INTERNATIONAL STANDARD

ISO 1043-1

Second edition
1997-03-01

Plastics — Symbols and abbreviated terms —

Part 1:
Basic polymers and their special characteristics

Plastiques — Symboles et abréviations —

Partie 1: Polymères de base et leurs caractéristiques spéciales

Reference number
ISO 1043-1:1997(E)

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 1043-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 1, *Terminology*.

This second edition cancels and replaces the first edition (ISO 1043-1:1987), which has been technically revised.

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*

Annexes A and B of this part of ISO 1043 are for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Plastics — Symbols and abbreviated terms —

Part 1:
Basic polymers and their special characteristics

1 Scope

This part of ISO 1043 gives uniform abbreviated terms for plastics, and symbols for components of these terms. It includes only those abbreviated terms that have come into established use and its aim is both to prevent the occurrence of more than one abbreviated term for a given plastics terms and to prevent a given abbreviated term being interpreted in more than one way.

NOTES

1 For symbols for fillers and reinforcing materials, see ISO 1043-2, for plasticizers see ISO 1043-3 and for flame retardants see ISO 1043-4. Nomenclature for rubber and latices is given in ISO 1629:1995, *Rubber and latices — Nomenclature.*

2 Guidance for the preparation of new abbreviated terms is given in annex A, and reference lists of symbols for the components of polymers used to form abbreviated terms are given in annex B.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 1043. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1043 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1874-1:1992, *Plastics — Polyamide (PA) moulding and extrusion materials— Part 1: Designation.*

3 Use of the symbols and the abbreviated terms

3.1 Abbreviated terms for homopolymeric, copolymeric and natural polymeric materials are given in clause 4, and symbols for special characteristics are given in clause 5. Examples of the use of symbols and abbreviated terms are given in clause 6.

3.2 To distinguish the essential molecular characteristics within a given generic type of plastic material, additional symbols, with guidance for their use, are provided. The use of symbols for describing properties that can only be ascertained subjectively should be avoided since this can lead to confusion.

3.3 The abbreviated terms are primarily intended to be a convenient shorthand for chemical names in publications and other written matter. They are not intended for the selection of materials. The abbreviated terms also are useful for indicating the type of basic polymer in materials and products, e.g. ABS moulding material, PA film, PE sheeting, PVC pipe.

3.4 Only capital letters shall be used for symbols and abbreviated terms.

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

3.6 The rules of the International Union of Pure and Applied Chemistry (IUPAC) for source-based names of polymers specify that, when "poly" is followed by more than one word, enclosing marks are used. This practice is followed in this part of ISO 1043, but in common usage the enclosing marks are often omitted.

3.7 No attempt is made formally to systematize a shorthand terminology of polymers. Terminology and formulae designations for scientific literature in the field of natural and synthetic polymers are elaborated by the Commission on Macromolecular Nomenclature of IUPAC. The abbreviated terms published by this commission are the same as in this part of ISO 1043, as far as frequently used polymers are concerned.

4 Abbreviated terms for homopolymeric, copolymeric and natural polymeric materials

Abbreviated term	Term for material
ABAK	Acrylonitrile-butadiene-acrylate
ABS	Acrylonitrile-butadiene-styrene
ACS	Acrylonitrile-chlorinated polyethylene-styrene
AEPDS	Acrylonitrile/ethylene-propylene-diene/styrene
AMMA	Acrylonitrile-methyl methacrylate
ASA	Acrylonitrile-styrene-acrylate
CA	Cellulose acetate
CAB	Cellulose acetate butyrate
CAP	Cellulose acetate propionate
CF	Cresol-formaldehyde
CMC	Carboxymethyl cellulose
CN	Cellulose nitrate
CP	Cellulose propionate
CSF	Casein-formaldehyde
CTA	Cellulose triacetate
EC	Ethyl cellulose
EEAK	Ethylene-ethyl acrylate
EMA	Ethylene-methacrylic acid
EP	Epoxide; Epoxy
E/P	Ethylene-propylene
ETFE	Ethylene-tetrafluoroethylene
EVAC	Ethylene-vinyl acetate
EVOH	Ethylene-vinyl alcohol

