D01F

CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS

Definition statement

This place covers:

Chemistry-related aspects in the manufacture of artificial fibres, filaments and similar. It also covers - the chemical treatment of fibres and filaments during their production, e.g. before winding,

- the produced fibres as such.

Apparatus specially adapted for the manufacture of carbon filaments is also covered.

Relationships with other classification places

Many documents in the field disclose features related to both the mechanical (D01D) and the chemical (D01F) aspect of fibre manufacture. Two cases can be envisaged:

a) When a document is concerned with mechanical aspects but mentions specific polymers, classification should always be given in D01D and classification may be added in D01F when the chemical aspects are relevant or non-usual polymers or additives are used. No D01F classification should be given when a long list of polymers is mentioned, even when in the claims.

b) When a document is concerned with chemical aspects but mentions specific techniques (e.g. melt-blowing, electrospinning) classification should always be given in D01F and classification may be added in D01D when the specific technique plays an important role. No D01D classification should be given when several unrelated techniques are mentioned, even when in the claims.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cigarette filters	A24D 3/00
Synthetic grass, lawns for playground or sports grounds	A41G 1/009, E01C 13/08
Artificial hair	A41G 3/0083
Bristles	A46D 1/00
Medical devices	A61L,, A61F
Strings for tennis rackets	A63B 51/02
Filters	B01D 39/00
Continuous casting of metals, i.e. casting in indefinite lengths	B22D 11/00
Treatment of metallic powder characterized by its shape or structure, e.g. fibre structure	B22F 1/06
Shaping composites, i.e. plastics material comprising reinforcements, fillers, or preformed parts	B29C 70/00
Tyre yarns	B60C 9/00
Carbon nanotubes	C01B 32/15
Production of ceramic fibres	C04B 35/62227

Manufacture of articles or shaped materials containing macromolecular substances	C08J 5/00
Recycling or recovering of waste materials	C08J 11/00
Additives in general	C08K
Crimping or curling fibres, filaments, threads, or yarns	D02G
Yarns or threads; Processes or apparatus for the production thereof, not otherwise provided for	D02G 3/00
Finishing or dressing of filaments, yarns, threads, cords, ropes or the like	D02J
Chemical treatment of fibres after production	D06L, D06M
Dyeing of fibres	D06P
Strings for musical instruments	G10D 3/10

Special rules of classification

Attention should be paid when blends or additives are used. These cases are classified in different subgroups and sometimes there is an overlap. As a general rule, additives are characterised by their function (e.g. stabilizer, pigment), whilst polymer blends have different properties compared to the single substances.

In the case where classification is given under D01F 1/00 a corresponding group under D01F 6/00 should be given when a specific polymer is used. However, no classification should be given under D01F 6/00 when a long list of polymers is mentioned.

The table below is an example concerning polyethylene:

PE homopolymer	D01F 6/04
PE copolymer	D01F 6/30
PE homopolymer with additives	D01F 6/04 and D01F 1/00
PE copolymer with additives	D01F 6/30 and D01F 1/00
Polymer blend (homo- or copolymer)	D01F 6/46
Polymer blend with additives (homo- or copolymer)	D01F 6/46 and D01F 1/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Fibre	relatively short, elongated member of natural or artificial material
Filament	endless or quasi-endless, elongated member of natural or artificial material
Thread	assembly of yarns or filaments, usually produced by twisting
Yarn	unitary assembly of fibres, usually produced by spinning

D01F 1/00

General methods for the manufacture of artificial filaments or the like

Definition statement

This place covers:

Addition of additives to the spinning solution or melt.

D01F 1/00 covers the chemical nature of the additive, whereas the method of adding the additive, that would be considered to be a mechanical feature, is classified in D01D 1/065.

Special rules of classification

In the case where classification is given under D01F 1/00 a corresponding group under D01F 6/00 should be given when a specific polymer is used. However, no classification should be given under D01F 6/00 when a long list of polymers is mentioned.

When an additive is used in the spinning solution or in the melt, and this additive has none of the specific properties mentioned in the subgroups of D01F 1/00, then two cases are envisaged:

when the additive has an effect on the fibre production process (e.g. lubricant, viscosity modifier), the group D01F 1/02 should be given;

when the additive has an effect on the final properties of the fibre (e.g. additives for improving the tensile strength), the group D01F 1/10 should be given.

