

Thesaurus for plastics: materials

This thesaurus contains terms for the correct naming and registration of materials in museum objects and works of art made of plastics. Within the project 'Know, name and assess your plastics' two thesauri were developed on plastics in heritage institutions: one on materials and another on techniques. Both thesauri can be used separately, but complement each other when combined.

The first version of this materials thesaurus was published in May 2022 and is available as a pdf on the **Design Museum Gent** website. The thesaurus is available in English and Dutch and will eventually also be available in German.

The project 'Know, name and assess your plastics' ran from October 2018 to June 2021 and focused on the identification and preventive conservation of plastics in the collections of **Design Museum Gent** and **S.M.A.K.** This project was made possible by funding from the Flemish government.

RELEVANCE IN A MUSEUM CONTEXT

In recent years more and more museums are identifying plastic objects in their collections for the care and preservation of these materials. These materials often form the building blocks of extraordinary heritage objects. Most institutions lack specific terms in their registration systems to categorise these materials, more specific than the term 'plastic'. An efficient thesaurus would enable museums to enter their findings more precisely into their collection registration system and improve the searchability of their database.

Artists and designers, conservators-restorers, museum staff, conservation scientists, chemists, historians and engineers working in the field of plastics all use their own terminology. This variety of terms - (former) product names, generic names and chemical names - makes it difficult for museum registrars to use the correct terms in their collection databases. This thesaurus attempts to fill this gap and offers a well-founded list that has been checked with various specialists from the aforementioned fields.

PURPOSE OF THE THESAURUS

This thesaurus is aimed at professionals in the heritage field who work with collection registration systems such as The Museum System (TMS) or Adlib/Axiell Collections and wish to optimise the registration of their plastic objects. The use of a correct thesaurus in a database is one of the foundations for proper functioning within museums. It increases searchability, enables the user to categorise and to create a correct, well-founded and multi-purpose inventory. By combining certain terms, one can gain a better understanding of the collection and it is possible to compile subgroups of objects or materials. For example, objects made of plastics that are known to require extra care during storage can be brought to light via a simple search.

This thesaurus does not address the question of how the available information on objects made of plastics should be made accessible to the general public. It is the choice of each heritage institution whether or not to use the term 'plastic' for the public, or to go into more detail about the type of plastic, by analogy with wood, for information labels one can choose a specific term such as 'oak' or rather remain general. This thesaurus does, however, encourage the use of the more chemical names within collection registration systems. The terminology chosen is primarily aimed at supporting the varied operations in a museum, professionalising the field and creating a uniform (international) language that can serve as a standard in the heritage field.

NOMENCLATURE

The difficulty of naming plastics begins with the term 'plastic' itself. Due to the international nature of this field, the English word 'plastic' predominates in current literature and everyday usage. 'Plastic' comes from the Greek word 'plastikos' and describes the plastic properties of the material.¹ Some languages, for example Dutch, Swedish and German, have other words such as 'kunststof', 'konstmateriale' and 'Kunststoff'. In contrast to 'plastic', these terms describe the origin of the modern, artificial material and combine the words 'art' and 'fabric'.²

The difficulty in finding the right term continues with the naming of specific plastics. Product or trade names such as 'bakelite', 'nylon' and 'plexiglas' are used as generic terms for 'phenol-formaldehyde', 'polyamide' and 'poly(methyl methacrylate)' respectively. In addition, many different spellings for one type of plastic can be found in the literature. Often these variations are due to the use or non-use of hyphens, spaces or brackets between the partial terms. Also the terminology used in the existing literature, such as in polymer manuals or databases, can vary greatly. There are traditional names, but also source-based names - where the preposition 'poly-' is combined with the name of the monomer - and structure-based names based on the structure of the polymer.³ For example, for the traditional name 'polypropylene', the source-based name is 'polypropene' and the structure-based name is 'poly(1-methylethylene)'. In some cases, the traditional name will correspond to the source-based name, as in the case of 'poly(vinyl chloride)'. In the industrial sector, the traditional or source-based names are mainly used, due to their simpler notation and clear relationship with the monomers from which the homopolymers are made. In scientific publications, on the other hand, structure-based names are mostly used.

SOURCES OF THE THESAURUS

There are several institutions that issue recommendations for the chemical nomenclature of plastics.⁴ The International Union of Pure and Applied Chemistry (IUPAC), a universally recognised authority on chemical nomenclature and terminology, is particularly aimed at chemists and scientists. IUPAC does not have a specific list of terms but provides recommendations and guidelines. The International Organization for Standardization (ISO), focuses more on the industry and has several standardised lists of plastic and rubber terminology that are compiled by (international) committees and are revised every five years.⁵ The lack of specific terms made the IUPAC less useful for this project, so the ISO standards were taken as a starting point.

Art and Architecture Thesaurus (abbreviated AAT) from The Getty Research Institute is often considered the international standard for terminology within the heritage field and is therefore used by many institutions. The AAT has been created over the years by contributions from more than 300 projects or institutions.⁶

¹ Plastic as an adjective comes from the Greek word *plassein* (meaning to mold) from which *plastikos* - or in Latin *plasticus* - are derived. Used as a noun for a "solid substance that can be molded" (1905). In its current meaning "synthetic product made from oil derivatives", it was first recorded in 1909 by Leo Baekeland. "Plastic", Online Etymology Dictionary, accessed May 2021 (<https://www.etymonline.com/word/plastic>).

² Friederike Waentig, *Plastics in Art. A study from the conservation point of view*. (Petersberg: Michael Imhof, 2008), 14.

³ Aubrey Jenkins and Richard G. Jones, "Introduction to Polymer Nomenclature" in *Compendium of Polymer Terminology and Nomenclature: IUPAC Recommendations 2008*; Issued by the Polymer Division (Cambridge: RSC Publ, 2009), 259-260.

⁴ 'International Union of Pure and Applied Chemistry' and 'International Organization for Standardization' are the two largest and most known institution dealing with polymer nomenclature, but there are many others. ISO and IUPAC are mentioned here because they (as well as the AAT) work with terminology committees, so there is a wider consensus on the chosen terminology.

⁵ The ISO standards consulted for this thesaurus: : ISO 472:2013 *Plastics - Vocabulary*; ISO 1043-1:2011 *Plastics - symbols and abbreviated terms. Part 1: Basic polymers and their special characteristics*; ISO 18064-2014 *Thermoplastic elastomers - Nomenclature and abbreviated terms*; ISO 1629-2013 *Rubber and latices - Nomenclature*; ISO 1382:2012 *Rubber - Vocabulary*.

⁶ "About the AAT.", The Getty, Getty Research Institute, accessed May 2021, <http://www.getty.edu/research/tools/vocabularies/aat/about.html>.

A disadvantage of this phased approach is that the chosen terms and underlying structures are not always uniform, complete and coherent. Generic names, product names and more scientific names are used interchangeably in the AAT.

SCOPE OF THE THESAURUS

The terminology in this thesaurus is based on a literature search in conservation literature, chemical polymer manuals and other thesauri such as the AAT, and from existing standards for chemists and industry such as the ISO standards.⁷ At the start of the research it became clear that the extent of materials that can be placed under the heading 'plastics' is very large. For this reason it was decided to provide a clear demarcation. Not all possible materials that fall under the category of plastics are included in this thesaurus. The focus is on bringing relevant terminology for plastics that can be encountered in heritage objects together. Materials from the industry that do not (yet) play a relevant role are not included.

Polymers that are specifically used as binding agents, coatings, glues, conservation materials or only as additives in non-museum materials (such as cosmetics) have not been included either. Polymers that are only used as synthetic fibres have also been left out of consideration. This is in analogy with currently available tools such as the Plastic Identification Tool and the flow chart of Museum of Design in Plastics.⁸ These tools enable collection staff to identify materials where possible on the basis of sensory observations without a scientific analysis in a specialised lab. The focus in this thesaurus is therefore also on plastics that occur in the form of films, sheets, elastomers, foams or as rigid materials.⁹

Furthermore it was decided not to include all brand names of plastics, as this would require an enormous amount of research, and many regional differences have also been identified. However, a number of brand names have been added as alternative terms that are often used as generic names instead of material names.

Of course, the choices made do not preclude further research into other groups of materials in the future and their inclusion in this thesaurus. The continuous production of ever new plastics poses an additional challenge for such a tool. Especially museums with design collections will have to keep an eye on these 'plastics of tomorrow'. Keeping the thesaurus up to date and updating the terms will remain necessary in the coming years. Design Museum Gent has the ambition to carry out such updates. The latest version will always be available on the website with an explanation of the adjustments that have been made.

USE OF THE THESAURUS

The terms are divided into preferred and alternative terms that are linked to one concept and placed in a hierarchy, establishing relationships between broader and narrower terms. The broadest term in the thesaurus is 'plastic'. Guide terms have also been included; these are general names for larger groups, which cannot be entered as a term but which give guidance in the hierarchy. These guide terms are indicated between < >, so the guide term <plastic by property> is covered under the term 'plastic'. This classification by property is in line with the current hierarchy in the AAT.¹⁰ The hierarchy is further divided into the terms 'thermoplastic', 'thermoset', 'thermoset and thermoplastic' and 'elastomer'.

⁷ Apart from the ISO standards and the AAT, the main sources consulted for this thesaurus are: Friederike Waentig, *Plastics in Art. A study from the conservation point of view.* (Petersberg: Michael Imhof, 2008); Charles Harper, *Plastics Materials and Processes. A Concise Encyclopedia.* (New Jersey: John Wiley & Sons, Inc., 2003); Tim A. Osswald et al., *International Plastics Handbook. The Resource for Plastics Engineers.* (Munich: Carl Hanser Verlag, 2006); James E. Mark, *Polymer Data Handbook.* (New York: Oxford University Press, 2009); website of Museum of Design in Plastics (<https://www.modip.ac.uk/>); website of The Plastics Historical Society (<http://plasticquarian.com/>) and Polymer Database of Chemical Retrieval on the Web (CROW) (<https://www.polymerdatabase.com/>).

⁸ For the Plastic Identification Tool see: <https://plastic.tool.cultureelerfgoed.nl/>, for the MoDiP flow chart see: <https://www.modip.ac.uk/projects/toolkit>.

⁹ It was a deliberate choice not to include these 'appearances' in the thesaurus as separate terms such as foam rubber or polyurethane foam. Our preference is to register an object under the material 'polyurethane' and to place the appearance 'foam' in another field.

¹⁰ Although part of the hierarchy corresponds to the AAT, there are also points where this thesaurus deviates. In the AAT, elastomers do not fall under the guide term <plastic by property> but under the umbrella term "organic material". The AAT also has other guide terms that focus on plastics: <plastic by composition or origin>; <plastic by form>; <plastic by function> and <plastic by production method>. These terms have deliberately not been included in this thesaurus. For example, under <plastic by shape> is the term "injection-moulded plastics". This term combines a material and a technique, whereas in registration systems it would be better to write this down as material plastic and technique injection moulding.

