Designation: D5538 – 13

Standard Practice for Thermoplastic Elastomers—Terminology and Abbreviations[1]

This standard is issued under the fixed designation D5538; 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

During the past two decades the use of special rubber-like polymers, designated as thermoplastic elastomers, has increased both in volume and in commercial importance. The number of unique polymers classified as thermoplastic elastomers that have been brought to commercial acceptance has also grown. (As explained below, these types of rubber-like polymers cannot be accommodated by the systematic nomenclature approach of the existing Practice D1418.)

Practice D1418 was initially published in 1956 with a systematic nomenclature procedure based on the chemical structure of the polymer. An attempt to incorporate the new thermoplastic elastomers into the nomenclature scheme of Practice D1418 produces two serious problems: *(1)* the abbreviations and acronyms are not the same as the well established abbreviations and acronyms used for the new thermoplastic elastomers by the various producers of these polymers, and *(2)* the attempt generates a very cumbersome terminology system. Therefore it is necessary to depart from the systematic approach of Practice D1418.

To avoid the confusion of attempting to revise Practice D1418 and have conflicting nomenclature and abbreviation designation procedures in the same practice, this new practice devoted exclusively to thermoplastic elastomers is being published.

1. Scope

1.1 This practice covers a uniform, consensus nomenclature approach for thermoplastic elastomers. This compilation is intended to accommodate and supplement any existing trade names and trademarks.

1.2 No attempt is made to develop an exclusively systematic process for nomenclature and abbreviations.

1.3 In technical papers and other technical or trade literature the full name of the thermoplastic elastomer should be given at its first appearance in the document along with its abbreviation in parentheses. In all subsequent references to the thermoplastic elastomer, the abbreviation may be given.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1418 Practice for Rubber and Rubber Latices—Nomenclature

D1566 Terminology Relating to Rubber

2.2 *ISO Standards:*[3]

ISO 1382 Rubber—Vocabulary

ISO 18064 Thermoplastic Elastomers—Nomenclature and Abbreviated Terms

2.3 *Other standards not specifically referenced in this document are important for a full appreciation of the use of thermoplastic elastomer abbreviations and terminology. They are listed in an appendix to this practice.*

PART A—TERMINOLOGY

3. Terminology Definitions

3.1 *Definitions:*

3.1.1 *TPE (thermoplastic elastomer)*—the acronym or abbreviation, TPE, occupies a special place as a generic abbreviation term for all of the *thermoplastic elastomers* currently in use.

3.1.1.1 *Discussion*—Although the definitions given in 3.1.2, 3.1.3 and 3.1.4 also appear in Terminology D1566, they are also given here for completeness of information in this practice.

[1] This practice is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.08 on Terminology.

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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 International Organization for Standardization (ISO), 1 rue de Varembé, Case postale 56, CH-1211, Geneva 20, Switzerland, http://www.iso.ch.

3.1.2 *thermoplastic elastomer (TPE)*—a diverse family of rubber-like materials that, unlike conventional rubbers, can be processed and recycled like thermoplastic materials. (See ISO 1382 and ISO 18064.)

3.1.2.1 *Discussion*—The great majority of commercial TPEs are block copolymers.

3.1.3 *thermoplastic vulcanizate (TPV)*—a thermoplastic elastomer with a chemically crosslinked rubbery phase, produced by dynamic vulcanization. (See ISO 1382 and ISO 18064.)

3.1.4 *dynamic vulcanization*—the process of intimate melt mixing a thermoplastic polymer with a suitable reactive rubbery polymer to generate a thermoplastic elastomer with chemically crosslinked rubbery phase, resulting in properties closer to those of a thermoset rubber when compared to the same uncrosslinked composition. (See ISO 1382 and ISO 18064.)

3.2 *Other Term:*

3.2.1 *alloy*—a unique composition of two or more polymers that has one or more of the polymers treated or processed in a special way to confer enhanced performance characteristics on the resulting material.

PART B—ABBREVIATIONS

3.3 *Abbreviated Designations:*

3.3.1 *block copolymer*—(BCP)

3.3.2 *dynamic vulcanization*—(DV)

3.3.3 *highly crosslinked thermoplastic vulcanizate*—(HCTPV)

3.3.4 *styrene butadiene styrene block copolymer*—(SBS)

3.3.5 *styrene ethylene/butylene styrene block copolymer*—(SEBS)

3.3.6 *styrene ethylene/propylene styrene block copolymer*—(SEPS)

3.3.7 *styrene isoprene styrene block copolymer*—(SIS)

3.3.8 *thermoplastic elastomer*—(TPE)

3.3.9 *thermoplastic elastomer, chlorinated ethylene alloy*—(TECEA)

3.3.10 *thermoplastic elastomer, ether–ester*—(TEEE)

3.3.11 *thermoplastic elastomer, polyether block amide*—(PEBA)

3.3.12 *thermoplastic elastomer, styrenic*—(TES)

3.3.13 *thermoplastic polyurethane*—(TPU)

3.3.14 *thermoplastic vulcanizate*—(TPV)

4. Keywords

4.1 dynamic vulcanization; thermoplastic elastomer; thermoplastic vulcanizate

APPENDIX

(Nonmandatory Information)

X1. IMPORTANT STANDARDS FOR POTENTIAL REFERENCE FOR TPE NOMENCLATURE

ASTM Standards:

D883 Terminology Relating to Plastics

D1566 Standard Terminology Relating to Rubber

D1600 Terminology of Abbreviated Terms Relating to Plastics

D4000 Classification System for Specifying Plastic Materials

D4474 Specification for Styrenic Thermoplastic Elastomer Injection Molding and Extrusion Materials (TES)

D4550 Specification for Thermoplastic Elastomer-Ether-Ester (TEEE)

D5021 Specification for Thermoplastic Elastomer—Chlorinated Ethylene Alloy (TECEA)

D6338 Standard Classification System for Highly Crosslinked Thermoplastic Vulcanizates (HCTPVs)

D6835 Classification System for Thermoplastic Elastomer-Ether-Ester Molding and Extrusion Materials (TEEE)