Abbreviated term	Term for material
FF	Furan-formaldehyde
LCP	Liquid-crystal polymer
MBS	Methacrylate-butadiene-styrene
MC	Methyl cellulose
MF	Melamine-formaldehyde
MMABS	Methyl methacrylate-acrylonitrile-butadiene-styrene
MPF	Melamine-phenol-formaldehyde
PA	Polyamide
PAEK	Polyacryletherketone
PAI	Polyamidimide
PAK	Polyacrylate
PAN	Polyacrylonitrile
PAR	Polyarylate
PB	Polybutene
PBAK	Poly(butyl acrylate)
PBT	Poly(butylene terephthalate)
PC	Polycarbonate
PCTFE	Polychlorotrifluoroethylene
PDAP	Poly(diallyl phthalate)
PDCPD	Polydicyclopentadiene
PE	Polyethylene
PEBA	Poly(ether block amide)
PEEK	Polyetheretherketone
PEEKK	Polyetheretherketoneketone
PEEST	Polyetherester
PEI	Polyetherimide
PEK	Polyetherketone
PEKEKK	Polyetherketoneetherketoneketone
PEKK	Polyetherketoneketone
PEOX	Poly(ethylene oxide)
PES	Polyethersulfone
PESTUR	Polyesterurethane
PET	Poly(ethylene terephthalate)
PEUR	Polyetherurethane
PF	Phenol-formaldehyde
PFA	Perfluoro alkoxyl alkane polymer
PFEP	Perfluoro(ethylene-propylene)
PI	Polyimide
PIB	Polyisobutylene
PIR	Polyisocyanurate
PMI	Polymethacrylimide
PMMA	Poly(methyl methacrylate)
PMMI	Poly(*N*-methyl methylacrylimide)
PMP	Poly(4-methyl pent-1-ene)
PMS	Poly-(α-methyl styrene)

Abbreviated term	Term for material
POM	Poly(oxymethylene); Polyformaldehyde
PP	Polypropylene
PPE	Poly(phenylene ether)
PPOX	Poly(propylene oxide)
PPS	Poly(phenylene sulfide)
PPSU	Poly(phenylene sulfone)
PS	Polystyrene
PSU	Polysulfone
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	Poly(vinyl carbazole)
PVP	Poly(vinyl pyrrolidone)
SAN	Styrene-acrylonitrile
SB	Styrene-butadiene
SI	Silicone
SMAH	Styrene-maleic anhydride
SMS	Styrene-α-methylstyrene
UF	Urea-formaldehyde
UP	Unsaturated polyester
VCE	Vinyl chloride-ethylene
VCEMAK	Vinyl chloride-ethylene-methyl acrylate
VCEVAC	Vinyl chloride-ethylene-vinyl acetate
VCMAK	Vinyl chloride-methyl acrylate
VCMMA	Vinyl chloride-methyl methacrylate
VCOAK	Vinyl chloride-octyl acrylate
VCVAC	Vinyl chloride-vinyl acetate
VCVDC	Vinyl chloride-vinylidene chloride

5 Symbols for indication of special characteristics

The abbreviated terms for the basic polymers may be supplemented by up to four symbols (see the list below) to differentiate between or among modifications of the polymer, if desired. The supplementary symbol(s) shall be placed after the abbreviated term of the basic polymer, separated by a hyphen, with no spacing before or after the hyphen. No symbol shall be placed in front of the abbreviated term of the basic polymer.

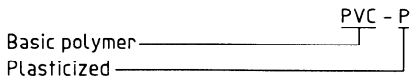
Symbols indicating special characteristics

Symbol	Meaning
B	block
B	brominated
C	chlorinated
D	density
E	elastomer
E	expanded; expandable
F	flexible
F	fluid
H	high
I	impact
L	linear
L	low
M	medium
M	molecular
N	normal
N	novolak
O	oriented
P	plasticized
R	raised
R	resol
S	saturated
S	sulfonated
T	temperature (resistance)
T	thermoplastic
T	thermosetting
T	toughened
U	ultra
U	unplasticized
U	unsaturated
V	very
W	weight
X	crosslinked; crosslinkable

6 Examples of use of symbols

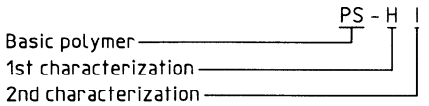
EXAMPLE 1

Plasticized poly(vinyl chloride) = PVC-P



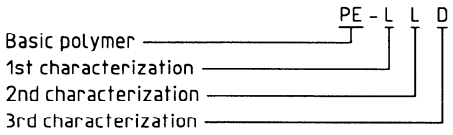
EXAMPLE 2

High-impact-modified polystyrene = PS-HI



EXAMPLE 3

Linear low-density polyethylene = PE-LLD



Annex A
(informative)

Guide for preparing new abbreviated terms for basic polymers, mixtures of polymers and related terms

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

NOTE — The letter P may also 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 When 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:

Polyacrylate	PAK
Polyarylate	PAR
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 for which the abbreviated term is being formed. The abbreviated terms for the components generally appear from left to right in the order of decreasing mass ratio (mass percent) of the monomeric components in the copolymer.