The hierarchical structure of the thesaurus not only helps in the search for a correct term, it also provides insight into the classification of plastics. The hierarchy is also available as a separate document in which the classification is visually represented.

When registering works of art and objects made of plastics, it is important for the purpose of preservation and (preventive) conservation to be as specific as possible. However, if there is doubt whether a particular material is involved, choose the broader term in the hierarchy. For example, 'polyethylene' and 'polypropylene' are narrower terms of 'polyolefin'. Polyolefin' is the classification of these materials. When in doubt between these narrower terms, choose the broader term 'polyolefin'. 'Vinyl plastic' is not an official term from ISO standards or other nomenclature but has been included in this thesaurus to provide guidance for registration.

Another deviation from the ISO that we made is the choice to not adopt 'resin' behind each thermoset. The term 'resin' is often used in literature to indicate the liquid state of product, a finishing layer or a laminate. It is also often used in relation to plastics that designers and artists can cast themselves, such as 'epoxy resin', 'polyurethane resin' or 'polyester resin'. The use of the term 'resin' is outdated - it comes from the natural occurring resins - and relates in particular to the material in liquid state. It has been decided to add 'resin' as alternative term but not as preferred term.

There is also a deviation from the ISO standards with regard to copolymers. These are indicated in the ISO standards by placing the term 'plastic' after the material name, for example 'acrylonitrile-butadiene-styrene plastic'. To simplify the terms and make them more applicable to the target group, it was decided not to follow the ISO standard for the copolymers and to use only the material name as the preferred term.

As previously mentioned, brand, product or trade names have been included when they are also used as a general or generic term. These terms are included as an alternative term with capital letters but without a copyright or trademark symbol.

Each concept (or term) has a scope note in which more information about the material can be found. These descriptions have been kept as unambiguous and short as possible. It was decided not to include data on the development of plastics or patents (with a few exceptions) because this can differ per country or continent.¹¹ The scope note describes the polymerisation, the different applications, the production techniques and a note explaining how the term should be used. Each scope note also contains the most commonly used abbreviation, which is usually taken from the ISO standards. Other possible abbreviations are listed in the alternative terms. The scope notes are not intended as an identification method, but only serve to give a broader picture of the application of the material. For this reason, no external characteristics such as gloss, colour and surface structure are described. It is indicated whether it is a high-quality plastic, a technical plastic or a standard plastic, because this indicates the likelihood of this type of material being used in a museum collection. However, it is not the case that high-quality plastics, which are widely used in aviation and space travel due to their excellent thermal and mechanical properties, cannot be found in collections.

The overview indicates a basic list, namely terms that are considered basic and of which it is desirable that they are present in the collection registration system. The other terms can be considered as a supplement, as they are narrower terms that are linked to the broader terms that make up the basic list. It is up to each collection (registrar) to decide whether to work with the basic list or to choose to add all available terms to the database.

¹¹ Only materials that belong to the early plastics and/or are hardly produced any more - such as cellulose nitrate - are indicated with a time span in use.

PARTNERS

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In autumn 2018, the Kuwerko project of the Cologne Institute of Conservation Sciences (CICS) also started, in cooperation with the LVR-Industrial Museum (Regional Council of the Rhineland) and the Institut für Kunststofftechnik (IKT). They, too, ran up against the lack of a correct and unambiguous terminology to describe and name heritage objects during an identification and condition survey. A cooperation between the two projects offered the possibility to reach an international consensus on the terms. The thesaurus working group within this project was further expanded with several international specialists whom we would like to thank for their special dedication.

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For more information on both projects:

<https://www.designmuseumgent.be/en/collection/project/plastics>

https://www.th-koeln.de/en/terminology-for-conservation-of-plastics_73939.php

HIERARCHY

plastic

<plastic by property>

thermoplastic

cellulose derivative

cellulose ester

cellulose acetate

cellulose acetate butyrate

cellulose acetate propionate

cellulose diacetate

cellulose triacetate

cellulose nitrate

cellulose propionate

regenerated cellulose

fluoroplastic

polychlorotrifluoroethylene

polytetrafluoroethylene

poly(vinyl fluoride)

poly(vinylidene fluoride)

gutta-percha

polyamide

polyamide-3

polyamide-4,6

polyamide-6

polyamide-6,6

polyamide-6,66

polyamide-6I/6T

polyamide-6,10

polyamide-6,12

polyamide-10

polyamide-11

polyamide-12

polyaramide

polyether

polyoxymethylene

poly(phenylene ether)

polyketone

polyaryletherketone

polyetheretherketone

poly(methyl methacrylate)

polyolefin

ethylene-(vinyl acetate)

polybutylene

polyethylene

chlorinated polyethylene

high-density polyethylene

linear low-density polyethylene

low-density polyethylene

medium-density polyethylene

ultra-high-molecular-weight polyethylene

very-low-density polyethylene

	polypropylene
	chlorinated polypropylene
polysulfone	polyethersulfone
	poly(phenylene sulfide)
	poly(phenylene sulfone)
saturated thermoplastic polyester	liquid-crystal polymer
	poly(butylene adipate terephthalate)
	poly(butylene succinate)
	poly(butylene terephthalate)
	polycaprolactone
	polycarbonate
	poly(ethylene naphthalate)
	poly(ethylene terephthalate)
	polyhydroxyalkanoate
	poly(lactic acid)
	poly(trimethylene terephthalate)
styrene plastic	acrylonitrile-butadiene-styrene
	acrylonitrile-styrene-acrylate
	polystyrene
	high impact polystyrene
	styrene-acrylonitrile
vinyl plastic	poly(vinyl chloride)
	chlorinated poly(vinyl chloride)
	plasticized poly(vinyl chloride)
	unplasticized poly(vinyl chloride)
	poly(vinylidene chloride)
thermoset	aminoplast
	casein-formaldehyde
	melamine-formaldehyde
	urea-formaldehyde
	bois durci
	epoxy
	hard rubber
	phenol-formaldehyde
	unsaturated polyester
<thermoset and thermoplastic>	polyimide
	polyamidimide
	polyetherimide
polyurethane	aromatic polycaprolactone polyurethane
	aromatic polycarbonate polyurethane
	polyesterurethane
	aliphatic polyesterurethane
	aromatic polyesterurethane

polyetherurethane
aliphatic polyetherurethane
aromatic polyetherurethane

elastomer

fluoro rubber
natural rubber
silicone rubber
synthetic rubber
 butadiene rubber
 chloroprene rubber
 isobutylene-isoprene rubber
 nitrile-butadiene rubber
 styrene-butadiene rubber
 synthetic isoprene rubber
thermoplastic elastomer
 thermoplastic copolyester elastomer
 thermoplastic olefinic elastomer
 ethylene-propylene-diene rubber
 ethylene-propylene rubber
 thermoplastic polyamide elastomer
 thermoplastic rubber vulcanizate
 thermoplastic styrenic elastomer
 styrene-butadiene-styrene rubber
 styrene-ethylene-butadiene-styrene rubber
 styrene-isoprene-styrene rubber
 thermoplastic urethane elastomer

