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# Standard Terminology Relating to Rubber and Rubber Latices—Abbreviations for Chemicals Used in Compounding<sup>1</sup>

This standard is issued under the fixed designation D3853; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This terminology is a compilation of abbreviations for accelerators, vulcanizing agents, activators, antidegradants, plasticizers, softeners, processing aids, blowing agents, retarders, isocyanates, peroxides, and antireversion agents used in the compounding of rubber products. Abbreviations for rubbers are listed in Practice D1418 and a numbering system for various grades of carbon blacks is described in Classification D1765.

1.2 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D1418 Practice for Rubber and Rubber Latices—Nomenclature

D1600 Terminology for Abbreviated Terms Relating to Plastics

D1566 Terminology Relating to Rubber

D1765 Classification System for Carbon Blacks Used in Rubber Products

2.2 *ISO Standard:*<sup>3</sup>

ISO 6472 Rubber Compounding Ingredients—Abbreviations

## 3. Significance and Use

3.1 These abbreviations are to be used in technical writing where the full chemical name of the substance is used initially,

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee D11 on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee D11.08 on Terminology.

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<sup>2</sup> 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.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

followed by the abbreviation found in this terminology. Later references to this substance may then use the abbreviation only.

## 4. Form and Style

4.1 Although generally accepted references<sup>3,4,5</sup> for naming chemicals provide the basis for these abbreviations, common usage has dictated the particular choice for the abbreviations set forth in this terminology.

4.2 Conventions used in this terminology are:

4.2.1 The symbol B will be used for butyl in the case of accelerators and vulcanizing agents and for butylidene in the case of bisphenol materials (see 4.2.6.2).

4.2.2 The symbol Bz will be used for benzyl groups.

4.2.3 When possible, a number will be used to denote long chain hydrocarbons, that is, 5 for penta, 88 for dioctyl, etc. If the length of the hydrocarbon chain is ten or higher, the number shall be placed in parenthesis, that is (12) for dodecyl, etc. The letter “i” shall be used to denote an iso structure.

4.2.4 The chemical symbol for metallic components will be used whenever possible. This will usually occur at the beginning of the abbreviation.

4.2.5 The symbol C will be used for dithiocarbamate accelerators and for cyclohexyl in the case of sulfenamide accelerators and bisphenol antioxidants.

4.2.6 Commercial bisphenol antioxidants are made up of two alkyl/cyclohexyl substituted phenol rings linked in the ortho or para position. The following conventions will be used in this nomenclature scheme:

4.2.6.1 *o*—ortho

*m*—meta

*p*—para

Bp—bisphenol structure

4.2.6.2 M—methylene

B—butylidene

IB—isobutylidene

IP—isopropylidene

T—thio

<sup>4</sup> *A Guide to IUPAC Nomenclature of Organic Compounds*, CRC Press, Boca Raton, FL, 1993.

<sup>5</sup> Fox, R. B., *Nomenclature of Organic Compounds*, American Chemical Society, Washington, DC, 2001.

- 4.2.6.3 1—methyl  
 2—ethyl  
 4—*t*-butyl  
 9—nonyl  
 C—cyclohexyl

4.2.7 For diphenylamine antidegradants use numbers for the identification of alkyl substituents on the diphenylamine rings.

