INTERNATIONAL STANDARD

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Rubber compounding ingredients — Abbreviations

Ingrédients de mélange du caoutchouc — Abréviations

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6472 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

This second edition cancels and replaces the first edition (ISO 6472:1986), which has been technically revised. A major feature of this revision is the inclusion of IUPAC equivalent terms.

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Rubber compounding ingredients — Abbreviations

1 Scope

This International Standard establishes unambiguous abbreviations for commonly used rubber compounding ingredients, other than polymers, derived from a consensus of world opinion.

2 Use of the symbols

2.1 The abbreviations are derived from common usage in industry and commerce rather than from any systematic nomenclature. The list is not intended to conflict with, but rather to act as a supplement to, existing tradenames and trademarks.

2.2 The first appearance of the symbols in texts shall be enclosed in parentheses and shall be preceded by the chemical name written in full.

2.3 The list does not purport to be comprehensive, and abbreviations for other compounding ingredients will be added in future revisions.

2.4 Two systems of abbreviations for some chemicals are recognized as being in widespread use. For example, in the system favoured by North America and some other countries, the dithiocarbamate group is denoted by the symbol "DC", whereas in the system prevailing in many European countries this group is denoted by the single letter "C", with "D" being used to signify dialkyl or diaryl substitution. Abbreviations derived from the latter system are given as alternatives. Where there are two, the first usually designates the North American, the second the European.

2.5 International Union of Pure and Applied Chemistry (IUPAC) nomenclature is provided where this is available, in addition to the commonly used chemical name or names. In cases where IUPAC nomenclature is not available due to uncertainty or ambiguity, an explanation is given in a note. Also, in some instances, alternative commonly used chemical names are given where they are recognized.

3 Accelerators and vulcanizing agents

BA	butyraldehyde-aniline condensate IUPAC: not possible
BiMDC; BiDMC	bismuth dimethyldithiocarbamate IUPAC: bismuth bis(dimethyldithiocarbamate)
BQD; PBQD	*p*-benzoquinone dioxime IUPAC: same

CBS	*N*-cyclohexylbenzothiazole-2-sulfenamide; *N*-cyclohexylbenzothiazyl sulfenamide IUPAC: *N*-cyclohexyl-1,3-benzothiazole-2-sulfenamide
CdEDC; CdDEC	cadmium diethyldithiocarbamate IUPAC: cadmium bis(diethyldithiocarbamate)
CdMDC; CdDMC	cadmium dimethyldithiocarbamate IUPAC: cadmium bis(dimethyldithiocarbamate)
CuMDC; CuDMC	copper dimethyldithiocarbamate IUPAC: copper bis(dimethyldithiocarbamate)
DBA	dibenzylamine IUPAC: same
DBQD	*p,p'*-dibenzoyl-*p*-benzoquinone dioxime; quinone dioxime dibenzoate IUPAC: *p*-benzoquinone bis(*O*-benzoyloxime)
DBTU	1,3-dibutylthiourea IUPAC: 1,3-dibutyl-2-thiourea
DBXD	dibutylxanthogen disulfide IUPAC: *O,O*-dibutyl dithiobis(thioformate)
DCBS	*N,N*-dicyclohexylbenzothiazole-2-sulfenamide; *N,N*-dicyclohexylbenzothiazyl sulfenamide IUPAC: *N,N*-dicyclohexyl-1,3-benzothiazole-2-sulfenamide
DCP	dicumyl peroxide IUPAC: bis(1-methyl-1-phenylethyl) peroxide
DETU	1,3-diethylthiourea IUPAC: 1,3-diethyl-2-thiourea
DIBS	*N,N*-diisopropylbenzothiazole-2-sulfenamide; *N,N*-diisopropylbenzothiazyl sulfenamide IUPAC: *N,N*-diisopropyl-1,3-benzothiazole-2-sulfenamide
DOTG	di-*o*-tolylguanidine IUPAC: 1,3-di-*o*-tolylguanidine
DPG	diphenylguanidine IUPAC: 1,3-diphenylguanidine
DPTD	dipentamethylenethiuram disulfide IUPAC: bis[piperidino(thiocarbonyl)] disulfide
DPTH	dipentamethylenethiuram hexasulfide IUPAC: bis[piperidino(thiocarbonyl)] hexasulfide
DPTM	dipentamethylenethiuram monosulfide IUPAC: di(piperidine-1-carbothioic) thioanhydride

