
Plastics — Symbols and abbreviated terms —

Part 1:
Basic polymers and their special characteristics

Plastiques — Symboles et termes abrégés —

Partie 1: Polymères de base et leurs caractéristiques spéciales

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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

This fourth edition cancels and replaces the third edition (ISO 1043-1:2001), 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*

Plastics — Symbols and abbreviated terms —

Part 1: Basic polymers and their special characteristics

1 Scope

This part of ISO 1043 defines abbreviated terms for the basic polymers used in plastics, symbols for components of these terms, and symbols for special characteristics of plastics. 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 plastic and to prevent a given abbreviated term being interpreted in more than one way.

NOTE 1 For symbols and abbreviated terms 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 rubbers and latices is given in ISO 1629. Nomenclature for thermoplastic elastomers is given in ISO 18064.

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

NOTE 3 A classification of abbreviated terms for polymers grouped by type is given in Annex C.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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*

3 Terms and definitions

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

3.1

abbreviated term

term resulting from the omission of any part of a term while designating the same concept

4 Use of symbols and abbreviated terms

4.1 Abbreviated terms for homopolymers, copolymers and natural polymers are given in Clause 5, symbols for special characteristics are given in Clause 6, the symbol for plastics recycle is given in Clause 7, and examples of the use of symbols are given in Clause 8.

4.2 To distinguish the essential molecular characteristics within a given generic type of plastics 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.

4.3 The abbreviated terms are primarily intended to be a convenient shorthand for chemical names in publications and other written matter. The abbreviated terms are also useful for indicating the type of basic polymer in materials and products, e.g. ABS moulding material, PA film, PE sheeting and PVC pipe.

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

4.5 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.

4.6 The rules of the International Union of Pure and Applied Chemistry (IUPAC) for source-based names of polymers recommend the use of parentheses when the prefix “poly” is used with a monomer name consisting of two or more words. This practice is followed in this part of ISO 1043, but in common usage the enclosing marks are often omitted.

4.7 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 have been elaborated by the Commission on Macromolecular Nomenclature of IUPAC. Any abbreviated terms published by this Commission are, in general, the same as in this part of ISO 1043.

5 Abbreviated terms for homopolymers, copolymers and natural polymers

The following list gives the preferred abbreviated terms for plastics materials, using the component symbols given in Annex B. For some established materials, the abbreviated terms are supplemented by symbols for special characteristics as defined in Clause 6.

For some materials, alternative abbreviated terms are often still used, and for information these are included after the name of the material.

Abbreviated term	Term for material
AB	acrylonitrile-butadiene plastic
ABAK	acrylonitrile-butadiene-acrylate plastic; preferred term for ABA
ABS	acrylonitrile-butadiene-styrene plastic
ACS	acrylonitrile-(chlorinated polyethylene)-styrene; preferred term for ACPES
AEPDS	acrylonitrile-(ethylene-propylene-diene)-styrene plastic; preferred term for AEPDMS
AMMA	acrylonitrile-(methyl methacrylate) plastic
ASA	acrylonitrile-styrene-acrylate plastic
CA	cellulose acetate
CAB	cellulose acetate butyrate
CAP	cellulose acetate propionate
CEF	cellulose formaldehyde
CF	cresol-formaldehyde resin
CMC	carboxymethyl cellulose
CN	cellulose nitrate
COC	cycloolefin copolymer
CP	cellulose propionate
CTA	cellulose triacetate
EAA	ethylene-(acrylic acid) plastic
EBAK	ethylene-(butyl acrylate) plastic; preferred term for EBA
EC	ethyl cellulose
EEAK	ethylene-(ethyl acrylate) plastic; preferred term for EEA
EMA	ethylene-(methacrylic acid) plastic
EP	epoxide; epoxy resin
E/P	ethylene-propylene plastic; preferred term for EPM

