Designation: D 1418 – 01a

Standard Practice for Rubber and Rubber Latices—Nomenclature[1]

This standard is issued under the fixed designation D 1418; 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

The system of designating rubbers and rubber latices in this practice was developed in 1955 to replace designations GR-A, GR-I, GR-M, GR-S and GR-T (standing for "Government Rubber": A-acrylontrile, I-isobutylene, S-styrene, M-monochlorobutadiene and T-thiosulfide), used for synthetic rubbers made in government owned plants. The system was designed to be a generic classification of the rubber polymers that would accommodate both existing and future rubbers. The chemical composition of the polymer chain was selected as the best classification proposal to achieve this goal. The rubber polymers were divided into seven classes as described in Section 2 of this practice. The letter symbol for the class was given last in the designation for the rubber. Preceding the class symbol were letter symbols to designate either the monomers used to prepare the polymer or the substituent groups on the polymer chain. The system has been successful both in accommodating the many new polymers developed since 1955 and in conveying to the user certain characteristics of the rubber associated with the chemical composition.

1. Scope

1.1 This practice covers a system of general classification for the basic rubbers both in dry and latex forms determined from the chemical composition of the polymer chain.

1.2 The purpose of this practice is to provide a standardization of terms for use in industry, commerce, and government and is not intended to conflict with but rather to act as a supplement to existing trade names and trademarks.

1.3 In technical papers or presentations the name of the polymer should be used if possible. The symbols can follow the chemical name for use in later references.

NOTE 1—For terms related to thermoplastic elastomers, see D 5538 Practice for Thermoplastic Elastomers – Terminology and Abbreviations.

2. Rubbers

2.1 Rubbers in both dry and latex form shall be classified and coded from the chemical composition of the polymer chain in the following manner:

M—Rubbers having a saturated chain of the polymethylene type.

N—Rubbers having nitrogen, but not oxygen or phosphorus, in the polymer chain.

O—Rubbers having oxygen in the polymer chain.

R—Rubbers having an unsaturated carbon chain, for example, natural rubber and synthetic rubbers derived at least partly from diolefins.

Q—Rubbers having silicon and oxygen in the polymer chain.

T—Rubbers having sulfur in the polymer chain.

U—Rubbers having carbon, oxygen, and nitrogen in the polymer chain.

Z—Rubbers having phosphorus and nitrogen in the polymer chain.

3. Class Designations

3.1 The "M" class includes rubbers having a saturated chain of the polymethylene type. The following classification shall be used:

ACM—Copolymers of ethyl or other acrylate and a small amount of monomer which facilitates vulcanization.

AEM—Copolymers of ethyl or other acrylates and ethylene.

---

[1] This practice is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.08 on Terminology.
Current edition approved ~~Feb.~~ May 10, 2001. Published ~~April~~ July 2001. Originally published as D 1418 – 56 T. Last previous edition D 1418 – ~~99~~00.

ANM—Copolymers of ethyl or other acrylate and acrylonitrile.
CM—Chloro-polyethylene.
CFM—Polychloro-trifluoro-ethylene.
CSM—Chloro-sulfonyl-polyethylene.
EOM—Copolymers of ethylene and an octene.
EPDM—Terpolymer of ethylene, propylene, and a diene with the residual unsaturated portion of the diene in the side chain.
EPM—Copolymers of ethylene and propylene.
EVM—Copolymers of ethylene and vinyl acetate.
FEPM—A fluoro rubber of the polymethylene type only containing one or more of the monomeric alkyl, perfluoroalkyl, and/or perfluoroalkoxy groups, with or without a cure site monomer (having a reactive pendant group).
FFKM—Perfluorinated rubbers of the polymethylene type having all fluoro, perfluoroalkyl, or perfluoroalkoxy substituent groups on the polymer chain; a small fraction of these groups may contain functionality to facilitate vulcanization.
FKM—Fluoro rubber of the polymethylene type that utilizes vinylidene fluoride as a comonomer and has substituent fluoro, alkyl, perfluoroalkyl or perfluoroalkoxy groups on the polymer chain, with or without a cure site monomer (having a reactive pendant group).
Type 1—Dipolymer of hexafluoropropylene and vinylidene fluoride.
Type 2—Terpolymer of tetrafluoroethylene, vinylidene fluoride, and hexafluoropropylene.
Type 3—Terpolymer of tetrafluoroethylene, a fluorinated vinyl ether, and vinylidene fluoride.
Type 4—Terpolymer of tetrafluoroethylene, propylene and vinylidene fluoride.
Type 5—Pentapolymer of tetrafluoroethylene, hexafluoropropylene, vinylidene fluoride, ethylene, and a fluorinated vinyl ether.

3.2 The “O” class includes rubbers having oxygen in the polymer chain. The following classification shall be used:
CO—Polychloromethyl oxirane (epichlorohydrin polymer).
ECO—Ethylene oxide (oxirane) and chloromethyl oxirane (epichlorohydrin copolymer).
GECO—Epichlorohydrin-ethylene oxide-allylglycidylether terpolymer.
GPO—Polypropylene oxide and allyl glycidyl ether.

