Designation: D 5021 – 00

Standard Specification for Thermoplastic Elastomer–Chlorinated Ethylene Alloy (TECEA)[1]

This standard is issued under the fixed designation D 5021; 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 specification is intended to be a means of calling out 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 materials other than those covered by this specification, and the economics.

1. Scope *

1.1 This specification covers alloys of chlorinated ethylene elastomers suitable for injection molding, extrusion, blow molding, thermoforming, and other plastics processing methods.

1.2 This specification allows for the use of those TECEA materials that can be recycled, regrounded, and reprocessed, provided that the requirements as stated in this specification are met. The proportions of recycled material used, as well as the nature and amount of any contaminant, however, cannot be covered practically in this specification.

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

1.4 The values stated in SI units are to be regarded as the standard. The practices, as detailed in Practice IEEE/ASTM SI 10, are incorporated herein.

1.5 The following precautionary caveat pertains only to the test methods portion, Section 10, 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.*

NOTE 1—There is no similar or equivalent ISO standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension[2]

D 618 Practice for Conditioning Plastics for Testing[3]

D 883 Terminology Relating to Plastics[3]

D 2240 Test Method for Rubber Property—Durometer Hardness[2]

D 3641 Practice for Injection Molding Test Specimens of Thermoplastic Molding and Extrusion Materials[4]

D 3892 Practice for Packaging/Packing of Plastics[4]

D 4000 Classification System for Specifying Plastic Materials[4]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance With Specifications[5]

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System [6]

3. Terminology

3.1 *Definitions*—For definitions of technical terms pertaining to plastics used in this specification, see Terminology D 883.

4. Classification

4.1 Alloys of chlorinated ethylene elastomers are classified into groups according to processing method. These groups are subdivided into classes by hardness and are further subdivided into grades by purpose as shown in the basic property table (Table TECEA).

[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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[2] *Annual Book of ASTM Standards*, Vol 09.01.

[3] *Annual Book of ASTM Standards*, Vol 08.01.

[4] *Annual Book of ASTM Standards*, Vol 08.02.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] *Annual Book of ASTM Standards*, Vol 14.04.

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

TABLE TECEA Requirements for Thermoplastic Elastomers of Chlorinated Ethylene Alloys

Group	Description	Class	Description	Grade	Description	Hardness Shore A, min	Tensile Strength Test Method D 412, MPa, min	Elongation, %, min	Tensile Strength Test Method D 412 at 100°C, MPa, min	Tensile Stress Tes t Method D 412 at 100 % Elongation, MPa, min
1	extrusion	1	low hardness	1	black	50	9.0	250	2.0	2.8
				2	neutral	50	7.2	325	1.2	2.3
				0	other					
		2	medium hardness	1	black	60	11.6	200	2.4	4.3
				2	neutral	60	8.3	300	1.3	3.4
				0	other					
		3	high hardness	1	black	70	12.1	130	2.9	6.2
				2	neutral	70	9.0	200	1.5	4.8
		0		0	other					
2	molding and extrusion	1	low hardness	1	black	50	6.2	350	1.0	2.4
				2	neutral	50	6.6	325	1.0	2.4
				3	translucent	45	5.0	335		1.8
				0	other					
		2	medium hardness	1	black	60	6.9	275	1.4	3.4
				2	neutral	60	7.2	330	1.2	3.4
				3	translucent	60	8.6	425	1.6	2.9
				0	other					
		3	high hardness	1	black	70	10.4	250	1.8	5.5
				2	neutral	70	8.6	350	1.6	4.7
				0	other					
		0		0	other					
0	other	0	other	0	other					

NOTE 2—An example of this classification system is as follows; the designation TECEA 112 would indicate:

TECEA = thermoplastic elastomer–chlorinated ethylene alloy,
1 (group) = extrusion grade,
1 (class) = low hardness, and
2 (grade) = general purpose–neutral.

4.1.1 To facilitate the incorporation of future or special materials not covered by the basic property table, the“ other/unspecified’’ category (0) for group, class, and grade is shown in Table TECEA. The basic properties can be obtained from Table A.

4.2 Specific requirements 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 as 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.