ETFE	ethylene-tetrafluoroethylene plastic
EVAC ¹⁾	ethylene-(vinyl acetate) plastic; preferred term for EVA
EVOH	ethylene-(vinyl alcohol) plastic
FEP	perfluoro(ethylene-propylene) plastic; preferred term for PFEP
FF	furan-formaldehyde resin
HBV	poly(3-hydroxybutyrate)-co-(3-hydroxyvalerate)
LCP	liquid-crystal polymer
MABS	(methyl methacrylate)-acrylonitrile-butadiene-styrene plastic
MBS	(methyl methacrylate)-butadiene-styrene plastic
MC	methyl cellulose
MF	melamine-formaldehyde resin
MP	melamine-phenol resin
MSAN	α -methylstyrene-acrylonitrile plastic
PA	polyamide
PAA	poly(acrylic acid)
PAEK	polyaryletherketone
PAI	polyamidimide
PAK	polyacrylate
PAN	polyacrylonitrile
PAR	polyarylate
PARA	polyarylamide
PB	polybutene
PBAK	poly(butyl acrylate)
PBD	1,2-polybutadiene
PBN	poly(butylene naphthalate)
PBS	poly(butylene succinate)
PBSA	poly(butylene succinate adipate)
PBT	poly(butylene terephthalate)
PC	polycarbonate
PCCE	poly(cyclohexylene dimethylene cyclohexanedicarboxylate)
PCO	polycycloolefin
PCL	polycaprolactone
PCT	poly(cyclohexylene dimethylene terephthalate)
PCTFE	polychlorotrifluoroethylene
PDAP	poly(diallyl phthalate)
PDCPD	polydicyclopentadiene
PE	polyethylene
PE-C ²⁾	polyethylene, chlorinated; preferred term for CPE
PE-HD	polyethylene, high density; preferred term for HDPE
PE-LD	polyethylene, low density; preferred term for LDPE
PE-LLD	polyethylene, linear low density; preferred term for LLDPE
PE-MD	polyethylene, medium density; preferred term for MDPE
PE-UHMW	polyethylene, ultra high molecular weight; preferred term for UHMWPE
PE-VLD	polyethylene, very low density; preferred term for VLDPE
PEC	polyestercarbonate
PEEK	polyetheretherketone
PEEST	polyetherester

1) In ISO 1629, the abbreviated term for ethylene-(vinyl acetate) copolymer is EVM.

2) In ISO 1629, the abbreviated term for chlorinated polyethylene is CM.

PEI	polyetherimide
PEK	polyetherketone
PEN	poly(ethylene naphthalate)
PEOX	poly(ethylene oxide)
PES	poly(ethylene succinate)
PESTUR	polyesterurethane
PESU	polyethersulfone
PET	poly(ethylene terephthalate)
PEUR	polyetherurethane
PF	phenol-formaldehyde resin
PFA	perfluoro(alkyl vinyl ether)-tetrafluoroethylene plastic
PHA	polyhydroxyalkanoate
PHB	poly(3-hydroxybutyrate)
PI	polyimide
PIB ³⁾	polyisobutylene
PIR	polyisocyanurate
PK	polyketone
PLA	poly(lactic acid)
PMI	polymethacrylimide
PMMA	poly(methyl methacrylate)
PMMI	poly(<i>N</i> -methylmethacrylimide)
PMP	poly(4-methylpent-1-ene)
PMS	poly(α -methylstyrene)
POM	polyoxymethylene; polyacetal; polyformaldehyde
PP	polypropylene
PP-E	polypropylene, expandable; preferred term for EPP
PP-HI	polypropylene, high impact; preferred term for HIPP
PPE	poly(phenylene ether)
PPOX	poly(propylene oxide)
PPS	poly(phenylene sulfide)
PPSU	poly(phenylene sulfone)
PS	polystyrene
PS-E	polystyrene, expandable; preferred term for EPS
PS-HI	polystyrene, high impact; preferred term for HIPS
PS-S	polystyrene, sulfonated
PSU	polysulfone
PTFE	polytetrafluoroethylene
PTT	poly(trimethylene terephthalate)
PUR	polyurethane
PVAC	poly(vinyl acetate)
PVAL	poly(vinyl alcohol); preferred term for PVOH
PVB	poly(vinyl butyral)
PVC	poly(vinyl chloride)
PVC-C	poly(vinyl chloride), chlorinated; preferred term for CPVC
PVC-U	poly(vinyl chloride), unplasticized; preferred term for UPVC
PVDC	poly(vinylidene chloride)
PVDF	poly(vinylidene fluoride)
PVF	poly(vinyl fluoride)