Please note that the composition of the spinning solution of viscose is dealt with in D01F 2/08 and subgroups.

Under D01F 1/09, when an intrinsically electrically conductive additive (e.g. carbon nanotubes) is added for a different purpose (e.g. tensile strength), only the classification related to the desired function should be allocated.

D01F 1/09

for making electroconductive or anti-static filaments

Definition statement

This place covers:

Also covers addition of additives to make antistatic fibres/filaments.

D01F 2/00

Monocomponent artificial filaments or the like of cellulose or cellulose derivatives; Manufacture thereof

Definition statement

This place covers:

Artificial monocomponent fibres or the like of cellulose or its derivatives .

Relationships with other classification places

D01F 2/00 only covers the production of cellulosic fibres. Fibres from other carbohydrates (e.g. starch, hemicellulose, chitosan, dextran, hyaluronan) are classified in D01F 9/00.

Special rules of classification

Fibres spun from amine oxide solutions (e.g. lyocell) are classified in D01F 2/00.

D01F 2/02

from solutions of cellulose in acids, bases or salts

Definition statement

This place covers:

Fibres spun from solutions of ionic liquids.

D01F 2/06

from viscose

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preparation of alkali cellulose	C08B 1/08

D01F 2/08

Composition of the spinning solution or the bath

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preparing or dissolving cellulose xanthate	C08B 9/00

D01F 2/10

Addition to the spinning solution or spinning bath of substances which exert their effect equally well in either

Definition statement

This place covers:

Addition of substances to the spinning solution or bath, these substances having an effect on the solution, on the bath or on the final fibre.

D01F 2/24

from cellulose derivatives

Definition statement

This place covers:

Cellulose carbamate fibres.

D01F 4/00

Monocomponent artificial filaments or the like of proteins; Manufacture thereof

Definition statement

This place covers:

Monocomponent fibres or the like of proteins.

Special rules of classification

When a polyaminoacid or a polypeptide is obtained synthetically, classification in D01F 6/68 should be given. Fibres from natural proteins are classified in D01F 4/00, even when the protein has been chemically modified.

D01F 6/00

Monocomponent artificial filaments or the like of synthetic polymers; Manufacture thereof

Definition statement

This place covers:

Monocomponent fibres or the like of synthetic polymers.

Special rules of classification

This group is divided in two main sections based on the type of polymer used. The first part relates to polyaddition polymers and the second part to polycondensation polymers. In turn, for each type of polymers a distinction is made between homopolymers, copolymers and blended polymers. When a document covers both homo- and copolymers the homopolymer group is always allocated, and the copolymer group is only allocated when specific information is given about the copolymer (e.g. type and amount of comonomers).

D01F 6/38 vs. D01F 6/40

All fibres comprising 35-85% of acrylonitrile are classified in D01F 6/40 even if the fibres are not defined as modacrylic. If an overlap exists on the amount of acrylonitrile both classifications should be allocated.

D01F 6/70

Although the polyurethanes used to make fibres are normally copolymers, elastic polyurethane fibres are always classified in this subgroup

D01F 6/04

from polyolefins

Definition statement

This place covers:

Polyolefins in general.

D01F 6/06

from polypropylene

Definition statement

This place covers:

Polypropene.

D01F 6/20

from polymers of cyclic compounds with one carbon-to-carbon double bond in the side chain

Definition statement

This place covers:

Polyvinylpyrrolidone fibres.

D01F 6/24

from polymers of aliphatic compounds with more than one carbon-to-carbon double bond

Definition statement

This place covers:

Polydienes

D01F 6/28

from copolymers obtained by reactions only involving carbon-to-carbon unsaturated bonds

Definition statement

This place covers:

Polyketone fibres.

D01F 6/625

{derived from hydroxy-carboxylic acids, e.g. lactones}

Definition statement

This place covers:

Poly(lactic acid) fibres, including the polymers of racemic mixtures of D- and L-acid.

D01F 6/74

from polycondensates of cyclic compounds, e.g. polyimides, polybenzimidazoles

Definition statement

This place covers:

Polybenzazole/polybenzoxazole fibres.