3.3 The “R” class shall be defined by inserting the name of the monomer or monomers before the word “rubber” from which it was prepared (except for natural rubber). The letter immediately preceding the letter R shall signify the diolefin from which the rubber was prepared (except for natural rubber). Any letter or letters preceding this diolefin letter signifies the comonomer or comonomers. A parenthetical letter (S), for solution, or (E), for emulsion, is used to indicate whether the rubber or latex was prepared by solution or emulsion polymerization. The following classification shall be used for rubbers of the “R” class:
ABR—Acrylate-butadiene.
BIIR—Bromo-isobutene-isoprene
BR—Butadiene.
CIIR—Chloro-isobutene-isoprene.
CR—Chloroprene.
ENR—Epoxidized natural rubber.
HNBR—Hydrogenated acrylonitrile-butadiene.
IIR—Isobutene-isoprene.
IR—Isoprene, synthetic.
NBR—Acrylonitrile-butadiene.
~~NCR—Acrylonitrile-chloroprene.~~
NIR—Acrylonitrile-isoprene.
NR—Natural rubber.
PBR—Vinylpyridine-butadiene.
PSBR—Vinylpyridine-styrene-butadiene.
SBR—Styrene-butadiene.
~~SCR—Styrene-chloroprene.~~
SIR—Styrene-isoprene rubbers.

3.3.1 Rubbers of the “R” class having substitute carboxylic acid (COOH) groups on the polymer chain shall be identified by the prefix “X”:
XBR—Carboxylic-butadiene rubber
XSBR—Carboxylic-styrene-butadiene.
XNBR—Carboxylic-acrylonitrile-butadiene.

NOTE 2—When designating latex or latices the terminology shall be, for example,“ SBR latex” or “SBR latices.”

3.4 The “Q” class shall be defined by inserting the name of the substituent group on the polymer chain prior to the silicone designation. The following classification shall be used for members of the“ Q” class.
(The M preceding the Q indicates that methyl is one of the substituent groups on the polymer chain.)
FMQ—Silicone rubber having both methyl and fluorine substituent groups on the polymer chain.

FVMQ—Silicone rubber having fluorine, vinyl, and methyl substitute groups on the polymer chain.

PMQ—Silicone rubbers having both methyl and phenyl substituent groups on the polymer chain.

PVMQ—Silicone rubbers having methyl, phenyl, and vinyl substituent groups on the polymer chain.

MQ—Silicone rubbers having only methyl substituent groups on the polymer chain, such as dimethyl polysiloxane.

VMQ—Silicone rubber having both methyl and vinyl substituent groups on the polymer chain.

3.5 The "U" class includes rubbers having carbon, oxygen, and nitrogen in the polymer chain. The following classification shall be used:

AFMU—Terpolymer of tetrafluoroethylene, trifluoronitrosomethane, and nitrosoperfluorobutyric acid.

AU—Polyester urethane.

EU—Polyether urethane.

3.6 The "T" class includes rubbers having carbon, oxygen, and sulfur in the polymer chain. The following classification shall be used for members of the "T" class:

OT—A rubber having either a $-CH_2-CH_2-O-CH_2-O-CH_2-CH_2$ group or occasionally an -R-group, where R is an aliphatic hydrocarbon between the polysulfide linkages in the polymer chain.

EOT—A rubber having a $-CH_2-CH_2-O-CH_2-O-CH_2-CH_2$ group and R groups that are usually $-CH_2-CH_2$ but occasionally other aliphatic groups between the polysulfide linkages in the polymer chain.

3.7 The "Z" class includes rubbers having phosphorus and nitrogen in the polymer chain. The following classification shall be used:

FZ—A rubber having a -P|CxN- chain and having fluoroalkoxy groups attached to the phosphorus atoms in the chain.

PZ—A rubber having a -P|CxN- chain and having aryloxy (phenoxy and substituted phenoxy) groups attached to the phosphorus atoms in the chain.

3.8 Mixtures of rubbers are identified by using the class designations for the types of rubbers in the mixture. If the composition is known, the major component is listed first; for example, a blend of NR/BR in 60/40 ratio is designated NR/BR. If the rubbers are present in equal amounts or if the proportion is unknown, the rubbers should be designated in alphabetical order; for example, BR/NR is used for a 50/50 ratio, and BR-NR is used for an unknown composition.

4. Keywords

4.1 acronyms for latices; acronyms for rubber; nomenclature

APPENDIX

X1. HISTORICAL NOMENCLATURE

X1.1 The following terms have been removed from the main body of this standard because they are obsolete and no longer commercially available. This appendix will serve as an historical reference.

NCR—Acrylonitrile-chloroprene

SCR—Styrene-chloroprene