

## 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

##### Limiting references

*This place does not cover:*

Production of metallic filaments	<a href="#">B22D 11/00</a> , <a href="#">B22F 1/0007</a>
Production of glass fibres	<a href="#">C03B 37/00</a>
Production of ceramic fibres	<a href="#">C04B 35/62227</a>
Processes starting from pre-made fibres or filaments, such as the production of yarns from single filaments	<a href="#">D02G</a> , <a href="#">D02J</a>

##### Informative references

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

Cigarette filters	<a href="#">A24D 3/00</a>
Synthetic grass, lawns for playground or sports grounds	<a href="#">A41G 1/009</a> , <a href="#">E01C 13/08</a>
Artificial hair	<a href="#">A41G 3/0083</a>
Bristles	<a href="#">A46D 1/00</a>
Medical devices	<a href="#">A61L</a> (chemical), <a href="#">A61F</a> (mechanical)
Strings for tennis rackets	<a href="#">A63B 51/02</a>
Filters	<a href="#">B01D 39/00</a>

Tyre yarns	<a href="#">B60C 9/00</a>
Carbon nanotubes	<a href="#">C01B 32/15</a>
Composite materials	<a href="#">C08J 5/00</a> (chemical aspects), <a href="#">B29C 70/00</a> (mechanical aspects)
Recycling or recovering of waste materials (in addition to <a href="#">D01F 13/00</a> )	<a href="#">C08J 11/00</a>
Additives in general	<a href="#">C08K</a>
Yarns and their applications	<a href="#">D02G 3/00</a>
Chemical treatment of fibres after production(during production: <a href="#">D01F 11/00</a> )	<a href="#">D06L</a> , <a href="#">D06M</a>
Dyeing of fibres	<a href="#">D06P</a>
Strings for musical instruments	<a href="#">G10D 3/10</a>

### 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	<a href="#">D01F 6/04</a>
PE copolymer	<a href="#">D01F 6/30</a>
PE homopolymer with additives	<a href="#">D01F 6/04</a> and <a href="#">D01F 1/00</a>
PE copolymer with additives	<a href="#">D01F 6/30</a> and <a href="#">D01F 1/00</a>
Polymer blend (homo- or copolymer)	<a href="#">D01F 6/46</a>
Polymer blend with additives (homo- or copolymer)	<a href="#">D01F 6/46</a> and <a href="#">D01F 1/00</a>

When a document also relates to a neighbouring field it should always be circulated to the corresponding classifiers. In the cases where many different applications of the invention are claimed, the document should only be circulated to the exemplified or the most relevant technical field.

### 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 2/10**

**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

##### Limiting references

*This place does not cover:*

ovens in general	<a href="#">F27B</a> in particular <a href="#">F27B 9/28</a>
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## 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** ({of artificial filaments from softened glass, minerals or slags [C03C](#); from ceramics [C04B](#)}; finishing [D06M](#))

**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****Limiting references**

*This place does not cover:*

Chemical treatment after production	<a href="#">D06L</a> , <a href="#">D06M</a> , <a href="#">D06P</a> , <a href="#">D06Q</a>
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**Informative references**

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

Mechanical aspects in coating with a spinning solution or melt during the manufacture	<a href="#">D01D 11/06</a>
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**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****Limiting references**

*This place does not cover:*

Chemical aspects in the recycling of plastic	<a href="#">C08J 11/00</a>
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