DPTT	dipentamethylenethiuram tetrasulfide IUPAC: bis[piperidino(thiocarbonyl)] tetrasulfide
DPTU	1,3-diphenylthiourea IUPAC: 1,3-diphenyl-2-thiourea
DTBP	di-*tert*-butyl peroxide IUPAC: same
DTDM	dithiodimorpholine IUPAC: 4-(morpholinodithio)morpholine
DTTU	1,3-di-*o*-tolylthiourea IUPAC: 1,3-di-*o*-tolyl-2-thiourea
EFA; ECFA	ethyl chloride, formaldehyde and ammonia reaction product IUPAC: not possible
EPTD	*N,N'*-diethyl-*N,N'*-diphenylthiuram disulfide IUPAC: same
ETU	ethylene thiourea IUPAC: imidazoline-2-thione
HMD	hexamethylenediamine IUPAC: same
HMT	hexamethylenetetramine IUPAC: 1,3,5,7-tetraazatricyclo[3.3.1.1^{3,7}]decane
LADC; LDAC	lead diamyldithiocarbamate IUPAC: lead bis(dipentyldithiocarbamate)
LMDC; LDMC	lead dimethyldithiocarbamate IUPAC: lead bis(dimethyldithiocarbamate)
MBDS; MDS	2-morpholinodithio-1,3-benzothiazole; 4-morpholino-2-benzothiazyl disulfide IUPAC: 2-morpholinodithio-1,3-benzothiazole
MBS	*N*-oxydiethylenebenzothiazole-2-sulfenamide; 2-morpholinothiobenzothiazole IUPAC: 2-morpholino-1,3-benzothiazole
MBT	2-mercaptobenzothiazole; 2-benzothiazolinethione IUPAC: 1,3-benzothiazole-2-thiol (enol form); 1,3-benzothiazole-2(3H)-thione (keto form)
MBTS	benzothiazole disulfide; benzothiazyl disulfide IUPAC: bis(1,3-benzothiazol-2-yl) disulfide

MPTD	*N,N'*-dimethyl-*N,N'*-diphenylthiuram disulfide IUPAC: same
OTBG	*o*-tolylbiguanide IUPAC: 1-*o*-tolylbiguanide
OTOS	*N*-oxydiethylene thiocarbamyl-*N'*-oxydiethylene sulfenamide IUPAC: 4-[morpholino(thiocarbonyl)thio]morpholine
PPDC	piperidinium pentamethylenedithiocarbamate; piperidine pentamethylenedithiocarbamate IUPAC: piperidinium piperidine-1-carbodithioate
SBDC; SDBC	sodium dibutyldithiocarbamate IUPAC: same
SEDC; SDEC	sodium diethyldithiocarbamate IUPAC: same
SeEDC; SeDEC	selenium diethyldithiocarbamate IUPAC: λ^4-selenium tetrakis(diethyldithiocarbamate)
SeMDC; SeDMC	selenium dimethyldithiocarbamate IUPAC: λ^4-selenium tetrakis(dimethyldithiocarbamate)
SIX	sodium isopropylxanthate IUPAC: sodium *O*-isopropyl dithiocarbonate
SMDC; SDMC	sodium dimethyldithiocarbamate IUPAC: same
TAC	triallylcyanurate IUPAC: 2,4,6-triallyloxy-1,3,5-triazine
TBBS	*N-tert*-butylbenzothiazole-2-sulfenamide; *N-tert*-butylbenzothiazyl sulfenamide IUPAC: *N-tert*-butyl-1,3-benzothiazole-2-sulfenamide
TBTD	tetrabutylthiuram disulfide IUPAC: same
TBTU	1,1,3-tributylthiourea IUPAC: 1,1,3-tributyl-2-thiourea
TeEDC; TeDEC	tellurium diethyldithiocarbamate IUPAC: λ^4-tellurium tetrakis(diethyldithiocarbamate)
TETD	tetraethylthiuram disulfide IUPAC: same
TMTD	tetramethylthiuram disulfide IUPAC: same
TMTM	tetramethylthiuram monosulfide IUPAC: same

TU	thiourea IUPAC: 2-thiourea
ZBDC; ZDBC	zinc dibutyldithiocarbamate IUPAC: zinc bis(dibutyldithiocarbamate)
ZBeDC; ZDBeC	zinc dibenzyldithiocarbamate IUPAC: zinc bis(dibenzyldithiocarbamate)
ZBX	zinc butylxanthate IUPAC: zinc di-*O*-butyl bis(dithiocarbonate)
ZDBP	zinc dibutyldithiophosphate IUPAC: zinc bis(*O,O*-dibutyl phosphorodithioate)
ZEDC; ZDEC	zinc diethyldithiocarbamate IUPAC: zinc bis(diethyldithiocarbamate)
ZEPDC; ZEPC	zinc ethylphenyldithiocarbamate IUPAC: zinc bis[ethyl(phenyl)dithiocarbamate]
ZEX	zinc ethylxanthate IUPAC: zinc di-*O*-ethyl bis(dithiocarbonate)
ZIX	zinc isopropylxanthate IUPAC: zinc di-*O*-isopropyl bis(dithiocarbonate)
ZMBT	zinc 2-mercaptobenzothiazole IUPAC: zinc bis(1,3-benzothiazole-2-thiolate)
ZMDC; ZDMC	zinc dimethyldithiocarbamate IUPAC: zinc bis(dimethyldithiocarbamate)
ZPMDC; ZPMC	zinc pentamethylenedithiocarbamate IUPAC: zinc bis(piperidine-1-carbodithioate)

