INTERNATIONAL STANDARD 1043

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Plastics — Symbols

Plastiques — Symboles

Second edition — 1978-12-15

UDC 678.5/.8 : 003.62

Ref. No. ISO 1043-1978 (E)

Descriptors : plastics, polymers, copolymers, plasticizers, symbols, abbreviations, designation.

Price based on 4 pages

FOREWORD

IOS (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1043 was developed by Technical Committee ISO/TC 61, *Plastics*. The first edition (ISO 1043-1975), which resulted from the combination of ISO Recommendation R 1043-1969 and its Addenda 1 and 2 into one single document, had been approved by the member bodies of the following countries :

Austria	Iran	Romania
Belgium	Ireland	South Africa, Rep. of
Brazil	Israel	Spain
Bulgaria	Italy	Sweden
Canada	Japan	Switzerland
Czechoslovakia	Korea, Dem. P. Rep. of	Thailand
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
Finland	Netherlands	United Kingdom
Germany, F.R.	New Zealand	U.S.A.
Greece	(R 1043/DAD 2)	U.S.S.R.
Hungary	Poland	Yugoslavia
India	Portugal	

The member bodies of the following countries had expressed disapproval of the document on technical grounds :

France
New Zealand
(R 1043 + R 1043/DAD 1)

This second edition, which supersedes ISO 1043-1975, incorporates draft Addendum 1, which was circulated to the member bodies in May 1976. This draft addendum was approved by the member bodies of the following countries :

Australia	Hungary	Poland
Austria	India	Romania
Belgium	Iran	South Africa, Rep. of
Brazil	Ireland	Spain
Chile	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
Finland	Mexico	United Kingdom
France	Netherlands	U.S.A.
Germany, F.R.	New Zealand	

The member body of the following country expressed disapproval of the document on technical grounds :

Peru

Printed in Switzerland

Plastics – Symbols

1 SCOPE AND FIELD OF APPLICATION

This International Standard provides uniform symbols for terms relating to plastics.

Abbreviated terminology has evolved through widespread common usage. This compilation of abbreviated nomenclature has been prepared primarily to promote the use of one rather than more than one symbol for a given material, and to avoid the use of the same symbol for more than one material. It includes, in general, those symbols that have come into established use.

When symbols are used in publications or other written matter, their first occurrence in the text should be enclosed in parentheses and should be preceded by the written word or words being abbreviated; subsequent references to such words in the text can then be by the appropriate symbols.

2 EXPLANATORY NOTES

2.1 IUPAC rules for source-based names of polymers specify that when "poly" is followed by more than one word, enclosing marks are used. The IUPAC practice is followed in this document. In common usage the enclosing marks are often omitted.

2.2 In addition to their use in designating polymers, the symbols are also intended for use in designating materials and compounds based on polymers; for example, PE plastics, PE moulding materials, PE film, PE sheeting, PE pipe, etc. Supplementary symbols for designating primary intended uses, distinguishing characteristics, etc., of plastic materials and compounds are standardized in specifications and designations prepared by ISO/TC 61.

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

2.4 The letter P may be used in place of F for "phosphate" in plasticizer symbols.

3 SYMBOLS FOR HOMOPOLYMERIC AND NATURAL POLYMERIC MATERIALS

CA	Cellulose acetate
CAB	Cellulose acetate butyrate
CAP	Cellulose acetate propionate
CF	Cresol-formaldehyde
CMC	Carboxymethyl cellulose
CN	Cellulose nitrate
CP	Cellulose propionate
CS	Casein
EC	Ethyl cellulose
EP	Epoxide; epoxy
MF	Melamine-formaldehyde
PA	Polyamide
PB	Polybutene-1
PBTP	Poly(butylene terephthalate)
PC	Polycarbonate
PCTFE	Polychlorotrifluoroethylene
PDAP	Poly(diallyl phthalate)
PE	Polyethylene
PEOX	Poly(ethylene oxide)
PETP	Poly(ethylene terephthalate)
PF	Phenol-formaldehyde
PIB	Polyisobutylene
PMMA	Poly(methyl methacrylate)
PMP	Poly-4 methylpentene-1
POM	Polyoxymethylene; polyformaldehyde
PP	Polypropylene
PPOX	Poly(propylene oxide)
PPSU	Poly(phenylene sulfone)
PS	Polystyrene
PTFE	Polytetrafluoroethylene
PUR	Polyurethane
PVAC	Poly(vinyl acetate)
PVAL	Poly(vinyl alcohol)
PVB	Poly(vinyl butyral)
PVC	Poly(vinyl chloride)
PVDC	Poly(vinylidene chloride)
PVDF	Poly(vinylidene fluoride)
PVF	Poly(vinyl fluoride)
PVFM	Poly(vinyl formal)
PVK	Polyvinylcarbazole
PVP	Polyvinylpyrrolidone
SI	Silicone
UF	Urea-formaldehyde
UP	Unsaturated polyester

