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Standard Specification for Styrene-Maleic Anhydride Materials (S/MA)¹

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1. Scope*

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

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 will be agreed upon between the user and the supplier, 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 specification. *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.*

¹ This specification 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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NOTE 1—There is no equivalent or similar ISO standard for S/MA.

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

3. Terminology

3.1 *General*—For definitions of technical terms pertaining to plastics used in this specification see Terminology D883.

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, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁴ Available from Underwriters Laboratories, Inc., Publications Stock, 333 Pfingsten Road, Northbrook, IL 60062.

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

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	...	...	...	...
2	Impact-modified, molding	0	other	0	other	...	...	...	...
		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
3	Impact modified, extrusion	0	other	0	other	...	...	...	...
		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	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.