingsten Rd., Northbrook, IL 60062-2096, http://www.ul.com.

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

3. Terminology

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

4. Classification

4.1 Styrene-maleic anhydride materials are classified into groups according to their use either for injection molding, or for extrusion. These groups are subdivided into classes and grades, as shown in Table S/MA.

NOTE 2—An example of this classification system is as follows: The designation S/MA 211 would indicate:

S/MA = Styrene-maleic anhydride,
2 = injection-molding resin (group),
1 = general purpose (class),
1 = requirements given in Table S/MA (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 S/MA. The basic properties can be obtained from Tables A and B as they apply (see 4.3).

TABLE S/MA Requirements for Natural Color Only

Group	Description	Class	Description	Grade	Description	Tensile Strength[A] (D638) min, MPa	Flexural Modulus[B] (D790) min, MPa	Izod Impact Strength[C] (D256) min, J/m	Vicat Softening Point[D] (D1525) min, °C
1	Crystal	1	general purpose	1		45	3000	10	120
				0	other	...	...	...	...
		2	high-heat resistant	1		45	2900	10	130
				0	other	...	...	...	...
		0	other	0	other	...	...	...	...
2	Impact-modified, molding	1	general purpose	1		40	2200	140	115
				2		33	2100	170	115
				3		30	2000	200	115
				0	other	...	...	...	...
		2	high-impact	1		45	2200	500	115
				2		34	2200	300	120
				0	other	...	...	...	...
		3	high-heat resistant	1		35	2500	120	135
				2		33	2200	210	125
				3		30	2200	80	125
				0	other	...	...	...	...
		4	plating	1		30	2000	150	120
				0	other	...	...	...	...
		5	FR	1		28	1900	130	115
				2		22	1800	70	115
				0	other	...	...	...	...
		0	other	0	other	...	...	...	...
3	Impact modified, extrusion	1	general purpose	1		40	2500	140	115
				2		35	2300	170	115
				3		30	2200	200	115
				0	other	...	...	...	...
		2	high-heat resistant	1		33	2200	210	125
				2		30	2200	80	125
				0	other	...	...	...	...
		3	FR	1		28	1900	130	115
				2		22	1800	70	115
		0	other	0	other	...	...	...	...
0	Other	0	other	0	other	...	...	...	...

[A] Tensile strength determined on 3.2-mm thick injection-molded D638, Type I specimen, tested at 5 mm/min.
[B] Flexural modulus determined on centrally-loaded D638, Type I tensile bar, 2-in. span, tangent, Method 1, 1.3 mm/s.
[C] Izod impact strength determined on 12.5 by 3.2-mm injection molded specimen. The specimen shall be obtained from the central section of a D638, Type I tensile bar.
[D] Vicat softening point shall be 1-kg load, Rate B, 12.5 by 3.2-mm injection-molded specimen obtained from the central section of a D638, Type I tensile bar.