4 Activators and process aids

DEA	diethanolamine IUPAC: 2,2′-iminodiethanol
DEG	diethylene glycol IUPAC: 2,2′-oxydiethanol
PEG	polyethylene glycol IUPAC: α-hydro-ω-hydroxypoly(oxyethylene)
PPG	polypropylene glycol IUPAC: α-hydro-ω-hydroxypoly(oxypropylene)
PVME	polyvinyl methyl ether IUPAC: poly(methoxyethylene)

SPP; SPCP	sodium pentachlorophenate IUPAC: sodium pentachlorophenoxide
TEA	triethanolamine IUPAC: 2,2′,2″-nitrilotriethanol
ZEH	zinc 2-ethylhexanoate; zinc octanoate IUPAC: zinc bis(2-ethylhexanoate)

5 Antioxidants and antiozonants

AANA	aldol-α-naphthylamine IUPAC: not possible
ADPA	acetone-diphenylamine condensate IUPAC: not possible
APPD	*N*-alkyl-*N*′-phenyl-*p*-phenylenediamine IUPAC: not possible, generic name, not a single compound
BHT	2,6-di-*tert*-butyl-4-methylphenol; butylated hydroxytoluene IUPAC: 2,6-di-*tert*-butyl-*p*-cresol
BMPPD; 77PD	*N*,*N*′-bis(1,4-dimethylpentyl)-*p*-phenylenediamine IUPAC: same
CPPD	*N*-cyclohexyl-*N*′-phenyl-*p*-phenylenediamine IUPAC: same
DLTDP	dilauryl thiodipropionate IUPAC: didodecyl 3,3′-thiodipropionate
DMHPD	*N*,*N*′-bis(1-methylheptyl)-*p*-phenylenediamine IUPAC: same
DNPD	*N*,*N*′-di-2-naphthyl-*p*-phenylenediamine IUPAC: same
DOPD; 88PD	*N*,*N*′-dioctyl-*p*-phenylenediamine IUPAC: *N*,*N*′-bis(1-ethyl-3-methylpentyl)-*p*-phenylenediamine

NOTE 1 The specific octyl isomer is given in the IUPAC name, the use of which is encouraged in order to avoid confusion with the 1-methylheptyl isomer in DMHPD.

DPA	diphenylamine IUPAC: same
DPPD	*N*,*N*′-diphenyl-*p*-phenylenediamine IUPAC: same
DTPD	*N*,*N*′-ditolyl-*p*-phenylenediamine IUPAC: *N*,*N*′-di-*x*-tolyl-*p*-phenylenediamine, where *x* denotes *o*, *m*, *p* or mixture

EDTMQ; ETMQ	6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline IUPAC: same
IPPD	*N*-isopropyl-*N'*-phenyl-*p*-phenylenediamine IUPAC: same
MBI	2-mercaptobenzimidazole IUPAC: benzimidazole-2-thiol
MMBI	2-mercapto-4(or 5)-methylbenzimidazole IUPAC: 4-methylbenzimidazole-2-thiol or 5-methylbenzimidazole-2-thiol
NBC; NDBC	nickel dibutyldithiocarbamate IUPAC: nickel bis(dibutyldithiocarbamate)
ODPA	octylated diphenylamine IUPAC: not possible
OPPD; 8PPD	*N*-octyl-*N'*-phenyl-*p*-phenylenediamine IUPAC: *N*-(1-methylheptyl)-*N'*-phenyl-*p*-phenylenediamine
PANA; PAN	*N*-phenyl-α-naphthylamine IUPAC: *N*-(1-naphthyl)aniline
PBNA; PBN	*N*-phenyl-β-naphthylamine IUPAC: *N*-(2-naphthyl)aniline
PPDPA	*p*-isopropoxydiphenylamine IUPAC: 4-isopropoxy-*N*-phenylaniline
SDPA	styrenated diphenylamine IUPAC: not possible
SPH	styrenated phenol IUPAC: not possible
TMQ	polymerized 2,2,4-trimethyl-1,2-dihydroquinoline IUPAC: not possible
TNPP	tri(nonylphenyl) phosphite IUPAC: tris(*x*-nonylphenyl) phosphite, where *x* denotes *o*, *m*, *p* or mixture
ZMBI	zinc 2-mercaptobenzimidazole IUPAC: zinc bis(benzimidazole-2-thiolate)
ZMMBI	zinc 2-mercapto-4(or 5)-methylbenzimidazole IUPAC: zinc bis(4-methylbenzimidazole-2-thiolate) or zinc bis(5-methylbenzimidazole-2-thiolate)
6PPD	*N*-1,3-dimethylbutyl-*N'*-phenyl-*p*-phenylenediamine IUPAC: same
7PPD	*N*-1,4-dimethylpentyl-*N'*-phenyl-*p*-phenylenediamine IUPAC: same