THESAURUS

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
plastic	<p>Plastics plastic material plastic (noun) plastic (organic material)</p>	<p>Plastic is a general term for materials which contain as an essential ingredient a semisynthetic or a synthetic polymer to which additives such as colorants, plasticizers, stabilizers, fillers and reinforcements are added. Plastics are shaped by flow into finished products.</p> <p>Note: The most common plastics are included as narrower terms, yet there are many other types or blends. Choose the broader term plastic when in doubt between narrower terms or if a term is not included in the thesaurus.</p>	-	x
<plastic by property>		<p>Plastics are divided into thermoplastics, thermosets and elastomers. Materials that can be both thermosetting and thermoplastic are classified separately.</p> <p>Note: <plastic by property> is a guide term within the hierarchy of the thesaurus, it cannot be used as a preference or alternative term.</p>	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
thermoplastic	thermoplastic polymer thermoplastic resin thermoplastics	Plastics with thermoplastic properties, hence they can repeatedly be remolded. They are melted or softened by increase in temperature and will harden by decrease in temperature. Note: Thermoplastic is a broader term for other materials. Choose this term when in doubt between narrower terms or if a term is not included in the thesaurus. Choose the broader term plastic when in doubt between rubbers, thermoplastic and thermosetting materials.	-	x
cellulose derivative	cellulose based polymer cellulose derivatives cellulose plastic cellulose (thermoplast) cellulosic plastic	Cellulose derivative is general term for a group of semi-synthetic thermoplastics, obtained from cellulose or cellulose compounds. Note: Cellulose derivative is a broader term for other materials, choose this term when in doubt between its narrower terms such as cellulose acetate and cellulose nitrate.	-	
cellulose ester	cellulose esters cellulose-ester	Cellulose ester is a general term for a group of semi-synthetic cellulose derivatives that are obtained from a cellulose and an acid. Note: When in doubt between cellulose ester and other narrower terms, choose the broader term cellulose derivative.	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
cellulose acetate	Bexoid Celanese cellulose acetates Clarifoil Estron Kodak Safety Film Plastacele Tenite	Cellulose acetate (abbreviated CA) is a semi-synthetic thermoplastic, obtained from the acetic acid ester of cellulose to which plasticizers are added. It was one of the first semi-synthetic plastics and until the 1960's often used for (photographic) films and molded products such as typewriter keys, radios, tool handles, combs and hairbrushes. Currently still used for spectacle frames. Products are generally manufactured by extrusion, injection molding and compression molding.	CA	x
cellulose acetate butyrate	butyrates cellulose acetate butyrates cellulose acetobutyrate cellulose butyrate	Note: When in doubt between cellulose nitrate, cellulose acetate and other narrower terms, choose the broader term cellulose ester. Cellulose acetate butyrate (abbreviated CAB) is a semi-synthetic thermoplastic, obtained from a mix of acetic and butyric acid ester of cellulose to which plasticizers are added. It is mainly used for (photographic) films, varnishes and molded goods such as tool handles. Products are generally manufactured by extrusion and injection molding. Note: When in doubt between cellulose acetate butyrate or other narrower terms, choose the broader term cellulose ester.	CAB	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
cellulose acetate propionate	cellulose acetate propionates	Cellulose acetate propionate (abbreviated CAP) is a semi-synthetic thermoplastic, obtained from a mix of acetic and propionic acid ester of cellulose to which plasticizers are added. It is mainly used for (photographic) films and molded products such as spectacle frames, shields and cutlery handles. Products are generally manufactured by extrusion and injection molding.	CAP	x
		Note: When in doubt between cellulose acetate propionate or other narrower terms, choose the broader term cellulose ester.		
cellulose diacetate	cellulose diacetates	Cellulose diacetate (abbreviated CDA) is a semi-synthetic thermoplastic obtained from the acetic acid ester of cellulose to which plasticizers are added. It is chemically very similar to cellulose acetate but with a different acetyl content. It is mainly used for (photographic) films and coatings. Products are generally manufactured by extrusion and injection molding.	CDA	
		Note: When in doubt between cellulose diacetate and cellulose triacetate, choose the broader term cellulose acetate.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
cellulose triacetate	cellulose triacetates	Cellulose triacetate (abbreviated CTA) is a semi-synthetic thermoplastic obtained from the acetic acid ester of cellulose to which plasticizers are added. It is chemically very similar to cellulose acetate but with a different acetyl content. It is mainly used for (photographic) films and fibers. Products are generally manufactured by extrusion and injection molding.	CTA	
		<p>Note: When in doubt between cellulose diacetate and cellulose triacetate, choose the broader term cellulose acetate.</p>		
cellulose nitrate	cellulose nitrates Celluloid Guncotton nitrocellulose Nitrocotton Parkesine Xylonite	Cellulose nitrate (abbreviated CN) is a semi-synthetic thermoplastic, obtained from the nitric acid ester of cellulose to which plasticizers are added. It was the first semi-synthetic plastic and until the 1940's often used for (photographic) films and molded products such as cutlery and tool handles, accessories, combs and hairbrushes. Currently it is still used as a coating on fabrics, as varnish and for ping pong balls. Products are generally manufactured by extrusion, injection molding, compression molding and blow molding.	CN	x
		<p>Note: When in doubt between cellulose nitrate, cellulose acetate and other narrower terms, choose the broader term cellulose ester. The general term celluloid should not be used.</p>		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
cellulose propionate	cellulose propionates	Cellulose propionate (abbreviated CP) is a semi-synthetic thermoplastic, obtained from a propionic acid ester of cellulose to which plasticizers are added. It is mainly used for (photographic) films and molded products such as spectacle frames, shields and cutlery handles. Products are generally manufactured by extrusion and injection molding.	CP	x
		Note: When in doubt between cellulose propionate and other narrower terms, choose the broader term cellulose ester.		
regenerated cellulose	CE cellophane cellophane film Lyocell Modal Rayon Sellotape viscose	Regenerated cellulose is a semi-synthetic cellulose derivative, obtained from a solution of dissolved cellulose, which is regenerated and solidified into an acid bath. It is mainly used for fibers in textiles or films in packaging. Products are generally manufactured by extrusion. Note: When in doubt between regenerated cellulose and other narrower terms, choose the broader term cellulose derivative. The general terms cellophane film, viscose and rayon should not be used.	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
fluoroplastic	<p>fluoro based polymer fluoroplastics fluoropolymer</p> <p>Related term: fluoro rubber</p>	<p>Fluoroplastic is a general term for a group of thermoplastics that contain a large portion of fluoropolymers. They are considered high performance plastics due to their excellent thermal and mechanical properties.</p> <p>Note: Fluoroplastic is a broader term for other materials, choose this term when in doubt between its narrower terms.</p>	-	x
polychlorotrifluoroethylene	<p>polychlorotrifluoroethylenes</p>	<p>Polychlorotrifluoroethylene (abbreviated PCTFE) is a thermoplastic, obtained by the polymerization of chlorotrifluoroethylene. It is a high performance plastic and is mainly used for films or insulation of cables. Products are generally manufactured by extrusion and injection molding.</p> <p>Note: When in doubt between polychlorotrifluoroethylene and other narrower terms, choose the broader term fluoroplastic.</p>	PCTFE	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polytetrafluoroethylene	polytetrafluoroethylenes Teflon	Polytetrafluoroethylene (abbreviated PTFE) is a thermoplastic obtained by the polymerization of tetrafluoroethylene. It is a high performance plastic and is mainly used as a coating on anti-stick cookware or as an insulation material. Products are generally manufactured in powdered form by compression molding or powder bed fusion. Note: When in doubt between polytetrafluoroethylene and other narrower terms, choose the broader term fluoroplastic. The general term Teflon should not be used.	PTFE	x
poly(vinyl fluoride)	polyvinyl fluoride polyvinyl fluorides	Poly(vinyl fluoride) (abbreviated PVF) is a thermoplastic obtained by the polymerization of vinyl fluoride. It is a high performance plastic and is mainly used for films or coatings. Products are generally manufactured by extrusion. Note: When in doubt between poly(vinyl fluoride) and other narrower terms, choose the broader term fluoroplastic.	PVF	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(vinylidene fluoride)	polyvinylidene fluoride polyvinylidene fluorides	Poly(vinylidene fluoride) (abbreviated PVDF) is a thermoplastic, obtained by the polymerization of vinylidene fluoride. It is a high performance plastic and is mainly used for films, fishing wire and tubes. Products are generally manufactured by extrusion and injection molding. Note: When in doubt between poly(vinylidene fluoride) and other narrower terms, choose the broader term fluoroplastic.	PVDF	x
gutta-percha	gutta percha related term: natural rubber; hard rubber	Gutta-percha is a semi-synthetic thermoplastic which is obtained from a tropical tree. The sap is heated in water, mixed with sulfur and afterwards shaped. It was first introduced in Europe from the East around 1850 and has decreased in use since the 1930's. It was used for insulation of cables, shoe soles, book covers and picture frames. Today gutta-percha is used for high-quality golf balls and in dentistry. Products are generally manufactured by compression molding or extrusion. Note: When in doubt between gutta-percha or other narrower terms, choose the broader term thermoplastic. The term gutta-percha is related to natural rubber, as it also comes from a tropical tree, but it does not have elastic properties like an elastomer.	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamide	Nylon nylon polyamide resin polyamides	Polyamide (abbreviated PA) is a general term for a group of engineering thermoplastics, obtained by the polymerization of amines and acids. There are different aliphatic and aromatic polyamide types. Polyamides are mainly used for fibers in clothing and carpets, bristles of toothbrushes, fishing lines, Velcro fasteners, zippers, films and in reinforced molded parts. Products are generally manufactured by filament spinning, extrusion, injection molding, blow molding and rotational molding. Note: Polyamide is a broader term for other materials, choose this term when in doubt between its narrower terms. The general term nylon should not be used.	PA	x
polyamide-3	nylon 3 nylon-3 polyamide 3	Polyamide-3 (abbreviated PA-3) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is obtained by polymerization of acryl amide and adipic acid. It is mainly used for fibers in ropes. Products are generally manufactured by extrusion and injection molding. Note: When in doubt between polyamide-3 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.	PA-3	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamide-4,6	<p>nylon 4,6 nylon-4,6 polyamide 4,6</p>	<p>Polyamide-4,6 (abbreviated PA-4,6) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is obtained by polymerization of tetramethylene-diamine and adipic acid. It is mainly used for high quality products, for instance in the automotive industry. Products are generally manufactured by extrusion and injection molding.</p> <p>Note: When in doubt between polyamide-4,6 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-4,6	
polyamide-6	<p>nylon 6 nylon-6 polyamide 6</p>	<p>Polyamide-6 (abbreviated PA-6) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is obtained by polymerization of caprolactam and aminocaproic acid. It is mainly used for fibers in clothing, fishing wires, nets, ropes, films, tubes and for tool handles. Products are generally manufactured by extrusion and injection molding.</p> <p>Note: When in doubt between polyamide-6 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-6	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamide-6,6	nylon 6,6 nylon-6,6 polyamide 6,6	<p>Polyamide-6,6 (abbreviated PA-6,6) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is obtained by polymerization of hexamethylene diamine and adipic acid. It is mainly used for fibers, wires, films and as electro-insulating parts in the automotive industry. Products are generally manufactured by extrusion and injection molding.</p> <p>Note: When in doubt between polyamide-6,6 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-6,6	x
polyamide-6,66	nylon 6,66 nylon-6,66 polyamide 6,66	<p>Polyamide-6,66 (abbreviated PA-6,66) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is applied in the automotive industry, sports equipment, medical devices and houseware. Products are generally manufactured by extrusion, injection molding, film casting and film blowing.</p> <p>Note: When in doubt between polyamide-6,66 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-6,66	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamide-6/6T	nylon 6/6T nylon-6/6T polyamide 6/6T	<p>Polyamide-6/6T (abbreviated PA-6/6T) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is mainly used for flexible and rigid packaging, film castings and automotive parts. Products are generally manufactured by injection molding, extrusion and blow molding.</p> <p>Note: When in doubt between polyamide-6/6T and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-6/6T	
polyamide-6,10	nylon 6,10 nylon-6,10 polyamide 6,10	<p>Polyamide-6,10 (abbreviated PA-6,10) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is mainly used for bristles (toothbrushes e.g.), zippers or as electro-insulating parts in the automotive industry. Products are generally manufactured by injection molding and extrusion.</p> <p>Note: When in doubt between polyamide-6,10 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-6,10	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamide-6,12	nylon 6,12 nylon-6,12 polyamide 6,12	<p>Polyamide-6,12 (abbreviated PA-6,12) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is mainly used for electrical components and in the automotive industry. Products are generally manufactured by injection molding, extrusion and blow molding.</p> <p>Note: When in doubt between polyamide-6,12 and other narrower terms, choose the broader term polyamide. The general term nylon should</p>	PA-6,12	
Polyamide-10	nylon 10 nylon-10 polyamide 10	<p>Polyamide-10 (abbreviated PA-10) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is mainly used for precision instruments, industrial parts and filaments. Products are generally manufactured by injection molding, extrusion and blow molding.</p> <p>Note: When in doubt between polyamide-10 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.</p>	PA-10	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamide-11	nylon 11 nylon-11 polyamide 11	Polyamide-11 (abbreviated PA-11) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is mainly used for tool handles, sports products (skis, tennis rackets, shoe soles), flexible tubes and pipes, electrical equipment and in the automotive industry. Products are generally manufactured by spinning, injection molding, extrusion and rotational molding. Note: When in doubt between polyamide-11 and other narrower terms, choose the broader term polyamide. The general term nylon should not	PA-11	x
polyamide-12	nylon 12 nylon-12 polyamide 12	Polyamide-12 (abbreviated PA-12) is an engineering thermoplastic and falls under the category of aliphatic polyamides. It is applied in the automotive industry, sports equipment, medical devices and housewares. Products are generally manufactured by spinning, injection molding and extrusion. Note: When in doubt between polyamide-12 and other narrower terms, choose the broader term polyamide. The general term nylon should not be used.	PA-12	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyaramide	aramid aramid fibers aramid polymers aramide aromatic polyamide Kevlar polyaramides	<p>Polyaramide is a general term for a group of aromatic polyamides. They are engineering plastics of which the majority is spun into synthetic fibers, also called aramid fibers, that are mostly used for safety clothing, ropes or incorporated in composite materials.</p> <p>Note: When in doubt between polyaramide and other narrower terms, choose the broader term polyaramide. The general term Kevlar should not</p>		
polyether	polyglycol	<p>Polyether is a general term for a group of thermoplastics that contain multiple ether groups. They are engineering plastics of which a part is used for products that require good dimensional stability or temperature resistance, or they are used as an additive for polyurethane or other thermoplastics.</p> <p>Note: Polyether is a broader term for other materials, choose this term when in doubt between its narrower terms.</p>	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyoxymethylene	acetal acetal resin Delrin Kematal polyacetal polyether (acetal) polyformaldehyde polyformaldehyde resin polyoxide	Polyoxymethylene (abbreviated POM) is a thermoplastic polyether, obtained by the polymerization of formaldehyde or trioxane. It is an engineering plastic and it is mostly used for zippers, fasteners and automotive parts. Products are generally manufactured by extrusion and injection molding. Note: When in doubt between polyoxymethylene and poly(phenylene ether),	POM	x
poly(phenylene ether)	polyphenylene ether polyphenylene oxide PPO	Poly(phenylene ether) (abbreviated PPE) is a thermoplastic polyether obtained by the polymerization of 2,6-dimethylphenol. It is an engineering plastic and is mostly used for molded parts in the electronics, household and automotive industry. Products are generally manufactured by extrusion and injection molding. Note: When in doubt between polyoxymethylene and poly(phenylene ether), choose the broader term polyether.	PPE	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyketone	ketone-based polymer polyketones	Polyketone is a general term for a group of thermoplastics that contain copolymers of alkenes and carbon monoxide. They are considered high performance plastics due to their excellent thermal and mechanical properties. Note: Polyketone is a broader term for other materials, choose this term when in doubt	PK	x
polyaryletherketone	polyaryletherketones	Polyaryletherketone (abbreviated PAEK) is a high performance thermoplastic, containing ether and ketone linkages. It is mainly used in the aerospace and automotive industry and for medical components. Products are mainly manufactured by injection molding, extrusion and compression molding. Note: When in doubt between polyaryletherketone and other narrower terms, choose the broader term polyketone.	PAEK	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyetheretherketone	polyetheretherketones	<p>Polyetheretherketone (abbreviated PEEK) is a high performance thermoplastic, obtained by step-growth polymerization by the dialkylation of bisphenolate salts. It is mainly used in the aerospace and automotive industry and for medical components. Products are mainly manufactured by injection molding, extrusion and compression molding.</p> <p>Note: When in doubt between polyetheretherketone and other narrower</p>	PEEK	x
poly(methyl methacrylate)	<p>acrylate</p> <p>Acrylite</p> <p>Corian</p> <p>Diakon</p> <p>Lucite</p> <p>Oroglass</p> <p>Perspex</p> <p>Plexiglass</p> <p>polymerized methyl methacrylate</p> <p>polymethyl methacrylate</p> <p>polymethyl methacrylate resin</p> <p>poly methyl-methacrylate</p> <p>polymethylmethacrylate</p>	<p>Poly(methyl methacrylate) (abbreviated PMMA) is an engineering thermoplastic, obtained by polymerization of methyl methacrylate. It is mainly used as sheet material, as a replacement for glass, for light boxes and cast or molded products such as blocks with embedded objects, kitchen utensils and jewelry. Products are generally manufactured by casting, compression molding, extrusion and injection molding.</p> <p>Note: When in doubt between poly(methyl methacrylate) or other narrower terms, choose the broader term thermoplastic. The general term Plexiglass or Perspex should not be used.</p>	PMMA	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyolefin	olefin olefinics polyalkene polyolefins	Polyolefin is a general term for a group of thermoplastics, obtained by the polymerization of an olefin. Most polyolefins are considered general purpose plastics, as they are used for products that do not require excellent thermal or mechanical properties. They are produced in high volume and at a low cost.	-	x
		Note: Polyolefin is a broader term for other materials, choose this term when in doubt between its narrower terms such as		
ethylene-(vinyl acetate)	ethylene vinyl acetate ethylene-vinyl acetate ethylene-(vinyl acetate) copolymer ethylene-(vinyl acetate) plastic ethylene vinyl acetate copolymer ethylene-vinyl acetate copolymer ethylene-vinyl acetate plastic EVA EVA foam EVM	Ethylene-(vinyl acetate) (abbreviated EVAC) is a copolymer of ethylene and vinyl acetate. Depending on the percentage of vinyl acetate, polymers with different properties can be obtained. It is a general purpose plastic and is used for a wide range of applications; food packaging, coatings, laminating, foams, rubbers, films and toys. Products are generally manufactured by injection molding, foaming and thermoforming.	EVAC	x
