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Plastics — Symbols and abbreviated terms —

Part 3: Plasticizers

Plastiques — Symboles et termes abrégés —

Partie 3: Plastifiants

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Foreword

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The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 1, *Terminology*.

This third edition cancels and replaces the second edition (ISO 1043-3:1996), which has been technically revised with the following changes:

— alternative CAS Registry Numbers have been added for some "octyl" plasticizers;

— a symbol for soya bean has been included in Annex A.

ISO 1043 consists of the following parts, under the general title *Plastics — Symbols and abbreviated terms*:

— *Part 1: Basic polymers and their special characteristics*

— *Part 2: Fillers and reinforcing materials*

— *Part 3: Plasticizers*

— *Part 4: Flame retardants*

Plastics — Symbols and abbreviated terms —

Part 3: Plasticizers

1 Scope

This part of ISO 1043 provides uniform symbols for components of terms relating to plasticizers to form abbreviated terms. It includes, in general, only those abbreviated terms that have come into established use.

The purpose of this part of ISO 1043 is to prevent the occurrence of more than one abbreviated term for a given plasticizer. The symbols are primarily intended to be convenient shorthand for forming abbreviated terms for chemical names in publications and other written matter.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 472, *Plastics — Vocabulary*

ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 and ISO 1043-1 apply.

4 Use of the symbols and abbreviated terms

4.1 The first appearance of an abbreviated term in a text shall be enclosed in parentheses and shall be preceded by the chemical name written in full.

4.2 Only capital letters shall be used for the symbols.

4.3 The list comprises the abbreviated term, the commonly used name or names and the International Union of Pure and Applied Chemistry (IUPAC) equivalent and the Chemical Abstracts Service Registry Number (CAS-RN) where these are available. In cases where IUPAC nomenclature or the CAS-RN is not available due to uncertainty or ambiguity, this is indicated in the text.

The commonly used chemical name or the IUPAC name given in this part of ISO 1043 shall be referred to when defining each abbreviated term.

It should be recognized that, in use in the rubber and plastics industries, many plasticizers are "commercial" or "technical" grades and not necessarily pure forms of substances.

4.4 A list of symbols for individual components of abbreviated terms is given in Annex A.

4.5 Mixtures of plasticizers are not considered in this part of ISO 1043.

4.6 Unless otherwise indicated, the alkyl groups are *n*-alkyl groups and phthalates are esters of *o*-phthalic acid.

4.7 No symbol is used in the abbreviated terms to indicate normal (*n*-) linear alcohols. For branched (iso) alcohols, the additional symbol I is used, with one exception: in view of worldwide usage of the symbol O for 2-ethylhexyl (for example, in DOA and DOP), this practice is observed in this part of ISO 1043 and the *n*-octyl group is designated NO (as in DNOP). Because of this dual usage, the application of the rule specified in 4.1 is most important.

4.8 The symbol I designates iso-branched groups (for example, DIOP). However, DTDP is sometimes used instead of DITDP because di-*n*-tridecyl phthalate is not used as a plasticizer; when DTDP is used, the application of the rule specified in 4.1 is most important.

4.9 For plasticizers based on di-esters of the same alcohol, the first symbol of the abbreviated term is D.

4.10 The letter P may be used in place of F for "phosphate" in abbreviated terms for plasticizers.

4.11 Several plasticizers having "iso" names indicating branched groups might consist of several isomers. For this reason, no single IUPAC name can describe the detailed chemical composition of each of these plasticizers.

4.12 Some plasticizers consisting of esters of more than one alcohol are known by a combined number and letter code, e.g. 711A is an alternative common name for heptyl nonyl undecyl adipate (HNUA). The first digit represents the number of carbon atoms in the shortest alkyl group and the second and third digits represent that of the longest alkyl group in the plasticizer; thus 7 denotes heptyl and 11 denotes undecyl. The letter at the end of the code is either A, which denotes adipate, or P, which denotes phthalate.