Bipolymers

Acrylonitrile-methyl methacrylate	AMMA
Ethylene-propylene	E/P

Terpolymers

Vinyl chloride-ethylene-methyl acrylate	VCEMAK

A.5 For mixtures of polymers, use the abbreviated terms for the basic polymers separated by a plus sign, in parentheses; for example:

(PMMA+ABS) for a mixture, blend or alloy of poly(methyl methacrylate) and acrylonitrile-butadiene-styrene

There shall be no space before and behind the "+" sign.

A.6 Use figures after the symbols for the components (but before the symbols indicating special characteristics) to designate polymers prepared from various condensation units in a homologous series; for example:

a)	Polymer of ε-caprolactam	PA 6
b)	Polymer of hexamethylenediamine and adipic acid	PA 66
c)	Polymer of hexamethylenediamine and sebacic acid	PA 610
d)	Polymer of 11-aminoundecanoic acid	PA 11
e)	Polymer of ω-dodecanolactam	PA 12
f)	Polymer of hexamethylenediamine, adipic acid and sebacic acid	PA 66/610
g)	Copolymer of ε-caprolactam and ω-dodecanolactam	PA 6/12
h)	Polymer of tetramethylenediamine and adipic acid	PA 46
i)	Polymer of hexamethylenediamine and dodecandioic acid	PA 612

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

Non-linear aliphatic units of polyamides and copolyamides are designated by letters. Details are listed in table A.3 of annex A of ISO 1874-1:1992.

A.7 The abbreviated terms for different materials used in the plastics industry should never be identical. On the other hand, it is not feasible to avoid using abbreviated terms in the plastics industry that designate a different material in another industry. Adherence to the provision in clause 3 for identification of the term for which the abbreviated term is used at its first occurrence in the test will avoid possible confusion.

Annex B
(informative)

List of symbols used for components of terms

B.1 List by symbol

Symbol	Component of term
A	Acetate; Acryl; Acrylate; Acrylonitrile; Alkoxyl; Alkane; Allyl; Amid; Amide
AC	Acetate
AH	Anhydride
AI	Amidimide
AK	Acrylate
AL	Alcohol
AN	Acrylonitrile
AR	Arylate
B	Block; Butadiene; Butene; Butyl; Butylene; Butyral; Butyrate
C	Carbonate; Carboxy; Cellulose; Chloride; Chlorinated; Chloro; Cresol; Crystal; Cyclo
CS	Casein
D	Di; Diene
E	Ether; Ethyl; Ethylene
EP	Epoxide; Epoxy
EST	Ester
F	Fluoride; Fluoro; Formaldehyde; Furan
FM	Formal
I	Imide; Iso
IR	Isocyanurate
K	Carbazole; Ketone
L	Liquid
M	Maleic; Melamine; Meth; Methacryl; Methacrylate; Methyl; Methylene
MA	Methacrylate; Methacrylic acid
N	Nitrate
O	Octyl; Oxy
OH	Alcohol
OX	Oxide
P	Penta; Pentene; Per; Phenol; Phenylene; Phthalate; Poly; Polyester; Polymer; Propionate; Propylene; Pyrrolidone
S	Styrene; Sulfide
SI	Silicone
SU	Sulfone
T	Terephthalate; Tetra; Tri
U	Unsaturated; Urea

Symbol	Component of term
UR	Urethane
V	Vinyl
VD	Vinylidene

B.2 List by component of term

Component of term	Symbol
Acetate	**A, AC**
Acryl	**MA**
Acrylate	**A, AK**
Acrylonitrile	**A, AN**
Alcohol	**AL, OH**
Alkane	**A**
Alkoxyl	**A**
Allyl	**A**
Amid	**A**
Amide	**A**
Amidimide	**AI**
Anhydride	**AH**
Arylate	**AR**
Block	**B**
Butadiene	**B**
Butene	**B**
Butyl	**B**
Butylene	**B**
Butyral	**B**
Butyrate	**B**
Carbazole	**K**
Carbonate	**C**
Carboxy	**C**
Casein	**CS**
Cellulose	**C**
Chloride	**C**
Chlorinated polyethylene	**C**
Chloro	**C**
Cresol	**C**
Crystal	**C**
Cyclo	**C**
Di	**D**
Diene	**D**
Epoxide	**EP**
Epoxy	**EP**
Ester	**EST**
Ether	**E**
Ethyl	**E**
Ethylene	**E**
Fluoride	**F**
Fluoro	**F**
Formal	**FM**
Formaldehyde	**F**
Furan	**F**
Imide	**I**
Iso	**I**
Isocyanurate	**IR**
Ketone	**K**
Liquid	**L**
Maleic	**M**
Melamine	**M**
Meth	**M**
Methacryl	**M**
Methacrylate	**M, MA**
Methacrylic acid	**MA**
Methyl	**M**
Methylene	**M**
Nitrate	**N**
Octyl	**O**
Oxide	**OX**
Oxy	**O**