	related term: thermoplastic olefinic elastomer	Note: When in doubt between polyethylene, ethylene-(vinyl acetate) and other narrower terms, choose the broader term polyolefin.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polybutylene	Polybutene polybutylenes	Polybutylene (abbreviated PB) is an engineering thermoplastic and is obtained by polymerization of butene. It is mainly used for pipes, films and adhesives. Products are generally manufactured by casting, blow molding, extrusion and injection molding	PB	
		Note: When in doubt between polybutylene and other narrower terms, choose the broader term		
polyethylene	Alkathene polyethene polyethylenes Tyvek	Polyethylene (abbreviated PE) is a general purpose thermoplastic, obtained by the polymerization of ethylene. It is available in various degrees of hardness. Most types of polyethylene are generally soft, yet hardness increases as density increases. It is used for many products, such as (thin) sheet material, foil, foam, rope, fiber and as molded products such as bottles, toys and furniture. Products are generally manufactured by blow molding, extrusion, injection molding and rotational molding.	PE	x
		Note: There are different types of polyethylene that are not specifically included in this thesaurus, such as crosslinked or expanded polyethylene. They can be placed under polyethylene. When in doubt between polypropylene, polyethylene or other narrower terms, choose the broader term polyolefin.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
chlorinated polyethylene	CPE PEC	Chlorinated polyethylene (abbreviated PE-C) is an engineering thermoplastic obtained by the chlorination of the polyethylene polymer. It is mostly used for sheet material, foils and pipes. Products are generally manufactured by extrusion, injection molding, blow molding and calendaring	PE-C	
		Note: When in doubt between chlorinated polyethylene and other narrower terms, choose		
high-density polyethylene	HDPE high density polyethene high-density polyethene high density polyethylene high-density polyethylenes PE-HD	High-density polyethylene (abbreviated PE-HD) is a thermoplastic with very few short-chain branches, obtained by the polymerization of ethylene. All polyethylene types are generally soft, yet hardness increases as density increases. It is a general purpose plastic and is mainly used to produce bottles, toys, food containers and plastic bags. Products are generally manufactured by blow molding, extrusion, film extrusion, injection molding and rotational molding.	PE-HD	x
		Note: When in doubt between high-density polyethylene and other narrower terms, choose the broader term polyethylene.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
linear low-density polyethylene	LDLPE linear low density polyethene linear low-density polyethene linear low density polyethylene linear low-density polyethylenes LLDPE PE-LLD	Linear low-density polyethylene (abbreviated PE-LLD) is a general purpose thermoplastic with long linear chains without alongside chains or branches, obtained by the polymerization of ethylene. All polyethylene types are generally soft, yet hardness increases as density increases. It is mainly used to produce films for packaging, hoses, containers and toys. Products are generally manufactured by blow molding, extrusion, injection molding and film blowing.	PE-LLD	x
low-density polyethylene	LDPE low density polyethene low-density polyethene low density polyethylene low-density polyethylenes	Note: When in doubt between linear low-density polyethylene and other narrower terms,	PE-LD	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
medium-density polyethylene	MDPE medium density polyethene medium-density polyethene medium density polyethylene medium-density polyethylenes	Medium-density polyethylene (abbreviated PE-MD) is a thermoplastic with some short-chain branching, obtained by the polymerization of ethylene. All polyethylene types are generally soft, yet hardness increases as density increases. It is a general purpose plastic and is mainly used for films that require more toughness such as garbage bags or stretch wrap. Products are generally manufactured by film blowing.	PE-MD	
ultra-high-molecular-weight polyethylene	polyethene polyethylene polyethylenes UHMWPE ultra high molecular weight ultra-high-molecular-weight	<p>Note: When in doubt between medium-density polyethylene and other narrower terms, choose</p> <p>Ultra-high-molecular-weight polyethylene (abbreviated PE-UHMW) is a thermoplastic with very long chains, obtained by the polymerization of ethylene. It is very similar to high-density polyethylene but with a higher molecular weight. It is an engineering plastic and is mainly used for molded goods in the sports or medical industry. Products are only manufactured by extrusion or compression molding of a fine powder, due to their difficulty in manufacturing.</p> <p>Note: When in doubt between narrower terms, choose the broader term polyethylene.</p>	PE-UHMW	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
very-low-density polyethylene	very low density polyethene very-low-density polyethene very low density polyethylene very-low-density polyethylenes VLDPE	very-low-density polyethylene (abbreviated PE-VLD) is a thermoplastic with many short-chain branches and a low number of long-chain branches, obtained by the polymerization of ethylene. All polyethylene types are generally soft, yet hardness increases as density increases. It is a general purpose plastic and is mainly used to produce thin films for packaging. Products are generally manufactured by blow molding, extrusion, injection molding and film blowing.	PE-VLD	
polypropylene	polypropene	Note: When in doubt between very-low-density polyethylene and other narrower terms, choose	PP	x
		Polypropylene (abbreviated PP) is a general purpose thermoplastic, obtained by the polymerization of propylene. It is used for many products; foils, molded goods such as household and kitchenware, furniture and foams. It is also used as a filament for 3-D printing and fibers for textiles, carpets and ropes. Products are generally manufactured by blow molding, extrusion, film blowing and injection molding.		
		Note: There are different types of polypropylene that are not specifically included in this thesaurus, such as expanded polypropylene. They can be placed under polypropylene. When in doubt between polypropylene, polyethylene or other narrower terms, choose the broader term polyolefin.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
chlorinated polypropylene	chlorinated polypropene CPP PPC	Chlorinated polypropylene (abbreviated PP-C) is an engineering thermoplastic obtained by the chlorination of the polypropylene polymer. It is mostly used for sheet materials, foils and pipes. Products are generally manufactured by extrusion, injection molding, blow molding and calendaring. Note: When in doubt between polypropylene and chlorinated polypropylene, choose	PP-C	
polysulfone	sulfone-based resin sulfone polymer sulphone polymer	Polysulfone (abbreviated PSU) is general term for a group of high performance thermoplastics. It is mainly used for microwave cookware, circuit boards, fibers and appliances that require resistance to hot water. Products are generally manufactured by compression molding, injection molding, thermoforming, spinning, extrusion and blow molding. Note: Polysulfone is a broader term for other materials, choose this term when in doubt between its narrower terms.	PSU	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyethersulfone	PES	<p>Polyethersulfone (abbreviated PESU) is a high performance thermoplastic. It is mainly used for molded parts that require resistance to high temperatures such as internal parts of coffee machines, plumbing and products in the electronics and automotive industry. Products are generally manufactured by injection molding, extrusion, casting and powder bed fusion.</p> <p>Note: When in doubt between polyethersulfone and other narrower terms, choose the broader</p>	PESU	
poly(phenylene sulfide)	polyphenylene sulfide	<p>Poly(phenylene sulfide) (abbreviated PPS) is a high performance thermoplastic. It is mainly used for molded parts in the electronics and automotive industry. Products are generally manufactured by compression molding, injection molding, thermoforming, spinning, extrusion and blow molding.</p> <p>Note: When in doubt between poly(phenylene sulfide) and other narrower terms, choose the broader term polysulfone.</p>	PPS	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(phenylene sulfone)	polyphenylene sulfone	Poly(phenylene sulfone) (abbreviated PPSU) is a high performance thermoplastic. It is mainly used for molded parts in plumbing and the electronics and automotive industry. Products are generally manufactured by compression molding, injection molding, thermoforming, spinning, extrusion, blow molding and 3-D printing.	PPSU	
		Note: When in doubt between poly(phenylene sulfone) and other narrower terms, choose the		
saturated thermoplastic polyester	polyester thermoplastic polyester	Saturated thermoplastic polyester is a general term for a group of thermoplastics that contain ester linkages and aliphatic or aromatic hydrocarbons. They are considered engineering or high performance plastics, depending on their thermal and mechanical properties.	-	
		Note: Saturated thermoplastic polyester is a broader term for other materials, choose this term when in doubt between its narrower terms such as poly(ethylene terephthalate) or polycarbonate. The general term polyester should not be used. The term polyester is often used in relation to textile fibres instead of polyethylene terephthalate or in relation to sculptures as unsaturated polyester.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
liquid-crystal polymer	liquid crystal polyester liquid-crystal polyester liquid-crystal polyester resin liquid crystal polymer liquid-crystal polymers	Liquid-crystal polymer (abbreviated LCP) is a general term for a group of thermoplastic aromatic polyesters. They are high performance plastics and used for displays of digital devices, microwave cookware, parts of electronic devices and in sports- and automotive products. Products are generally manufactured by extrusion, fiber spinning, injection molding and rotational molding.	LCP	
poly(butylene adipate terephthalate)	polybutene adipate terephthalate poly(butene adipate terephthalate) polybutylene adipate terephthalate polybutyrate adipate terephthalate poly(butyrate adipate terephthalate)	Note: When in doubt between liquid-crystal polymer and other narrower terms, choose the broader term saturated thermoplastic	PBAT	x
	Poly(butylene adipate terephthalate) (abbreviated PBAT) is a saturated thermoplastic polyester, obtained by the polymerization of adipic acid, 1,4-butanediol and terephthalic acid. It is biodegradable and compostable and is mainly used as a foil for food packaging and gardening, or as a thin coating on paper tableware. Products are generally manufactured by blow molding or coating.	Note: When in doubt between poly(butylene adipate terephthalate) and other narrower terms, choose the broader term saturated thermoplastic polyester.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(butylene succinate)	polybutene succinate poly(butene succinate) polybutylene succinate	Poly(butylene succinate) (abbreviated PBS) is a biodegradable thermoplastic polyester, obtained by polymerization of succinic acid and 1-4-butanediol. It is mainly used for foils, fibers, finishing lines, nets, disposable products such as tableware and packaging. Products are generally manufactured by blow molding, injection molding and filament winding. Note: When in doubt between poly(butylene succinate) and other narrower terms, choose the broader term saturated thermoplastic	PBS	
poly(butylene terephthalate)	PBTP polybutylene terephthalate	Poly(butylene terephthalate) (abbreviated PBT) is a saturated thermoplastic polyester, obtained by the polymerization of butylene glycol and terephthalic acid or dimethyl terephthalate. It is a high performance plastic and is mainly used for molded goods in the automotive or sports industry, for electrical appliances, coatings, fibers or films. Products are generally manufactured by extrusion, injection molding, rotational molding and extrusion. Note: When in doubt between poly(butylene terephthalate) and other narrower terms, choose the broader term saturated thermoplastic polyester.	PBT	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polycaprolactone		<p>Polycaprolactone (abbreviated PCL) is a saturated thermoplastic polyester, obtained by polymerization of caprolactone using a catalyst. It is mainly used as an additive for polyurethane, in dentistry fillings, hobby modeling and for 3-D printing techniques.</p> <p>Note: When in doubt between polycaprolactone and other narrower terms, choose the broader</p>	PCL	x
polycarbonate	<p>Lexan Makrolon Merlon polycarbonate resin</p>	<p>Polycarbonate (abbreviated PC) is a saturated thermoplastic polyester, obtained by polymerization of bisphenol A and carbonyl chloride or diphenyl carbonate. It is an engineering plastic and is mainly used as a glass substitute in safety helmets and aircraft windows, bottles, containers, household appliances and electronic devices. Products are generally manufactured by blow molding, calendaring, extrusion, injection molding, casting and thermoforming.</p> <p>Note: When in doubt between polycarbonate and other narrower terms, choose the broader term saturated thermoplastic polyester.</p>	PC	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(ethylene naphthalate)	polyethene naphthalate polyethylene naphthalate poly(ethene naphthalate)	Poly(ethylene naphthalate) (abbreviated PEN) is a saturated thermoplastic polyester, obtained by the polymerization of ethylene glycol and 2,6-naphthalenedicarboxylic acid. It is an engineering plastic and is mainly used for the production of carbonated drinks bottles, textile fibers and films. Products are generally manufactured by extrusion, injection molding, blow molding, thermoforming and spinning.	PEN	
		Note: When in doubt between poly(ethylene naphthalate) and other narrower terms, choose the broader term saturated thermoplastic		
poly(ethylene terephthalate)	Dacron Melinex Mylar PET PETE PETP PET-P Polyester polyethene terephthalate polyethylene terephthalate poly(ethene terephthalate) Rynite	Poly(ethylene terephthalate) (abbreviated PET) is a saturated thermoplastic polyester, obtained by the polymerization of ethylene glycol and terephthalic acid or dimethyl terephthalate. At present it is the most widely used thermoplastic polyester. It is an engineering plastic mainly used for carbonated drinks bottles, textile fibers, foils and films for video/audiotapes. Products are generally manufactured by blow molding, extrusion, injection molding and monofilament extrusion.	PET	x
		Note: When in doubt between poly(ethylene terephthalate) and other narrower terms, choose the broader term saturated thermoplastic polyester.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyhydroxyalkanoate		<p>Polyhydroxyalkanoate (abbreviated PHA) is a biodegradable thermoplastic polyester, obtained from bacterial fermentation of sugar, glucose or oil. It is mainly used for molded goods in the medical and pharmaceutical industries, fibers, films for food packaging or agriculture and disposable items such as tableware. Products are generally manufactured by extrusion, injection molding, blow molding and filament winding.</p> <p>Note: When in doubt between polyhydroxyalkanoate and other narrower terms, choose the broader term saturated</p>	PHA	x
poly(lactic acid)	<p>Lactel NatureWorks Plantic polylactic acid polylactide</p>	<p>Poly(lactic acid) (abbreviated PLA) is a biodegradable thermoplastic polyester, obtained from renewable resources such as sugar cane or corn starch. It is mainly used for molded goods, fibers, film, sheet material and shopping or trash bags. Products are generally manufactured by extrusion, coating, injection molding, spinning and 3-D printing techniques.</p> <p>Note: When in doubt between poly(lactic acid) and other narrower terms, choose the broader term saturated thermoplastic polyester.</p>	PLA	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(trimethylene terephthalate)	polytrimethylene terephthalate	<p>Poly(trimethylene terephthalate) (abbreviated PTT) is a saturated thermoplastic polyester, obtained by the polymerization of trimethylene glycol and terephthalic acid or dimethyl terephthalate. It is an engineering plastic and is mainly used for films and fibers. Products are generally manufactured by compounding, spinning and injection molding.</p> <p>Note: When in doubt between poly(trimethylene terephthalate) and other narrower terms, choose the broader term saturated</p>	PTT	
styrene plastic	<p>styrene based plastics</p> <p>styrene based polymers</p>	<p>Styrene plastic is a general term for a group of thermoplastics that have styrene content or are copolymers of polystyrene. Most styrene plastics are considered general purpose plastics, as they are used for products that do not require excellent thermal or mechanical properties. They are produced in high volume and at a low cost.</p> <p>Note: Styrene plastic is a broader term for other materials, choose this term when in doubt between its narrower terms such as polystyrene or acrylonitrile-butadiene-styrene plastic.</p>		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
acrylonitrile-butadiene-styrene	acrylonitrile butadiene styrene acrylonitrile butadiene styrene copolymer acrylonitrile-butadiene-styrene copolymer acrylonitrile-butadiene-styrene acrylonitrile-butadiene-styrene plastic Cevian Cycolac Lustran Novodur poly(acrylonitrile-co-butadiene-co-styrene) Tairilac Terluran	Acrylonitrile-butadiene-styrene (abbreviated ABS) is a thermoplastic copolymer of acrylonitrile and styrene with butadiene extensions. It is a general purpose plastic and widely used for toys such as Lego™, electronic devices, suitcases, furniture and in the automotive industry. Acrylonitrile-butadiene-styrene is also being used as a 3-D printing material. Products are generally manufactured by injection molding, extrusion or thermoforming. Note: When in doubt between acrylonitrile-butadiene-styrene and other narrower terms, choose the broader term styrene plastic.	ABS	x
acrylonitrile-styrene-acrylate	acrylate styrene acrylonitrile acrylate-styrene-acrylonitrile acrylate-styrene-acrylonitrile copolymer acrylonitrile styrene acrylate acrylonitrile-styrene-acrylate plastic	Acrylonitrile-styrene-acrylate (abbreviated ASA) is a thermoplastic, obtained by adding an acrylic ester rubber onto the styrene acrylonitril backbone. It is a general purpose thermoplastic and is mainly used for garden furniture, postboxes and automotive parts. Products are generally manufactured by blow molding, extrusion and injection molding. Note: When in doubt acrylonitrile-styrene-acrylate and other narrower terms, choose the broader term styrene plastic.	ASA	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polystyrene	<p>Arrasol Depron Lacqrene Polystyrol Styrofoam Styropor Tempex</p>	<p>Polystyrene (abbreviated PS) is a thermoplastic, obtained by the polymerization of styrene. It is a general purpose plastic and mainly used for molded goods such as disposable items, CD cases and toys, foams, films or sheets. Products are generally manufactured by blow molding, extrusion, foaming, injection molding and thermoforming.</p> <p>Note: There are different types of polystyrene that are not specifically included in this thesaurus, such as expanded or extruded polystyrene. They can be placed under polystyrene. When in doubt between polystyrene and other narrower terms, choose</p>	PS	x
high impact polystyrene	HIPS	<p>High impact polystyrene (abbreviated PS-HI) is a thermoplastic, obtained by the polymerization of styrene to which a rubber such as butadiene is added in 5 to 10%. This results in more flexibility and a higher impact strength. It is mainly used for furniture, electronic devices and packaging. Products are generally manufactured by blow molding, extrusion and injection molding.</p> <p>Note: When in doubt between high impact polystyrene and other narrower terms, choose the broader term styrene plastic.</p>	PS-HI	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
styrene-acrylonitrile	Kostil Luran styrene acrylonitrile copolymer styrene-acrylonitrile plastic styrene acrylonitrile polymers Tyril	Styrene-acrylonitrile (abbreviated SAN) is a thermoplastic, obtained by polymerization of styrene and acrylonitrile. It is an engineering plastic and is mainly used in the medical and automotive industry, for dishwasher-safe products and refrigerator shelving and cosmetic packaging. Products are generally manufactured by blow molding, extrusion, casting, thermoforming and injection molding.	SAN	x
		Note: When in doubt between styrene-acrylonitrile and other narrower terms, choose		
vinyl plastic	vinyl vinyl based polymer vinyl plastic vinyl polymer vinyl resin	Vinyl plastic is a general term for a group of thermoplastics that have a vinyl content. Most vinyl plastics are considered general purpose plastics, as they are used for products that do not require excellent thermal or mechanical properties. They are produced in high volume and at a low cost. Note: Vinyl plastic is a broader term for other materials, choose this term when in doubt between its narrower terms such as poly(vinyl chloride) or poly(vinylidene chloride).	-	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(vinyl chloride)	<p>polyvinyl chloride</p> <p>polyvinyl chloride chloride</p>	<p>Poly(vinyl chloride) (abbreviated PVC) is a group of thermoplastics, obtained by the polymerization of vinyl chloride. It is available as a rigid plastic or as a flexible plastic to which plasticizers are added. They are considered general purpose plastics, as they are used for products that do not require excellent thermal or mechanical properties. They are produced in high volume and at a low cost.</p> <p>Note: When in doubt between poly(vinyl chloride) and other narrower terms, choose the</p>	PVC	x