5 Schedule of terms

Abbreviated term	Common name	IUPAC equivalent	CAS-RN
ASE	alkyl sulfonic acid ester	alkanesulfonates or alkyl alkanesulfonates	not known
ATBC (or **TBAC**)	tributyl *o*-acetylcitrate (or acetyl tributylcitrate)	tributyl *o*-acetylcitrate	77-90-7
ATEC (or **TEAC**)	triethyl o-acetylcitrate (or acetyl triethyl citrate)	triethyl o-acetylcitrate	77-89-4
ATEHC	actyltri-(2-ethylhexyl) citrate	tris(2-ethylhexyl) 2-actyloxypropane-1,2,3- tricarboxylate	144-15-0
BAR	butyl *o*-acetylricinoleate	butyl (*R*)-12-acetoxyoleate	140-04-5
BBP	benzyl butyl phthalate	same	85-68-7
BCHP	butyl cyclohexyl phthalate	same	84-64-0
BNP	butyl nonyl phthalate	same	not known
BOA	benzyl octyl adipate	benzyl 2-ethylhexyl adipate	3089-55-2
BOP	butyl octyl phthalate	butyl 2-ethylhexyl phthalate	85-69-8
BST	butyl stearate	same	123-95-5
DBA	dibutyl adipate	same	105-99-7
DBEP	di-(2-butoxyethyl) phthalate	bis(2-butoxyethyl) phthalate	117-83-9

[a] In this context, "octyl" and "(2-ethylhexyl)" are synonymous. DEHA and DEHP are frequently used as the abbreviated terms.

Abbreviated term	Common name	IUPAC equivalent	CAS-RN
DBF	dibutyl fumarate	same	105-75-9
DBM	dibutyl maleate	same	105-76-0
DBP	dibutyl phthalate	same	84-74-2
DBS	dibutyl sebacate	same	109-43-3
DBTP	dibutyl terephthalate	same	1962-75-0
DBZ	dibutyl azelate	same	2917-73-9
DCHP	dicyclohexyl phthalate	same	84-61-7
DCP	dicapryl phthalate	bis(1-methylheptyl) phthalate	131-15-7
DDP	didecyl phthalate	same	84-77-5
DEGDB	diethylene glycol dibenzoate	oxydiethylene dibenzoate	120-55-8
DEP	diethyl phthalate	same	84-66-2
DHP	diheptyl phthalate	same	3648-21-3
DHXP	dihexyl phthalate	same	84-75-3
DIBA	diisobutyl adipate	same	141-04-8
DIBM	diisobutyl maleate	same	14234-82-3
DIBP	diisobutyl phthalate	same	84-69-5
DIDA	diisodecyl adipate	see 4.11	27178-16-1
DIDP	diisodecyl phthalate	see 4.11	26761-40-0
DIHP	diisoheptyl phthalate	see 4.11	41451-28-9
DIHXP	diisohexyl phthalate	same	71850-09-4
DINA	diisononyl adipate	see 4.11	33703-08-1
DINCH	diisononyl cyclohexane dicarboxylate	diisononyl cyclohexane-1,2-dicarboxylate	166412-78-8
DINP	diisononyl phthalate	see 4.11	28553-12-0 68515-48-0
DIOA	diisooctyl adipate	see 4.11	1330-86-5
DIOM	diisooctyl maleate	see 4.11	1330-76-3
DIOP	diisooctyl phthalate	see 4.11	27554-26-3
DIOS	diisooctyl sebacate	see 4.11	27214-90-0
DIOZ	diisooctyl azelate	see 4.11	26544-17-2
DIPP	diisopentyl phthalate	same	605-50-5
DMEP	di-(2-methyloxyethyl) phthalate	bis(2-methoxyethyl) phthalate	117-82-8
DMP	dimethyl phthalate	same	131-11-3
DMS	dimethyl sebacate	same	106-79-6
DNF	dinonyl fumarate	same	2787-63-5
DNM	dinonyl maleate	same	2787-64-6
DNOP	di-*n*-octyl phthalate	dioctyl phthalate	117-84-0
DNP	dinonyl phthalate	same	14103-61-8
DNS	dinonyl sebacate	same	4121-16-8
DOA	dioctyl[a] adipate	bis(2-ethylhexyl)[a] adipate	103-23-1
DOIP	dioctyl isophthalate	bis(2-ethylhexyl) isophthalate	137-89-3
DOP	dioctyl phthalate	bis(2-ethylhexyl) phthalate	117-81-7
DOS	dioctyl sebacate	bis(2-ethylhexyl) sebacate	122-62-3