3) In ISO 1629, the abbreviated term for polyisobutylene is IM.

PVFM	poly(vinyl formal)
PVK	poly(<i>N</i> -vinylcarbazole)
PVP	poly(<i>N</i> -vinylpyrrolidone)
SAN	styrene-acrylonitrile plastic
SB	styrene-butadiene plastic
SI⁴⁾	silicone plastic
SMAH	styrene-(maleic anhydride) plastic; preferred term for S/MA or SMA
SMS	styrene- α -methylstyrene plastic
UF	urea-formaldehyde resin
UP	unsaturated polyester resin
VCE	(vinyl chloride)-ethylene plastic
VCEMAK	(vinyl chloride)-ethylene-(methyl acrylate) plastic; preferred term for VCEMA
VCEVAC	(vinyl chloride)-ethylene-(vinyl acetate) plastic
VCKMAK	(vinyl chloride)-(methyl acrylate) plastic; preferred term for VCMA
VCMMA	(vinyl chloride)-(methyl methacrylate) plastic
VCOAK	(vinyl chloride)-(octyl acrylate) plastic; preferred term for VCOA
VCVAC	(vinyl chloride)-(vinyl acetate) plastic
VCVDC	(vinyl chloride)-(vinylidene chloride) plastic
VE	vinyl ester resin

6 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 for the basic polymer.

Symbol	Meaning
A	acid (modified)
A	adipate
A	amorphous; atactic
B	biaxial
B	block
B	brominated
C	chlorinated
C	crystalline; isotactic
D	density
E	epoxidized
E	expanded; expandable
F	flexible
F	fluid
F	fluorinated
G	glycol (modified)
H	high
I	impact
L	linear
L	low
M	medium

4) In ISO 1629, the generic abbreviated term for silicone polymers is Q.

M	molecular
N	normal
N	novolak
O	orientated
P	plasticized
P	thermoplastic
R	raised
R	random
R	resol
R	rigid
S	saturated
S	sulfonated
S	syndiotactic
S	thermosetting
T	temperature (resistance)
T	toughened
U	ultra
U	unplasticized
U	unsaturated
V	very
W	weight
X	crosslinked; crosslinkable

7 Symbol for plastics recyclate

The symbol “(REC)” (made up of the capital letters REC enclosed in parentheses) is an option (according to ISO 14021:1999) that may be used in addition to the abbreviated term for the basic polymer and the symbols for the indication of special characteristics. The symbol “(REC)” for plastics recyclate shall always be at the last position of the abbreviated term and symbols used for the plastic.

If the percentage recycled content is available and a specific claim of recycling content has to be declared, the capital letters REC may be followed by a number indicating the minimum percentage by mass of the recycling content and the whole enclosed in parentheses, e.g. “(REC50)”.

8 Examples of the use of symbols

EXAMPLE 1 Plasticized poly(vinyl chloride) = PVC-P
 Basic polymer PVC
 Plasticized P

EXAMPLE 2 High-impact polystyrene = PS-HI
 Basic polymer PS
 High impact HI

EXAMPLE 3 Linear low-density polyethylene = PE-LLD
 Basic polymer PE
 Linear low density LLD

EXAMPLE 4 Poly(ethylene terephthalate) material resulting from the recycling of PET = PET(REC)

EXAMPLE 5 High-density polyethylene material resulting from the recycling of PE-HD = PE-HD(REC)

NOTE It should be understood that a plastics recyclate might contain constituents apart from the polymer type concerned.