chlorinated poly(vinyl chloride)	<p>chlorinated polyvinyl chloride</p> <p>C-PVC</p>	<p>Chlorinated poly(vinyl chloride) (abbreviated PVC-C) is a thermoplastic, obtained by the chlorination of a poly(vinyl chloride) suspension. This increases its chlorine content to or above 67%, which contributes to better thermal and environmental stability compared to other poly(vinyl chloride). It is an engineering plastic and is mainly used for piping and the automotive industry. Products are generally manufactured by extrusion, calendaring or injection molding.</p> <p>Note: When in doubt between chlorinated poly(vinyl chloride) and other narrower terms, choose the broader term vinyl plastic.</p>	PVC-C	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
plasticized poly(vinyl chloride)	<p>plasticized polyvinyl chloride</p> <p>plasticized PVC</p> <p>polyvinyl chloride plasticized</p> <p>poly(vinyl chloride) plasticized</p> <p>P-PVC</p> <p>soft polyvinyl chloride</p> <p>soft poly(vinyl chloride)</p> <p>soft PVC</p>	<p>Plasticized poly(vinyl chloride) (abbreviated PVC-P) is a general purpose thermoplastic obtained by the polymerization of vinyl chloride to which plasticizers, most commonly phthalates, are added. This increases its flexibility. It is mainly used as a foil for inflatable products or non-food packaging, electrical cable insulation, tubes, imitation leather, flooring and as a replacement for rubbers. Products are manufactured in many different ways, such as injection molding, compression molding, blow molding, slush molding, extrusion, calendaring, coating, laminating, rotational molding and vacuum thermoforming.</p> <p>Note: When in doubt between plasticized poly(vinyl chloride) and unplasticized poly(vinyl chloride), choose the broader term poly(vinyl chloride).</p>	PVC-P	x
unplasticized poly(vinyl chloride)	<p>polyvinyl chloride unplasticized</p> <p>poly(vinyl chloride) unplasticized</p> <p>rigid polyvinyl chloride</p> <p>rigid poly(vinyl chloride)</p> <p>rigid PVC</p> <p>unplasticized polyvinyl chloride</p> <p>unplasticized PVC</p> <p>U-PVC</p>	<p>Unplasticized poly(vinyl chloride) (abbreviated PVC-U) is a general purpose thermoplastic, obtained by the polymerization of vinyl chloride. It is a rigid poly(vinyl chloride). It is mainly used for piping, credit cards, window frames and for gramophone records. Products are mainly manufactured by extrusion, calendaring and injection molding.</p> <p>Note: When in doubt between plasticized poly(vinyl chloride) and unplasticized poly(vinyl chloride), choose the broader term poly(vinyl chloride).</p>	PVC-U	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
poly(vinylidene chloride)	polyvinylidene chloride	<p>Poly(vinylidene chloride) (abbreviated PVDC) is a general purpose thermoplastic, obtained by polymerization of vinylidene chloride. It is mainly used for (food) packaging. Products are mainly manufactured by extrusion, injection molding and blow molding.</p> <p>Note: When in doubt between poly(vinylidene chloride) and other narrower terms, choose the</p>	PVDC	x
thermoset	<p>thermosetting plastic thermoset plastic thermosets thermosetting plastics thermosetting resin thermoset resin thermoset synthetic resin thermoset polymer thermosetting polymer duroplast</p>	<p>Plastics with thermoset properties, hence they cannot be remolded after curing into a permanent shape. They are cured by heat or chemical reaction.</p> <p>Note: Thermoset is a broader term for other materials, choose this term when in doubt between its narrower terms or if a term is not included in this thesaurus. If unsure between elastomers or thermoplastic and thermosetting materials, choose the broader term plastic.</p>	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
aminoplast	amino resin amino-resin aminoplast resin aminoplastic aminoplastics aminoplasts	Aminoplast is a general term for a group of thermosets. It is obtained by polycondensation of a compound containing amino groups, such as urea or melamine, with an aldehyde, such as formaldehyde. They are mainly manufactured by compression molding.	-	x
		Note: Aminoplast is a broader term for other materials, choose this term when in doubt		
casein-formaldehyde	Aladdinite Ameroid casein plastic caseine-formaldehyde resin Dorcasine Erinoid Galalith Ivoride Karolith Kylloid Lactoid milkstone Syrolit	Casein-formaldehyde (abbreviated CS) is a thermoset obtained by plasticizing casein with water and afterwards soaking it in a formaldehyde solution to cross-link the amide groups. It is mainly used for molded products such as buttons, jewelry, knitting needles or small decorative items. Products are manufactured by further processing of extruded sheets or rods.	CS	x
		Note: When in doubt between casein-formaldehyde and other narrower terms, choose the broader term aminoplast.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
melamine-formaldehyde	Abet Basotect Formica Gaydon Magic Sponge Melamine melamine formaldehyde melamine-formaldehyde melamine-formaldehyde polymers melamine formaldehyde resin melamine-formaldehyde resin melamine resin Melaware Melmax Mepal	Melamine-formaldehyde (abbreviated MF) is a thermoset obtained by polycondensation of melamine and formaldehyde. It is mainly used for molded products such as table and picnicware, as a resin or laminate. Products are generally manufactured by compression molding. Note: When in doubt between melamine-formaldehyde and other narrower terms, choose the broader term aminoplast.	MF	x
urea-formaldehyde	Bandalasta Bakelite Urea Beatl Beetle Cibanoid LingaLonga Plaskon Pollopas Resopal Scarab urea formaldehyde urea formaldehyde resin urea-formaldehyde resin urea resin Urochem	Urea-formaldehyde (abbreviated UF) is a thermoset obtained by polycondensation of urea and formaldehyde. It is mainly used for molded products such as tableware, jewelry or electrical elements like fittings and plugs. Products are generally manufactured by compression molding. Note: When in doubt between urea-formaldehyde and other narrower terms, choose the broader term aminoplast.	UF	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
bois durci		<p>Bois durci is a natural thermoset material obtained from albumen from blood to which fillers such as sawdust and colorants are added to imitate wood. Products were manufactured by compression molding and were polished afterwards. It was used for desk accessories such as paper weights or inkstands, plaques, frames, boxes, combs and broches. Bois durci is quite rare in museum collections due to its short production period. It was first patented in 1855 but strongly decreased in production after 1900.</p> <p>Note: The former tradename bois durci has become a general term to describe this type of material. When in doubt between bois durci and other narrower terms, choose the broader</p>	-	x
epoxy	<p>Araldite D.E.R. D.E.H. epoxide epoxy resin epoxy resin</p>	<p>Epoxy is a general term for thermosets with epoxide groups, obtained by the combination of a cross-linking polymer and a curing agent. It is mainly used for glass-fiber reinforced molded goods, cast resins, adhesives and coatings. Products manufactured by casting, compression molding and injection molding.</p> <p>Note: When in doubt between epoxy and other narrower terms, choose the broader term thermoset.</p>	EP	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
hard rubber	<p>Ebonite Vulcanite vulcanized rubber</p> <p>Related term: natural rubber; gutta-percha</p>	<p>Hard rubber is a general term for natural rubber, which is vulcanized with sulfur to such an extent that it is no longer elastic but becomes a hard thermoset material. It was first made in Europe around 1850 and has decreased in use since the 1930's. It was used for items such as combs, small boxes, jewellery and pipe stems or for electrical insulation parts. Products are manufactured with compression molding and can be reworked with other techniques such as turning.</p> <p>Note: When in doubt between hard rubber or other narrower terms, choose the broader term thermoset. The term hard rubber is related to natural rubber, as it also comes from a tropical tree, but it does not have elastic properties like</p>	-	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
phenol-formaldehyde	Bakelite Carvacraft Catalin Durez Durite Indur Mouldrite Nestorite phenol formaldehyde phenol formaldehyde resin phenol-formaldehyde resin phenolic phenolic resin phenoplasts Redmonal Resinox Roanoids	Phenol-formaldehyde (abbreviated PF) is a thermoset obtained by polycondensation of phenol or cresol and formaldehyde. It is mainly used for molded products such as radios, cameras, ashtrays, handles, jewelry and laminates. Products are generally manufactured by compression molding. Note: When in doubt between phenol-formaldehyde and other narrower terms, choose the broader term thermoset. Bakelite, the original trademarked name for phenol-formaldehyde, should not be used.	PF	x
unsaturated polyester	polyester unsaturated polyester resin	Unsaturated polyester (abbreviated UP) is a general term for a group of thermosets with carbon-carbon double bonds in the polymer chain which enables crosslinking of an unsaturated monomer or prepolymer. It is mainly used for glass-fiber reinforced molded goods such as chairs, boats, cast resins, adhesives and coatings. Products are manufactured by casting, compression molding and injection molding. Note: When in doubt between unsaturated polyester and other narrower terms, choose the broader term thermoset.	UP	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
<thermoset and thermoplastic>		<p>Materials that can be thermoset and thermoplastic, depending on their composition.</p> <p>Note: <thermoset and thermoplastic> is a guide term within the hierarchy of the thesaurus, it cannot be used as a preference or alternative term. If unsure between elastomers or thermoplastic and thermosetting materials, choose the broader term plastic.</p>		
polyimide		<p>Polyimide is a general term for a group of high performance thermoplastics obtained by the polymerization of a dianhydride and a diamine into a poly(amic acid) which forms a polyimide in a two-step process. They are considered high performance plastics due to their excellent thermal and mechanical properties.</p> <p>Note: Polyimide is a broader term for other materials, choose this term when in doubt between its narrower terms.</p>	PI	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyamidimide		<p>Polyamidimide (abbreviated PAI) is a high performance thermoplastics obtained by the polymerization of a diamine and acid chloride anhydride or a diisocyanate and an anhydride. Production techniques include extrusion and injection molding. Reinforcements such as glass fibers can be added. It is mainly used for films, molded products, laminates and adhesives.</p> <p>Note: When in doubt between polyamidimide and other narrower terms, choose the broader</p>	PAI	
polyetherimide	polyether-imide	<p>Polyetherimide (abbreviated PEI) is a high performance thermoplastics obtained by the polymerization of an ether-dianhydride and a diamine into a poly(amic acid) which forms a polyimide in a two-step process. Production techniques include extrusion, injection molding, blow molding and thermoforming. Reinforcements such as glass fibers can be added. It is mainly used for molded products and laminates.</p> <p>Note: When in doubt between polyetherimide and other narrower terms, choose the broader term polyimide.</p>	PEI	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
polyurethane	<p>Elastane Lycra polyurethane fiber polyurethane foam PU foam PU urethane PUR foam Spandex urethane resin</p>	<p>Polyurethane (abbreviated PUR) is general term for a large group of polymers which are obtained by the reaction of isocyanates or diisocyanates and polyols or diols. They are usually classified by their chemical linkages, such as ether, ester, carbonates or polycaprolactone and by their hydrocarbon component which can be aromatic or aliphatic. They can be thermoplastic or thermoset. Thermosetting polyurethane is generally manufactured by reaction injection molding, thermoplastic polyurethanes by extrusion, blow molding, and injection molding. Polyurethanes are very versatile and are available as foams, rubbers, coatings, fibers and as a rigid material.</p>	PUR	x
aromatic polycaprolactone polyurethane		<p>An aromatic polyurethane, obtained by the reaction of an aromatic isocyanates or diisocyanates and polycaprolactone polyols. See the scope note of polyurethane for use and manufacturing.</p> <p>Note: When in doubt between aromatic polycaprolactone polyurethane and other narrower terms, choose the broader term polyurethane.</p>		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
aromatic polycarbonate polyurethane		Aromatic polyurethane is obtained by the reaction of an aromatic isocyanates or diisocyanates and polycarbonate polyols. See the scope note of polyurethane for use and manufacturing.		
		Note: When in doubt between aromatic polycarbonate polyurethane and other narrower terms, choose the broader term		
polyesterurethane	PESTUR polyurethane ester polyurethane polyester type PUR-AU	Polyesterurethane (abbreviated PUR-ester) is obtained by the reaction of isocyanates or diisocyanates and polyester polyols or diols. See the scope note of polyurethane for use and manufacturing.	PUR-ester	x
		Note: When in doubt between polyesterurethane and polyetherurethane, choose the broader term polyurethane.		
aliphatic polyesterurethane		Aliphatic polyesterurethane is obtained by the reaction of an aliphatic isocyanates or diisocyanates and polyester polyols or diols. See the scope note of polyurethane for use and manufacturing.		
		Note: When in doubt between aliphatic polyesterurethane and other narrower terms, choose the broader term polyurethane.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
aromatic polyesterurethane		<p>Aromatic polyesterurethane is obtained by the reaction of an aromatic isocyanates or diisocyanates and polyester polyols or diols. See the scope note of polyurethane for use and manufacturing.</p> <p>Note: When in doubt between aromatic polyesterurethane and other narrower terms,</p>		
polyetherurethane	<p>PEUR polyurethane ether polyurethane, polyether type PUR-EU</p>	<p>Polyetherurethane (abbreviated PUR-ether) is obtained by the reaction of isocyanates or diisocyanates and polyether polyols or diols. See the scope note of polyurethane for use and manufacturing.</p> <p>Note: When in doubt between polyesterurethane and polyetherurethane, choose the broader term polyurethane.</p>	PUR-ether	x
aliphatic polyetherurethane		<p>Aliphatic polyetherurethane is obtained by the reaction of an aliphatic isocyanates or diisocyanates and polyether polyols or diols. See the scope note of polyurethane for use and manufacturing.</p> <p>Note: When in doubt between aliphatic polyetherurethane and other narrower terms, choose the broader term polyurethane.</p>		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
aromatic polyetherurethane		<p>Aromatic polyetherurethane is obtained by the reaction of an aromatic isocyanates or diisocyanates and polyether polyols or diols. See the scope note of polyurethane for use and manufacturing.</p> <p>Note: When in doubt between aromatic polyetherurethane and other narrower terms,</p>		
elastomer	<p>elastic polymer elastomeric material elastomers rubber</p>	<p>An elastomer is a material that returns to its original shape and dimensions after undergoing deformation due to minor stress and strain. elastomers can be thermoset or thermoplastic. Elastomers are classified into natural rubbers, synthetic rubbers and thermoplastic elastomers.</p> <p>Note: The most common elastomers are included as narrower terms, yet there are many others types and blends. Choose the broader term elastomer when in doubt between narrower terms or if a term is not included in this thesaurus. If unsure between elastomers or thermoplastic and thermosetting materials, choose the broader term plastic. The alternative term rubber is often used as a synonym for elastomer, since it has similar properties, but the term has an association with natural materials rather than with synthetic ones. Elastomer is the broader term for all elastic polymers.</p>		x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
fluoro rubber	FKM fluorocarbon fluorocarbon rubber fluoro elastomer fluoro-elastomer fluororubber related term: fluoroplastic	Fluoro rubber is a general term for a group of rubbers that contain a large portion of fluoropolymers. They are considered speciality rubbers due to their excellent thermal and mechanical properties. They are mainly used for hoses, gaskets, O-rings and seals. Note: The abbreviation FPM is according to ISO/DIN standards, the abbreviation FKM is according to ASTM standards. Both are correct. There are different types of fluoro rubbers that are not specifically included in this thesaurus. They can be placed under fluoro rubber. Choose the broader term elastomer when in doubt between narrower terms or if a term is	FPM	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
natural rubber	<p>caoutchouc caoutchouc (resin) caout-rubber India rubber isoprene rubber latex latex (organic material) lattices natural isoprene rubber natural polyisoprene para rubber polyisoprene rubber</p> <p>related term: hard rubber; gutta-percha</p>	<p>Natural rubber (abbreviated NR) is a general term for elastomers, obtained from the sap (latex) of a rubber tree, which is vulcanized. It is also called (natural) isoprene rubber. It differs from synthetic isoprene rubber in its microstructure, synthetic isoprene rubber consists of a blend of cis-1,4, trans-1,4 and 3,4 vinyl polymer, whereas natural rubber is mainly made of the cis-1,4 polymer. It is used for a variety of purposes: adhesives, rubber bands, foams, car tires, balloons, shoe soles, clothing and erasers. Products are primarily manufactured by compression molding, extrusion, calendering, dipping and foaming.</p> <p>Note: Choose the broader term elastomer when in doubt between natural rubber and synthetic</p>	NR	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
silicone rubber	<p>Polysilixane polysiloxane Q Silastic Silicone silicone elastomer Silopren SIR</p>	<p>Silicone rubber is a general term for a group of semi-inorganic thermoset materials. They are very versatile and are available as low-viscosity oils or liquids, gels, rubbers and as a more rigid material. They are used for lubricants, glues, protective coatings, paints, rubbers, flexible foams and as rigid materials. They are considered specialty rubbers due to their excellent thermal and mechanical properties. They are used for kitchenware, in the medical industry, insulation material around cables, protective coatings, flexible foams and as a material to make molds.</p> <p>Note: Silicone rubber is a general term for different types of silicone rubbers. When in doubt between silicone rubber and other narrower terms, choose the broader term</p>	SI	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
synthetic rubber	artificial rubber synthetic elastomer	<p>Synthetic rubber is a general term for a large group of elastomers, obtained by polymerization of unsaturated hydrocarbons such as butadiene or isoprene, that are vulcanized. Synthetic rubbers are thermoset materials. Most types are considered general purpose rubbers, some blends are applied as speciality rubbers.</p> <p>Note: Synthetic rubber is a general term for rubbers that are not made of latex from the rubber tree. It can also refer to synthetic isoprene rubber. The most common synthetic rubbers are included as narrower terms, yet there are many others types or blends. Choose the broader term synthetic rubber when in doubt between narrower terms or if a term is</p>		x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
butadiene rubber	polybutadiene polybutadiene rubber	Butadiene rubber (abbreviated BR) is a synthetic rubber, obtained by the polymerization of 1,3-butadiene. It is the second most common synthetic rubber and is used for a variety of purposes, such as car tires, golf ball cores, shoe soles and heels, tubing and sponges. It is often blended with styrene-butadiene rubber and natural rubber, or added to polystyrene to form high impact polystyrene or acrylonitrile-butadiene-styrene. Products are primarily manufactured by injection molding, extrusion and calendaring.	BR PBD	x
chloroprene rubber	neoprene Neoprene polychloroprene polychloroprene rubber	Chloroprene rubber (abbreviated CR) is a synthetic rubber, obtained by polymerization of 2-chlorobuta-1,3-diene. It is used for a wide variety of products, such as glues, textile material in diving suits, soles of shoes, tubes and sealings. Products are primarily manufactured by injection molding and calendaring.	CR	x
		Note: When in doubt between butadiene rubber and other narrower terms, choose the broader		
		Note: When in doubt between chloroprene rubber and other narrower terms, choose the broader term synthetic rubber.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
isobutylene-isoprene rubber	<p>butyl rubber</p> <p>isobutene-isoprene rubber</p> <p>isobutylene-isoprene copolymer</p> <p>isobutylene rubber</p> <p>polyisobutylene</p> <p>polyisobutylene-isoprene elastomer</p>	<p>Isobutylene-isoprene rubber (abbreviated IIR) is a synthetic rubber, obtained by the copolymerization of isobutylene and a smaller amount of isoprene. It is used for a wide variety of products, such as hoses and tubes, tires, cable insulation, gloves, anticorrosion protectants and adhesives. Products are primarily manufactured by injection molding and calendaring.</p> <p>Note: When in doubt between isobutylene-isoprene rubber and other narrower terms,</p>	IIR	x