[a] In this context, "octyl" and "(2-ethylhexyl)" are synonymous. DEHA and DEHP are frequently used as the abbreviated terms.

Abbreviated term	Common name	IUPAC equivalent	CAS-RN
DOTP (or **DEHT**)	dioctyl terephthalate	bis(2-ethylhexyl) terephthalate	6422-86-2
DOZ	dioctyl azelate	bis(2-ethylhexyl) azelate	103-24-2
DPCP (or **DPCF**)	diphenyl cresyl phosphate	diphenyl *x*-tolyl orthophosphate, where *x* denotes *o*, *m*, *p* or mixture	26444-49-5
DPGDB	di-*x*-propylene glycol dibenzoate	not possible	27138-31-4
DPHP	di-(2-propylheptyl) phthalate	bis(2-propylheptyl) benzene-1,2-dicarboxylate	53306-54-0
DPOP (or **DPOF**)	diphenyl octyl phosphate	2-ethylhexyl diphenyl orthophosphate	1241-94-7 115-88-8
DPP	diphenyl phthalate	same	84-62-8
DTDP	diisotridecyl phthalate (see 4.8)	see 4.11	27253-26-5
DUP	diundecyl phthalate	same	3648-20-2
ELO	epoxidized linseed oil	not possible	8016-11-3
ESBO	epoxidized soya bean oil	not possible	8013-07-8
GTA	glycerol triacetate	same	102-76-1
HNUA	heptyl nonyl undecyl adipate (= 711A)	not possible	not known
HNUP	heptyl nonyl undecyl phthalate (= 711P)	not possible	68515-42-4
HXODA	hexyl octyl decyl adipate (= 610A)	not possible	not known
HXODP	hexyl octyl decyl phthalate (= 610P)	not possible	68515-51-5
NUA	nonyl undecyl adipate (= 911A)	not possible	not known
NUP	nonyl undecyl phthalate (= 911P)	not possible	not known
ODA	octyl decyl adipate	decyl octyl adipate	110-29-2
ODP	octyl decyl phthalate	decyl 2-ethylhexyl phtahalate or 1,2-benzenedicarboxylic acid, mixed 2-ethylhexyl and isodecyl esters	68515-52-6 119-07-3
ODTM	*n*-octyl decyl trimellitate	decyl octyl hydrogen benzene-1,2,4-tricarboxylate	67989-23-5
PO	paraffin oil	not possible	8012-95-1
PPA	poly(propylene adipate)	same	not known
PPS	poly(propylene sebacate)	not possible	not known
SOA	sucrose octa-acetate	sucrose octaacetate	126-14-7
TBAC (or **ATBC**)	tributyl *o*-acetylcitrate (or acetyl tributylcitrate)	tributyl *o*-acetylcitrate	77-90-7
TBEP	tri-(2-butoxyethyl) phosphate	tris(2-butoxyethyl) orthophosphate	78-51-3
TBP	tributyl phosphate	tributyl orthophosphate	126-73-8
TCEP (or **TCEF**)	trichloroethyl phosphate	tris(2-chloroethyl) orthophosphate	115-96-8
TCP (or **TCF**)	tricresyl phosphate	tri-*x*-tolyl orthophosphate, where *x* denotes *o*, *m*, *p* or mixture	1330-78-5
TDBPP	tri-(2,3-dibromopropyl) phosphate	tris(2,3-dibromopropyl) orthophosphate	126-72-7

[a] In this context, "octyl" and "(2-ethylhexyl)" are synonymous. DEHA and DEHP are frequently used as the abbreviated terms.