4 SYMBOLS FOR COPOLYMERIC MATERIALS (see annex, clause A.4)

ABS	Acrylonitrile/butadiene/styrene
A/MMA	Acrylonitrile/methyl methacrylate
A/S/A	Acrylonitrile/styrene/acrylate
E/EA	Ethylene/ethyl acrylate
E/P	Ethylene/propylene
E/VAC	Ethylene/vinyl acetate
FEP	Perfluoro (ethylene/propylene); tetrafluoroethylene/hexafluoropropylene
MPF	Melamine/phenol formaldehyde
S/B	Styrene/butadiene
S/MS	Styrene/α-methylstyrene
VC/E	Vinyl chloride/ethylene
VC/E/MA	Vinyl chloride/ethylene/methyl acrylate
VC/E/VAC	Vinyl chloride/ethylene/vinyl acetate
VC/MA	Vinyl chloride/methyl acrylate
VC/MMA	Vinyl chloride/methyl methacrylate
VC/OA	Vinyl chloride/octyl acrylate
VC/VAC	Vinyl chloride/vinyl acetate
VC/VDC	Vinyl chloride/vinylidene chloride

5 SYMBOLS FOR PLASTICIZERS

ASE	Alkylsulfonic acid ester
BBP	Benzyl butyl phthalate
BOA	Benzyl octyl adipate (Benzyl 2-ethylhexyl adipate)
DBP	Dibutyl phthalate
DCP	Dicapryl phthalate
DEP	Diethyl phthalate
DHP	Diheptyl phthalate
DHXP	Dihexyl phthalate
DIBP	Diisobutyl phthalate
DIDA	Diisodecyl adipate
DIDP	Diisodecyl phthalate
DINA	Diisononyl adipate
DINP	Diisononyl phthalate
DIOA	Diisooctyl adipate
DIOP	Diisooctyl phthalate
DITDP	Diisotridecyl phthalate
DMP	Dimethyl phthalate
DNP	Dinonyl phthalate
DOA	Dioctyl adipate (Di-2-ethylhexyl adipate)
DOIP	Dioctyl isophthalate (Di-2-ethylhexyl isophthalate)
DOP	Dioctyl phthalate (Di-2-ethylhexyl phthalate)
DOS	Dioctyl sebacate (Di-2-ethylhexyl sebacate)
DOTP	Dioctyl terephthalate (Di-2-ethylhexyl terephthalate)
DOZ	Dioctyl azelate (Di-2-ethylhexyl azelate)
DPCF	Diphenyl cresyl phosphate
DPOF	Diphenyl octyl phosphate
ELO	Epoxidized linseed oil
ESO	Epoxidized soya bean oil
ODP	Octyl decyl phthalate
TCEF	Trichloroethyl phosphate
*TCF	Tricresyl phosphate, tritolyl phosphate (TTP)
TIOTM	Triisooctyl trimellitate
TOF	Trioctyl phosphate (Tri-2-ethylhexyl phosphate)
TOPM	Tetraoctyl pyromellitate (Tetra-2-ethylhexyl pyromellitate)
TOTM	Trioctyl trimellitate (Tri-2-ethylhexyl trimellitate)
TPF	Triphenyl phosphate

* It is normal practice in the United Kingdom to use P in place of F to signify "phosphate". However, the abbreviation "TCP" is not acceptable because it is a registered trade-mark in the United Kingdom. Consequently, the abbreviation TTP (derived from the chemical name "tritolyl phosphate") has been adopted.

ANNEX

GUIDE FOR PREPARING NEW SYMBOLS FOR NAMES OF PLASTICS, PLASTICIZERS, AND RELATED TERMS

A.1 Use the letter P for "poly" to designate a homopolymer.

NOTE – The letter P may be used to designate a copolymer when its omission would be confusing.

A.2 Use only capital letters, for example :

Poly(vinyl chloride)	PVC

A.3 Where duplication otherwise occurs or where confusion may otherwise result, use two capital letters for a given component, not necessarily in the order in which they occur in the component being designated, for example :

Poly(vinyl acetate)	PVAC
Poly(vinyl alcohol)	PVAL
Poly(vinyl formal)	PVFM

A.4 For copolymers, use symbols for monomeric components in the order in which they occur in the term being designated, separated by an oblique stroke; the symbols generally appear left to right in the order of decreasing mole ratio (mol-%) or mass ratio (mass-%) of the monomeric components in the copolymer.