## 5. Abbreviations

### ACCELERATORS AND VULCANIZING AGENTS

BA—butyraldehyde–aniline condensate.  
 BiDMC—bismuth dimethyldithiocarbamate.  
 BMTS—bis–morpholino–thiocarbamyl sulfenamide.  
 CBS—*N*-cyclohexyl-2-benzothiazyl sulfenamide.  
 CdDEC—cadmium diethyldithiocarbamate.  
 CdDMC—cadmium dimethyldithiocarbamate.  
 Cd5MC—cadmium pentamethylenedithiocarbamate.  
 CEA—cyclohexylethylamine.  
 CuDIP—copper diisopropyldithiophosphate.  
 CuDMC—copper dimethyldithiocarbamate.  
 CuMBT—copper 2-mercaptobenzothiazole.  
 DBA—dibutylamine.  
 DBQD—*p,p'*-dibenzoyl-*p*-benzoquinone dioxime.  
 DBTU—1,3-dibutylthiourea.  
 DBXD—dibutyl xanthogen disulfide.  
 DBzA—dibenzylamine.  
 DCBS—*N,N*-dicyclohexyl-2-benzothiazyl sulfenamide.  
 DEPTD—sym. diethyldiphenylthiuram disulfide *N,N'*diethyl-*N,N'*-diphenylthiuram disulfide.  
 DETU—1,3-diethylthiourea.  
 DMPTD—dimethyl diphenyl thiuram disulfide.  
 DIBS—*N,N*-diisopropyl-2-benzothiazyl sulfenamide.  
 DOTG—di-tolylguanidine.  
 DPG—diphenylguanidine.  
 DPTD—dipentamethylenethiuram disulfide.  
 DPTH—dipentamethylenethiuram hexasulfide.  
 DPTM—dipentamethylenethiuram monosulfide.  
 DPTT—dipentamethylene thiuram tetrasulfide  
 DPTU—*N,N'*-diphenylthiourea (thiocarbanilide).  
 DTDM—4,4'-dithiomorpholine.  
 DTTU—*N,N'*-di-*o*-tolylthiourea.  
 EFA—ethyl chloride, formaldehyde, and ammonia reaction product.  
 ETU—ethylene thiourea.  
 HMD—hexamethylenediamine.  
 HMDC—hexamethylenediamine carbamate.  
 HMMA—*N,N'*-hexamethylene-bis-methacrylamide.  
 HMT—hexamethylenetetramine.  
 MBSS—4-morpholinyl-2-benzothiazyl disulfide.  
 MBS—2-(morpholiniothio)benzothiazole.  
 MBSS—2-benzothiazole-*N*-morpholydisulfide.  
 MBT—2-mercaptobenzothiazole.  
 MBTS—dibenzothiazyl disulfide.  
 M-*o*-CA—4-4'-methylene-bis-(chloroaniline).  
 m-PBM—*N,N'*-*m*-phenylene-bis-maleimide.  
 MPTD—*N,N'*-dimethyl-*N,N'*-diphenylthiuram disulfide.  
 MTT—3-methyl-thiazolidine-thione-2.  
 NaDMC—sodium dimethyldithiocarbamate.

NaDBC—sodium dibutyldithiocarbamate.  
 NaDEC—sodium diethyldithiocarbamate.  
 NaIX—sodium isopropylxanthate.  
 OTBG—*o*-tolylbiguanide.  
 OTOS—*N*-oxydiethylene thiocarbamyl-*N'*-oxydiethylene sulfenamide.  
 PbDAC—lead diamyldithiocarbamate.  
 PbDMC—lead dimethyldithiocarbamate.  
 PBQD—*p*-benzoquinone dioxime.  
 P5MC—piperidinium pentamethylenedithiocarbamate.  
 SeDEC—selenium diethyldithiocarbamate.  
 SeMDC—selenium dimethyldithiocarbamate.  
 TAC—triallyl cyanurate.  
 TAIC—triallyl isocyanurate.  
 TBBS—*N-t*-butyl-2-benzothiazyl sulfenamide.  
 TBSI—*t*-butyl-2-benzothiazyl sulfenimide.  
 TBTD—tetrabutylthiuram disulfide.  
 TBTU—*N,N,N'*-tributylthiourea.  
 TBzTD—tetrabenzylthiuram disulfide.  
 TCT—tricrotonylidenetetramine.  
 TeDEC—tellurium diethyldithiocarbamate.  
 TeDMC—tellurium dimethyldithiocarbamate.  
 TIBTD—tetraisobutylthiuram disulfide  
 TETD—tetraethylthiuram disulfide.  
 TMTD—tetramethylthiuram disulfide.  
 TMTM—tetramethylthiuram monosulfide.  
 TU—thiourea.  
 ZnBX—zinc butylxanthate.  
 ZnDBC—zinc dibutyldithiocarbamate.  
 ZnDBP—zinc dibutyldithiophosphate.  
 ZnDBzC—zinc dibenzylthiocarbamate.  
 ZnDEC—zinc diethyldithiocarbamate.  
 ZnDIBC—zinc diisobutyldithiocarbamate  
 ZnDMC—zinc dimethyldithiocarbamate.  
 ZnEHBP—zinc ethylhexyl-*n*-butyldithiophosphate.  
 ZnEPC—zinc ethylphenyldithiocarbamate.  
 ZnEX—zinc ethylxanthate.  
 ZnIX—zinc isopropylxanthate.  
 ZnMBT—zinc-2-mercaptobenzothiazole.  
 Zn5MC—zinc pentamethylenedithiocarbamate.