Abbreviated term	Common name	IUPAC equivalent	CAS-RN
TDCPP	tri-(2,3-dichloropropyl) phosphate	tris(2,3-dichloropropyl) orthophosphate	78-43-3
TEAC (or **ATEC**)	triethyl o-acetylcitrate (or acetyl triethyl citrate)	triethyl o-acetylcitrate	77-89-4
THFO	tetrahydrofurfuryl oleate	same	5420-17-7
THTM	triheptyl trimellitate	triheptyl benzene-1,2,4-tricarboxylate	1528-48-9
TIOTM	triisooctyl trimellitate	tris(6-methylheptyl) benzene-1,2,4-tricarboxylate	27251-75-8
TOP (or **TOF**)	trioctyl phosphate	tris(2-ethylhexyl) orthophosphate	78-42-2 1806-54-8
TOPM	tetraoctyl pyromellitate	tetrakis(2-ethylhexyl) benzene-1,2,4,5-tetracarboxylate	3126-80-5
TOTM	trioctyl trimellitate	tris(2-ethylhexyl) benzene-1,2,4-tricarboxylate	3319-31-1
TPP	triphenyl phosphate	triphenyl orthophosphate	115-86-6
TXP (or **TXF**)	trixylyl phosphate	tri-*x*,*y*-xylyl orthophosphate, where *x* and *y* denote *o*, *m*, *p* or mixture	25155-23-1

[a] In this context, "octyl" and "(2-ethylhexyl)" are synonymous. DEHA and DEHP are frequently used as the abbreviated terms.

Annex A
(normative)

List of symbols for individual components of abbreviated terms

A.1 List of symbols

Symbol	Component of abbreviated term
A	acetate, acetyl, adipate, alkyl
B	benzoate, benzyl, bromo, butoxy, butyl
C	capryl, chloro, citrate, cresyl
CH	cyclohexyl
D	decyl, di
E	epoxidized, ethyl, ethylene
EST	ester
F	fumarate, furfuryl, phosphate
G	glycerol, glycol
H	heptyl, hydro
HX	hexyl
I	iso
L	linseed
M	maleate, mellitate, methyl, methyloxy
N	*n*-(normal), nonyl
O	octa, octyl, oil, oleate
P	paraffin, pentyl, phenyl, phosphate, phthalate, poly, propyl, propylene, pyro
R	ricinoleate
S	sebacate, sucrose, sulfonic acid
SB	soya bean
ST	stearate
T	ter, tetra, tolyl, tri
U	undecyl
X	xylyl
Z	azelate

A.2 List of components of abbreviated terms

Component of abbreviated term	Symbol
acetate	**A**
acetyl	**A**
adipate	**A**
alkyl	**A**
azelate	**Z**
benzoate	**B**
benzyl	**B**

Component of abbreviated term	Symbol
bromo	**B**
butoxy	**B**
butyl	**B**
capryl	**C**
chloro	**C**
citrate	**C**
cresyl	**C**
cyclohexyl	**CH**
decyl	**D**
di	**D**
epoxidized	**E**
ester	**EST**
ethyl	**E**
ethylene	**E**
fumarate	**F**
furfuryl	**F**
glycerol	**G**
glycol	**G**
heptyl	**H**
hexyl	**HX**
hydro	**H**
iso	**I**
linseed	**L**
maleate	**M**
mellitate	**M**
methyl	**M**
methyloxy	**M**
n-(normal)	**N**
nonyl	**N**
octa	**O**
octyl	**O**
oil	**O**
oleate	**O**
paraffin	**P**
pentyl	**P**
phenyl	**P**
phosphate	**P, F**
phthalate	**P**
poly	**P**
propyl	**P**
propylene	**P**
pyro	**P**
ricinoleate	**R**
sebacate	**S**
soya bean	**SB**