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.

The letter P may also be used to designate a copolymer or other polymer when its omission would be confusing.

A.2 Use only capital letters.

EXAMPLE Poly(vinyl chloride) is designated PVC.

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

EXAMPLE 1 Polyacrylate is designated PAK.

EXAMPLE 2 Polyarylate is designated PAR.

EXAMPLE 3 Poly(vinyl formal) is designated PVFM.

A.4 For copolymers, use the symbols for the monomeric components in the order in which they occur in the term being designated. The symbols 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.

EXAMPLE 1 Acrylonitrile-(methyl methacrylate) plastic is designated AMMA.

EXAMPLE 2 (Vinyl chloride)-ethylene-(methyl acrylate) plastic is designated VCEMAK.

A stroke “/” may be used to designate a copolymer when its omission would be confusing.

EXAMPLE 3 E/P for ethylene-propylene plastic.

A.5 For polymer blends or alloys, use the abbreviated terms for the basic polymers, with the main component in first place followed by the other components in descending order of their mass fractions, separated by a plus sign.

EXAMPLE A blend of polycarbonate and acrylonitrile-butadiene-styrene plastics is designated PC+ABS.

There should be no space before or after the “+” sign.

A.6 Use figures and letters 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.

EXAMPLE 1 A polymer of ϵ -caprolactam is designated PA6.

EXAMPLE 2 A polymer of hexamethylenediamine, adipic acid and sebacic acid is designated PA66/610.

EXAMPLE 3 A polymer of *m*-xylylenediamine and adipic acid is designated PAMXD6.

In each of the above three examples, PA indicates the polyamide and the figure refers to the number of carbon atoms in the monomer unit. When two monomers are involved, the first figure refers to the number of carbon atoms in the amine and the second 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 ISO 1874-1:2010, Table A.3.

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 4 for identification of the term for which the abbreviated terms is used at its first occurrence in the text will avoid possible confusion.

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Annex B (informative)

List of symbols used for components of abbreviated terms

B.1 List by symbol

Symbol	Component of term
A	acetate; acid; acryl; acrylate; acrylic; acrylonitrile; alkane; alkanoate; alkoxy; allyl; amid; amide; aryl
AC	acetate
AH	anhydride
AI	amidimide
AK	acrylate
AL	alcohol
AN	acrylonitrile
AR	aryl; arylate
B	block; butadiene; butene; butyl; butylene; butyral; butyrate
BD	butadiene
C	capro; carbonate; carboxy; cellulose; chloride; chlorinated; chloro; copolymer; cresol; crystal; cyclo; cyclohexylene dimethylene
CE	cellulose; cyclohexanedicarboxylate
D	di; diene
E	ester; ether; ethyl; ethylene
EP	epoxide; epoxy
EST	ester
F	fluoride; fluoro; formaldehyde; furan
FM	formal
H	hydroxy
I	imide; iso
IR	isocyanurate
K	carbazole; ketone
L	lactic; lactone; liquid;
M	maleic; melamine; meth; methacryl; methacrylate; methyl; methylene; methyl methacrylate
MA	methacrylate; methacrylic acid
N	naphthalate; nitrate
O	octyl; olefin; oxy
OH	alcohol
OX	oxide
P	penta; pentene; per; phenol; phenylene; phthalate; poly; polyester; polymer; propionate; propylene; pyrrolidone
S	styrene; succinate; sulfide
SI	silicone
SU	sulfone
T	terephthalate; tetra; tri; trimethylene
U	unsaturated; urea
UR	urethane
V	valerate; vinyl
VD	vinylidene