### PEROXIDES

BBPIB—1, 4-bis-(*t*-butylperoxyisopropyl) benzene.  
 BPO—benzoyl peroxide.  
 BPV—*n*-butyl bis (4,4-*tert*-butylperoxy) valerate.  
 DBPC—1,1-bis (butylperoxy)-3,5,5-trimethyl-cyclohexane.  
 DCPB—2,4-dichlorobenzoyl peroxide.  
 DCP—dicumyl peroxide.  
 DMBPHa—2,5-dimethyl-2,5-di-(butyl peroxy) hexane.  
 DMBPHy—2,5-dimethyl-2,5-di-(butyl peroxy) hexyne-3.  
 DTBP—di-*t*-butyl peroxide.  
 EBPB—ethyl-3,3 bis (butyl peroxy) butryate.  
 MBPP—4-methyl-2,2-bis-(butyl peroxy) pentane.  
 TBCP—butyl cumyl peroxide.  
 TSS—toluene sulfonylsemicarbazide

**ANTIDEGRADANTS (ANTIOXIDANTS AND ANTIOZONANTS)**

AANA—aldol- $\alpha$ -naphthylamine.  
ADPA—acetone diphenylamine condensation product  
APPD—*N*-alkyl-*N'*-phenyl-*p*-phenylenediamine.  
p-BBp14—4,4'-butylidene-bis-(6-*t*-butyl-*m*-cresol).  
BHA—butylated hydroxyanisole.  
BHT—2, 6-di-butyl-4-methylphenol (butylated hydroxy toluene).  
CPPD—*N*-cyclohexyl-*N'*-phenyl-*p*-phenylenediamine.  
DBHQ—2,5-di-*tert*-butylhydroquinone.  
DLTDP—dilauryl thiodipropionate.  
I88PD—*N,N'*-bis-(1-methylheptyl)-*p*-phenylenediamine.  
NOTE 1—This is a specific isomer of *N,N'*-dioctyl-*p*-phenylenediamine (see ISO 6472).  
DNPD—*N, N'*-di-2-naphthyl-*p*-phenylenediamine.  
DOPD—*N,N'*-dioctyl-*p*-phenylenediamine.  
DPA—diphenylamine.  
DPPD—*N,N'*-diphenyl-*p*-phenylenediamine.  
DSTD—distearylthiodipropionate  
DTPD—*N,N'*-ditolyl-*p*-phenylenediamine.  
ETMQ—6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline.  
o-IBBp11—2,2'-isobutylidene-bis-(4,6-di-methylphenol).  
p-IPBp(4)<sub>n</sub>—polybutylated bisphenol A.  
IPPD—*N*-isopropyl-*N'*-phenyl-*p*-phenylenediamine.  
MBI—2-mercaptobenzimidazole.  
o-MBp1C—2,2'-methylene-bis-(4-methyl-6-cyclohexylphenol).  
o-MBp1(1C)—2,2'-methylene-bis-[6-(1-methylcyclohexyl)*p*-cresol].  
o-MBp14—2,2'-methylene-bis-(4-methyl-6-*t*-butylphenol).  
o-MBp19—2,2'-methylene-bis-(4-methyl-6-nonylphenol).  
o-MBp24—2,2'-methylene-bis-(4-ethyl-6-*t*-butylphenol).  
p-MBp44—4,4'-methylene-bis-(2,6-di-*t*-butylphenol).  
MMBI—methyl-2-mercaptobenzimidazole.  
NiDBC—nickel dibutylthiocarbamate.  
8DPA—octylated diphenylamine.  
PAN—*N*-phenyl-*alpha*-naphthylamine.  
PBN—*N*-phenyl-*beta*-naphthylamine.  
i-8PPD—*N*-phenyl-*N'*-2-octyl-*p*-phenylenediamine.  
P3DPA—*p*-isopropoxylateddiphenylamine.  
SPDA—styrenated diphenylamine.  
SPH—styrenated phenol.  
p-BBp14—4,4'-butylidene-bis-(2-*t*-butyl-*m*-cresol).  
p-TBp14—4,4'-thio-bis-(2-*t*-butyl-*m*-cresol).  
TAHQ—2,5-di-*amyl*hydroquinone.  
TMQ—2,2,4-trimethyl-1,2-dihydroquinoline (oligomer).  
TNPP—tri(nonylphenyl)phosphite.  
ZnDPT—zinc dialkylphosphorodithioate  
ZnMBI—zinc-2-mercaptobenzimidazole.  
ZnMMBI—zinc-methyl-2-mercaptobenzimidazole.  
6PPD—*N*-(1,3-dimethylbutyl)-*N'*-phenyl-*p*-phenylenediamine.  
6QDI—*N*-phenyl-*N'*-(1,3-dimethylbutyl)-2,5-cyclohexadiene-1,4-diimine.  
7PPD—*N*-(1,4-dimethylpentyl)-*N'*-phenyl-*p*-phenylenediamine.  
77PD—*N,N'*-bis-(1,4-dimethylpentyl)-*p*-phenylenediamine.