4.2.2 An example of this classification system is as follows; the designation TECEA 110 A22400 would indicate the following with the material requirements from Table A:

TECEA 110 = thermoplastic elastomer chlorinated ethylene alloy from Table TECEA.
A = Table A property requirements,
2 = 50 Durometer A hardness, min,
2 = 5.0 MPa tensile, min,
4 = 1.5 MPa tensile, min at 100°C,
0 = unspecified, and
0 = unspecified.

TABLE A Detail Requirements

Designation Order Number	Property	0	1	2	3	4	5	6	7	8	9
1	Hardness, Test Method D 2240, A/D Durometer, min	unspecified	45A	50A	55A	60A	65A	70A	75A	80A	specify value
2	Tensile Strength, Test Method D 412, MPa, min	unspecified	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	specify value
3	Tensile Strength, Test Method D 412, MPa, min at 100°C	unspecified	0.7	1.0	1.2	1.5	1.7	2.0	2.5	3.0	specify value
4	Tensile Modulus, Test Method D 412, at 100 % elongation, MPa	unspecified	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	specify value
5	Elongation, Test Method D 412, %, min	unspecified	100	150	200	250	300	350	400	450	specify value

If no properties are specified, the designation would be TECEA 110.

5. Suffix Requirements

5.1 When requirements are needed that supersede or supplement the property table requirements, they shall be specified through the use of suffixes. In general, the first suffix letter indicates the special requirement needed and the second letter indicates that condition, or test method, or
both, with a three-digit number indicating the specific requirement. The suffixes that may be used are listed in Table 3 of Classification System D 4000.

5.1.1 Additional suffixes will be added to this specification as test methods and requirements are developed or requested, or both.

6. General Requirements

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

6.2 The material composition shall be uniform and shall conform to the requirements specified herein.

7. Detail Requirements

7.1 The material shall conform to the requirements prescribed in Tables TECEA and A and suffix requirements as they apply.

7.2 For the purposes of determining conformance, all specified limits in this specification are absolute limits, as defined in Practice E 29.

7.2.1 With the absolute method, an observed or calculated value is not rounded, but is to be compared directly to the specified limiting value. Conformance or nonconformance with this specification is based on this comparison.

8. Sampling

8.1 Sampling shall be statistically adequate to satisfy the requirements of 12.4. A lot of resin shall be considered to be a unit of manufacture as prepared for shipment and may consist of a blend of two or more product runs or batches of material.

9. Specimen Preparation

9.1 The test specimens shall be prepared by an injection-molding process as specified in Practice D 3641, or they shall be molded as specified by the resin supplier.

10. Conditioning

10.1 Test specimens shall be conditioned in the standard laboratory atmosphere in accordance with Procedure A of Practice D 618 before performing the required tests.

10.2 Conduct tests in the standard laboratory atmosphere of 23 ± 2°C and 50 ± 5 % relative humidity.

11. Test Methods

11.1 Determine the properties enumerated in this specification by means of the test methods referenced.

11.2 The number of tests shall be consistent with the requirements of Section 8 and 12.4.

12. Inspection and Certification

12.1 Inspection and certification of the material supplied under this specification shall be in accordance with the requirements specified herein.

12.2 Lot-acceptance inspection shall be the basis on which acceptance or rejection of the lot is made. The lot-acceptance inspection shall consist of the tests listed as they apply: hardness, tensile strength, and elongation.

12.3 Periodic-check inspection shall consist of the tests specified for all requirements of the material under this specification. Inspection frequency shall be adequate to ensure the material is certifiable in accordance with 12.4.

12.4 Certification shall be that the material was manufactured, sampled, tested, and inspected in accordance with this specification and that average values meet the requirements at a confidence level of 95 %.

12.5 Reports of the test results shall be furnished when requested. The report shall consist of the lot-acceptance inspection for the shipment and results of the most recent periodic-check inspection.

13. Packaging and Marking

13.1 For packing, packaging, and marking, the provisions of Practice D 3892 apply.

14. Keywords

14.1 chlorinated ethylene alloy; elastomers; line callout; recycled

SUMMARY OF CHANGES

This section identifies the location of selected changes to this specification. For the convenience of the user, Committee D20 has highlighted those changes that may impact the use of this specification. This section may also include descriptions of the changes or reasons for the changes, or both.

D 5021 – 00: (*1*) Revised cell values in Table A.