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
nitrile-butadiene rubber	acrylonitrile butadiene acrylonitrile-butadiene copolymer acrylonitrile-butadiene rubber Buna N butadiene acrylonitrile nitrile-butadiene nitrile-butadiene copolymer nitrile elastomer nitrile rubber	Nitrile-butadiene rubber (abbreviated NBR) is a synthetic rubber, obtained by the copolymerization of buta-1,3-diene and acrylonitrile. It is available with a wide range of nitrile content and different blends with isoprene or poly(vinyl chloride). It is used for a wide variety of products, such as seals and O-rings, rubber gloves, sheet material, shoe soles, hoses and tubes. It is also used for adhesives and coatings on textiles, paper and leather. Products are primarily manufactured by injection molding, calendaring, dip molding and rotational molding.	NBR	x
		Note: There are many different variations and blends with nitrile-butadiene rubber that are not specifically included in this thesaurus, such as hydrogenated acrylonitrile-butadiene rubber (HNBR), acrylonitrile-butadiene-isoprene rubber (NBIR) and acrylonitrile-isoprene rubber (NIR). They can be placed under nitrile-butadiene rubber or the broader term synthetic rubber. When in doubt between nitrile-butadiene rubber and other narrower terms,		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
styrene-butadiene rubber	Buna S styrene butadiene styrene butadiene elastomer styrene-butadiene elastomer styrene butadiene copolymer styrene-butadiene copolymer styrene butadiene rubber	Styrene-butadiene rubber (abbreviated SBR) is a synthetic rubber, obtained by the copolymerization of styrene and butadiene. It can be blended with isoprene rubber. It is the most common rubber and is used for a variety of purposes, including tires, sealings, conveyor belts or as a coating on paper. Products are primarily manufactured by injection molding, calendaring, dip coating and rotational molding.	SBR	x
		<p>Note: There are many different variations of blends with styrene-butadiene rubber that are not specifically included in this thesaurus, such as styrene-isoprene-butadiene rubber (SIBR). They can be placed under styrene-butadiene rubber or the broader term synthetic rubber. When in doubt between styrene-butadiene rubber and other narrower terms, choose the</p>		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
synthetic isoprene rubber	isoprene polyisoprene polyisoprene rubber synthetic natural rubber synthetic polyisoprene synthetic polyisoprene rubber	Synthetic isoprene rubber (abbreviated IR) is a synthetic rubber, obtained by polymerization of 1-methyl-1,3-butadiene. It differs from natural isoprene rubber in its microstructure, synthetic isoprene rubber consists of a blend of cis-1,4, trans-1,4 and 3,4 vinyl polymer, whereas natural rubber is made of the cis-1,4 polymer. It is often blended with styrene-butadiene rubber and butadiene rubber. It is used for a wide variety of products, such as car tires, adhesives tapes, hot melts and coatings on wires. Products are primarily manufactured by injection molding, extrusion, compression molding and calendaring.	IR	x
		Note: When in doubt between synthetic isoprene rubber and other narrower terms,		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
thermoplastic elastomer	thermoplastic rubber	<p>Thermoplastic elastomers (abbreviated TPE) are a large group of materials. They are processed and reprocessed like thermoplastics yet they have properties of thermoset elastomers and are applied similarly. Most thermoplastic elastomers are considered specialty elastomers due to their excellent thermal and mechanical properties.</p> <p>Note: Thermoplastic elastomer is a generic term for a large class of different elastomers. The most common ones are included as narrower terms, yet there are many others types or blends. Choose the broader term thermoplastic elastomer when in doubt between narrower terms or if a term is not</p>	TPE	x
thermoplastic copolyester elastomer	<p>copolyester elastomer</p> <p>copolyester thermoplastic elastomer</p> <p>thermoplastic polyester elastomer</p>	<p>Thermoplastic copolyester elastomers (abbreviated TPC) are a group of copolymers that consist of a polyester hard segment with polyester or polyether soft segments. They are used for tubes, seals, coatings on wires and products in the automotive industry.</p> <p>Note: When in doubt between thermoplastic copolyester elastomer and other narrower terms, choose the broader term thermoplastic elastomer.</p>	TPC	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
thermoplastic olefinic elastomer	olefinic thermoplastic elastomer thermoplastic olefin copolymer thermoplastic polyolefin elastomer	Thermoplastic olefinic elastomers are a group of copolymers that consist of ethylene and propylene segments and soft butadiene segments. They are the second most widely used thermoplastic elastomers and available at a lower price range. They are used for a wide variety of products, such as coatings on wires, high-quality flat roof and building sheets, seals and O-rings. Products are primarily manufactured by injection molding and calendaring.	TPO	
		Note: When in doubt between thermoplastic olefinic elastomer and other narrower terms, choose the broader term thermoplastic		
ethylene-propylene-diene rubber	ethylene propylene diene copolymer ethylene-propylene-diene copolymer ethylene propylene diene rubber	Ethylene-propylene-diene rubber (abbreviated EPDM) is a thermoplastic olefinic elastomer, obtained by the copolymerization of ethylene, propylene and diene monomers. It is used for a wide variety of products, such as high-quality flat roof and building sheets, seals and O-rings. Products are primarily manufactured by injection molding and calendaring.	EPDM	x
		Note: When in doubt between ethylene-propylene-diene rubber and other narrower terms, choose the broader term thermoplastic olefinic elastomer.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
thermoplastic rubber vulcanizate	thermoplastic vulcanizate vulcanized thermoplastic elastomer	Thermoplastic rubber vulcanizate (abbreviated TPV) is a group of thermoplastic elastomers that consist of a vulcanized rubber in a thermoplastic olefinic matrix, often polypropylene. Examples of blends are PP-NBR, PP-NR and PP-EPDM. It is mainly used in the vehicle and medical industry.	TPV	
		Note: When in doubt between thermoplastic rubber vulcanizate and other narrower terms, choose the broader term thermoplastic		
thermoplastic styrenic elastomer	styrene block copolymer styrenic thermoplastic elastomer thermoplastic styrene elastomer	Thermoplastic styrenic elastomers are a group of copolymers that consist of hard styrene segments and soft butadiene segments. They are the most widely used thermoplastic elastomers and available at a lower price range. They are used for a wide variety of products, such as shoe soles, grip coatings on household appliances, coatings on wires, adhesives, kitchen utensils, toys, films and sheets.	TPS	
		Note: When in doubt between thermoplastic styrenic elastomer and other narrower terms, choose the broader term thermoplastic elastomer.		