D01F 6/76

from other polycondensation products

Definition statement

This place covers:

Polyaniline fibres.

D01F 8/00

Conjugated, i.e. bi- or multicomponent, artificial filaments or the like; Manufacture thereof

Definition statement

This place covers:

Multicomponent, i.e. conjugated, fibres or the like such as core-sheath, side-by-side, islands-in the sea, etc.

Relationships with other classification places

Documents concerning multicomponent fibres should be classified under D01F 8/00 if the chemical aspects are important (e.g. the materials used) and in D01D 5/30 - D01D 5/36 when the mechanical aspects are important (e.g. the spinneret or the method used).

The coating of fibres or filaments is classified in D01F 13/00 (if the coating happens during production, covering chemical aspects), D01D 11/06 (if the coating happens during production, covering mechanical aspects), D06M (if the coating happens after production, covering chemical aspects), or D02J (if the coating happens after production, covering mechanical aspects).

D01F 9/00

Artificial filaments or the like of other substances; Manufacture thereof; Apparatus specially adapted for the manufacture of carbon filaments

Definition statement

This place covers:

Man-made filaments or the like of other substances that are not comprised in any of the above groups.

Also covers apparatus for manufacturing carbon fibres.

Relationships with other classification places

Carbon nanofibers vs nanotubes:

Carbon nanotubes are classified in C01B 32/15. However, sometimes a document uses the term "nanofiber" as a broad term including nanotubes. In these cases, the description should be checked, and classification under D01F should not be given if the document appears to actually relate to nanotubes only. Yarns of carbon nanotubes/nanofibres are classified under D01F 9/00 when the chemical aspects are important, and under D02G 3/00 when the mechanical aspects are important. In case of doubt, classification under both groups should be given.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Ovens in general	F27B, F27B 9/28

D01F 9/08

of inorganic material (working or processing of metal wire B21F; from softened glass, minerals or slags C03B 37/00)

References

Limiting references

This place does not cover:

Working or processing of metal wire	B21F
Manufacture of fibres or filaments from softened glass, minerals or slags	C03B 37/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Processing inorganic compounds to obtain ceramic fibres	C04B 35/62227
Incandescent bodies	F21H
Incandescent bodies; Manufacture of incandescent bodies	H01K 1/02, H01K 3/02

D01F 9/12

Carbon filaments; Apparatus specially adapted for the manufacture thereof

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Nanosized carbon materials	C01B 32/15
Nanosized carbon materials having a fullerene structure	C01B 32/152

D01F 9/133

Apparatus therefor

Definition statement

This place covers:

Apparatus for manufacturing vapor-grown carbon fibres.

D01F 9/32

Apparatus therefor

Definition statement

This place covers:

Apparatus for manufacturing carbon fibres obtained by carbonization of organic filaments.

D01F 11/00

Chemical after-treatment of artificial filaments or the like during manufacture

Definition statement

This place covers:

Chemical treatment of filaments and the like during their manufacture, i.e. during a continuous production process before the filaments have been collected.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Surface treatment of fibres or filaments made from glass, minerals or slags	C03C 25/00
Surface treatment of fibres or filaments made from ceramics	C04B
Mechanical aspects in coating with a spinning solution or melt during the manufacture	D01D 11/06
Dry-Cleaning, washing or bleaching fibres, filaments, threads, yarns, fabrics, feathers or made-up fibrous goods; Bleaching leather or furs	D06L
Finishing; Treatment not provided for elsewhere of fibres, threads, yarns, fabrics, feathers or fibrous goods made therefrom	D06M
Dyeing or Printing textile; Dyeing leather, furs or solid macromolecular substances in any form	D06P
Decorating Textiles	D06Q

Special rules of classification

Chemical treatment is not limited to reactive treatments, but is considered to encompass any treatment with a chemical substance, e.g. coating with a solution.

D01F 13/00

Recovery of starting material, waste material or solvents during the manufacture of artificial filaments or the like

Definition statement

This place covers:

Recovery of starting material, waste material or solvents during the manufacture of artificial filaments or the like.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Chemical aspects in the recycling of plastic	C08J 11/00