B.2 List by component of term

Component of term	Symbol	Component of term	Symbol
acetate	A, AC	ethylene	E
acid	A	fluoride	F
acrylate	A, AK	fluoro	F
acrylic	A	formal	FM
acrylonitrile	A, AN	formaldehyde	F
alcohol	AL, OH	furan	F
alkane	A	hydroxy	H
alkanoate	A	imide	I
alkoxyl	A	iso	I
allyl	A	isocyanurate	IR
amid	A	ketone	K
amide	A	lactic	L
amidimide	AI	lactone	L
anhydride	AH	liquid	L
aryl	A, AR	maleic	M
arylate	AR	melamine	M
block	B	meth	M
butadiene	B, BD	methacryl	M
butene	B	methacrylate	M, MA
butyl	B	methacrylic acid	MA
butylene	B	methyl	M
butyral	B	methylene	M
butyrate	B	methyl methacrylate	M
capro	C	naphthalate	N
carbazole	K	nitrate	N
carbonate	C	octyl	O
carboxy	C	olefine	O
cellulose	C, CE	oxy	O
chloride	C	oxyde	OX
chlorinated	C	penta	P
chloro	C	pentene	P
copolymer	C	per	P
cresol	C	phenol	P
crystal	C	phenylene	P
cyclo	C	phthalate	P
cyclohexanedicarboxylate	CE	poly	P
cyclohexylene dimethylene	C	polyester	P
di	D	polymer	P
diene	D	propionate	P
epoxide	EP		
epoxy	EP		
ester	E, EST		
ether	E		
ethyl	E		

Component of term	Symbol	Component of term	Symbol
propylene	P	trimethylene	T
pyrrolidone	P		
		unsaturated	U
silicone	SI	urea	U
styrene	S	urethane	UR
succinate	S		
sulfide	S	valerate	V
sulfone	SU	vinyl	V
		vinylidene	VD
terephthalate	T		
tetra	T		
tri	T		

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Annex C (informative)

Abbreviated terms for plastics grouped by type

C.1 Group A

NOTE The abbreviated terms in this group are simple abbreviations of the polymer names.

C.1.1 Homopolymers

Abbreviated term	Name of polymer	Abbreviated term	Name of polymer
PAA	poly(acrylic acid)	PP	polypropylene
PAN	polyacrylonitrile	PPE	poly(phenylene ether)
PB	polybutene	PPOX	poly(propylene oxide)
PBAK	poly(butyl acrylate)	PPS	poly(phenylene sulfide)
PBD	1,2-polybutadiene	PPSU	poly(phenylene sulfone)
PCL	polycaprolactone	PS	polystyrene
PCTFE	polychlorotrifluoroethylene	PTFE	polytetrafluoroethylene
PDCPD	polydicyclopentadiene	PVAC	poly(vinyl acetate)
PE	polyethylene	PVAL	poly(vinyl alcohol)
PEOX	poly(ethylene oxide)	PVB	poly(vinyl butyral)
PIB	polyisobutylene	PVC	poly(vinyl chloride)
PMI	polymethacrylimide	PVDC	poly(vinylidene chloride)
PMMA	poly(methyl methacrylate)	PVDF	poly(vinylidene fluoride)
PMMI	poly(<i>N</i> -methylmethacrylimide)	PVF	poly(vinyl fluoride)
PMP	poly(4-methylpent-1-ene)	PVFM	poly(vinyl formal)
PMS	poly(α -methylstyrene)	PVK	poly(<i>N</i> -vinylcarbazole)
POM	polyoxymethylene	PVP	poly(<i>N</i> -vinylpyrrolidone)

C.1.2 Copolymers

Abbreviated term	Name of polymer	Abbreviated term	Name of polymer
PBN	poly(butylene naphthalate)	PEN	poly(ethylene naphthalate)
PBT	poly(butylene terephthalate)	PES	poly(ethylene succinate)
PCCE	poly(cyclohexylene dimethylene cyclohexanedicarboxylate)	PET	poly(ethylene terephthalate)
PCT	poly(cyclohexylene dimethylene terephthalate)	PTT	poly(trimethylene terephthalate)