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
ethylene-propylene rubber	E/P EPR ethylene propylene diene monomer ethylene propylene diene terpolymer ethylene propylene copolymer ethylene-propylene copolymer ethylene propylene rubber	Ethylene-propylene rubber (abbreviated EPM) is a thermoplastic olefinic elastomer, obtained by the copolymerization of ethylene and propylene. It is used for coatings on wires and hoses. Note: When in doubt between ethylene-propylene rubber and other narrower terms, choose the broader term thermoplastic olefinic	EPM	
thermoplastic polyamide elastomer	polyamide thermoplastic elastomer thermoplastic polyamide copolymer	Thermoplastic polyamide elastomers are a group of copolymers that consist of a hard polyamide segment with polyether, polyester or polyester-ether soft segments. They are used for waterproof and breathable clothing, coatings on wires, flexible keypads, sports balls and soles of shoes. Note: When in doubt between thermoplastic polyamide elastomer and other narrower terms, choose the broader term thermoplastic elastomer.	TPA	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
styrene-butadiene-styrene rubber	<p>block copolymer of styrene and isopren</p> <p>poly (styrene-butadiene-styrene)</p> <p>styrene-butadiene block copolymer</p> <p>styrene butadiene styrene copolymer</p> <p>styrene-butadiene-styrene copolymer</p>	<p>Styrene-butadiene-styrene rubber (abbreviated SBS) is a thermoplastic styrenic elastomer, obtained by the copolymerization of styrene and butadiene. It is used for a wide variety of products, such as hotmelt adhesives, toys, roofing, pavement, sealants, rubber bands and shoe soles. Products are primarily manufactured by injection molding and calendaring.</p> <p>Note: When in doubt between styrene-butadiene-styrene rubber and other narrower terms, choose the broader term thermoplastic</p>	SBS	
styrene-ethylene-butadiene-styrene rubber	<p>polystyrene-poly(ethylene-butylene)-polystyrene</p> <p>styrene ethylene butadiene styrene copolymer</p> <p>styrene-ethylene-butadiene-styrene copolymer</p> <p>styrene ethylene butadiene styrene rubber</p> <p>styrene ethylene butylene styrene</p> <p>styrene ethylene/butylene styrene block copolymer</p>	<p>Styrene-ethylene-butadiene-styrene rubber (abbreviated SEBS) is a thermoplastic styrenic elastomer, obtained by the copolymerization of styrene and butadiene. It is used for a wide variety of products, such as grip coatings on household appliances and kitchen utensils, hotmelt adhesives, toys, roofing, pavement, sealants, rubber bands and shoe soles. Products are primarily manufactured by injection molding and calendaring.</p> <p>Note: When in doubt between styrene-ethylene-butadiene-styrene rubber and other narrower terms, choose the broader term thermoplastic styrenic elastomer.</p>	SEBS	