Bipolymers

A/MMA	Acrylonitrile/methyl methacrylate
E/P	Ethylene/propylene

Terpolymer

VC/E/MA	Vinyl chloride/ethylene/methyl acrylate

NOTE – The oblique strokes may be omitted when common usage has established the symbol without the oblique stroke; for example, ABS and FEP.

A.5 Use figures after the symbols to designate polymers prepared from various condensation units in a homologous series, for example :

1)	Polymer of ϵ-caprolactam	PA 6
2)	Polymer of hexamethylenediamine and adipic acid	PA 66
3)	Polymer of hexamethylenediamine and sebacic acid	PA 610
4)	Polymer of 11-aminoundecanoic acid	PA 11
5)	Polymer of 1,12-dodecanolactam	PA 12
6)	Copolymer of hexamethylenediamine, adipic acid and sebacic acid	PA 66/610
7)	Copolymer of 1) and 5)	PA 6/12

where PA indicates a polyamide and where two monomers are involved, the first figure refers to the number of carbon atoms in the amine and the second figure refers to the number of carbon atoms in the acid. An oblique stroke is used to separate the polyamide components of copolyamides.

A.6 Where necessary to distinguish between a two-component (diamine and diacid) polyamide and a one-component (amino acid or lactam) polyamide, a hyphen may be inserted between the figure representing the diamine and the figure representing the diacid of the two-component polyamide, for example :

Poly(methyleneoxamide)	PA 1-2
Poly(dodecanolactam)	PA 12

A.7 The symbols of terms for different materials used in the plastics industry should never be identical. On the other hand, it is not feasible to avoid using in the plastics industry symbols that in another industry designate another product. Adherence to the provision in clause 1 for identification of the term for which the symbol is used at its first occurrence in the text will avoid possible confusion.

A.8 New symbols for terms relating to plastics will be incorporated in future editions of this International Standard when they are needed for purposes of international communication and commerce. Interested parties should keep their national ISO Member Bodies informed of the need for such new international symbols for industrially important materials.

A.9 LIST OF SYMBOLS USED FOR COMPONENTS OF TERMS

A.9.1 List by symbols

Letters	Used as symbols for :
A	acetate, acrylate, acrylonitrile, adipate, alkyl, allyl, amide
AC	acetate
AL	alcohol
AN	acrylonitrile
B	benzyl, butadiene, butene, butyl, butylene, butyral, butyrate
C	capryl, carbonate, carboxy, cellulose, chloride, chloro, cresol, cresyl
CS	casein
D	decyl, di
E	epoxidized, ester, ethyl, ethylene
EP	epoxide, epoxy
F	fluoride, fluoro, formaldehyde, perfluoro, phosphate

FM	formal
H	heptyl
HX	hexyl
I	iso
K	carbazole
L	linseed
M	melamine, mellitate, meth, methyl, methylene
N	nitrate, nonyl
O	octyl, oil,oxy
OX	oxide
P	phenol, phenyl, phenylene, phosphate, phthalate, poly, polyester, propionate, propylene, pyro, pyrrolidone
S	sebacate, soya bean, styrene, sulfonic acid
SI	silicone
SU	sulfone
T	tere, tetra, tri
U	unsaturated, urea
UR	urethane
V	vinyl
VD	vinylidene
Z	azelate

A.9.2 List by components of terms

Components	Symbols
Acetate	A, AC
Acrylate	A
Acrylonitrile	A, AN
Adipate	A
Alcohol	AL
Alkyl	A
Allyl	A
Amide	A
Azelate	Z
Benzyl	B
Butadiene	B
Butene	B
Butyl	B
Butylene	B
Butyral	B
Butyrate	B
Capryl	C
Carbazole	K
Carbonate	C
Carboxy	C
Casein	CS
Cellulose	C
Chloride	C
Chloro	C
Cresol	C
Cresyl	C
Decyl	D
Di	D
Epoxide	EP
Epoxidized	E
Epoxy	EP
Ester	E
Ethyl	E
Ethylene	E
Fluoride	F
Fluoro	F
Formal	FM
Formaldehyde	F
Heptyl	H
Hexyl	HX
Iso	I
Linseed	L
Melamine	M
Mellitate	M
Meth	M
Methyl	M
Methylene	M
Nitrate	N
Nonyl	N
Octyl	O
Oil	O
Oxide	OX
Oxy	O
Perfluoro	F
Phenol	P
Phenyl	P
Phenylene	P
Phosphate	F, P
Phthalate	P
Poly	P
Polyester	P
Propionate	P
Propylene	P
Pyro	P
Pyrrolidone	P
Sebacate	S
Silicone	SI
Soya bean	S
Styrene	S
Sulfone	SU
Sulfonic acid	S
Tere	T
Tetra	T
Tri	T
Unsaturated	U
Urea	U
Urethane	UR
Vinyl	V
Vinylidene	VD