8PPD—*N*-octyl-*N'*-phenyl-*p*-phenylenediamine.  
88PD—*N,N'*-dioctyl-*p*-phenylenediamine.  
9DPA—nonylated diphenylamine.  
29DPA—ethylated/nonylated diphenylamine.  
48DPA—butylated/octylated diphenylamine

**PLASTICIZERS AND SOFTENERS**

 (See Terminology **D1600**)

BOP—butyl octyl phthalate.  
DBP—dibutyl phthalate.  
DBS—dibutyl sebacate.  
DCHP—dicyclohexyl phthalate  
DEP—diethyl phthalate.  
DIBA—diisobutyl adipate.  
DIBP—diisobutyl phthalate.  
DIDA—diisodecyl adipate.  
DIDP—diisodecyl phthalate.  
DIOA—diisooctyl adipate.  
DIOP—diisooctyl phthalate.  
DMP—dimethyl phthalate.  
DMS—dimethyl sebacate.  
DOA—dioctyl adipate.  
DOP—dioctyl phthalate or di-(2-ethylhexyl) phthalate.  
DOS—dioctyl sebacate.  
DOTP—dioctyl terephthalate-or-di-(2-ethylhexyl) terephthalate.  
DPCF—diphenyl cresyl phosphate  
DPOF—diphenyl octyl phosphate  
DPP—diphenyl phthalate.  
DUP—diundecyl phthalate.  
ELO—epoxidized linseed oil.  
ESO—epoxidized soya bean oil.  
ODA—octyl decyl adipate.  
TCEF—trichloroethyl phosphate  
TCF—cresyl phosphate  
TOF—trioctyl phosphate  
TOTM—trioctyl trimellitate.

**ACTIVATORS AND PROCESSING AIDS**

DEA—diethanolamine.  
DEG—diethylene glycol.  
GTMA—glyceryl trimethacrylate.  
PEG—polyethylene glycol.  
PPG—polypropylene glycol.  
PVME—polyvinyl methyl ether.  
NaPCP—sodium pentachlorophenate.  
TEA—triethanolamine.  
ZnEH—zinc 2-ethylhexanoate (zinc octoate).

**BLOWING AGENTS**

ADC—azodicarbonamide.  
BDSH—benzene-1,3-disulfonylhydrazide.  
BSH—benzene sulfonylhydrazide.  
DNPT—dinitrosopentamethylenetetramine.  
OBSh—oxy-bis-(benzene sulfonylhydrazide)  
TSH—toluene sulfonylhydrazide  
TSS—toluene sulfonylsemicarbazide

**ISOCYANATES**

CHDI—1,4-cyclohexane diisocyanate.  
HDI—1,6-hexamethylene diisocyanate.  
HMDI—4,4'-dicyclohexylmethane diisocyanate.  
IPDI—isophorone diisocyanate.  
MDI—4,4'-diphenylmethane diisocyanate.  
NDI—naphthalene-1,5-diisocyanate.  
PMPPI—polymethylene polyphenyl isocyanate.  
PPDI—p-phenylene diisocyanate.  
TDI—toluene diisocyanate.  
TMDI—2,2,4- and 2,4,4-trimethyl hexamethylene diisocyanate.  
TMXDI—m-tetramethylxylylene diisocyanate.  
TTI—4,4',4''-triphenylmethane triisocyanate.  
TIPT—tris-(p-iscyanatophenyl)-thiophosphate.

**RETARDERS**

CTP—*N*-(cyclohexylthio)phthalimide.  
NDPA—*N*-nitroso diphenylamine  
PTA—phthalic anhydride.  
SA—salicylic acid.

**ANTIREVERSION AGENTS**

DCIMX—1,3-bis(citraconimidomethyl)benzene.  
DHTS—hexamethylene-1,6-bis(thiosulfate) disodium salt dihydrate.

**6. Keywords**

6.1 accelerators; activators; antidegradants; antioxidants; antiozonants; antireversion agents; blowing agents; isocyanates; peroxides; plasticizers; processing aids; retarders; softeners; vulcanizing agents

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