PREFERENCE TERM	ALTERNATIVE TERMS	SCOPE NOTE	ABR.	FUNDAM.
styrene-isoprene-styrene rubber	<p>block copolymer of styrene and isoprene</p> <p>block copolymer of styrene and isoprene styrene</p> <p>poly (styrene-isoprene-styrene)</p> <p>styrene-isoprene block copolymer</p> <p>styrene isoprene styrene copolymer</p> <p>styrene-isoprene-styrene copolymer</p> <p>styrene isoprene styrene rubber</p>	<p>Styrene-isoprene-styrene rubber (abbreviated SIS) is a thermoplastic styrenic elastomer, obtained by the copolymerization of styrene and isoprene. It is used for a wide variety of products, such as hotmelt adhesives, toys, roofing, pavement, sealants, rubber bands and shoe soles. Products are primarily manufactured by injection molding and calendaring.</p> <p>Note: When in doubt between styrene-isoprene-styrene rubber and other narrower terms, choose the broader term thermoplastic</p>	SIS	FUNDAM.
thermoplastic urethane elastomer	<p>polyurethane thermoplastic elastomer</p> <p>thermoplastic polyurethane elastomer</p> <p>thermoplastic polyurethane rubber</p> <p>urethane thermoplastic elastomer</p> <p>Related term: polyurethane</p>	<p>Thermoplastic urethane elastomers (abbreviated TPU) are a group of thermoplastic elastomers that consist of an aromatic or aliphatic hard segment and polyester, polyether, polycarbonate or polycaprolactone soft segments. They are used for a wide variety of products, such as coatings on textiles or leathers, films and sheets, shoe soles, coatings in wires, tubes and wheels.</p> <p>Note: See the related term polyurethane for specific types and more information. When in doubt between thermoplastic urethane elastomer and other narrower terms, choose the broader term thermoplastic elastomer or the related term polyurethane.</p>	TPU	FUNDAM.