B01D

SEPARATION (separating solids from solids by wet methods B03B, B03D; by pneumatic jigs or tables B03B; by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electric fields B03C; centrifuges, vortex apparatus B04; presses per se for squeezing-out liquid from liquid-containing material B30B 9/02; treatment of water C02F, e.g. softening by ion-exchange C02F 1/42; {arrangements of air intake cleaners in gas turbine plants F02C 7/05} ; arrangements or mounting of filters in air-conditioning, air-humidification or ventilation F24F 13/28)

Definition statement

This place covers:

Processes and apparatus for evaporation, distillation, sublimation, crystallisation, solvent extraction, chromatography, sedimentation, filtration, dust precipitation, gas cleaning, absorption, adsorption, separation of isotopes.

Cold traps, cold baffles.

Treating liquids by displacement, adsorption, separation or degasification.

Treating gases or vapours by separation, recovering, chemical or biological purification of waste gases.

Separation using semi-permeable membranes, dialysis, osmosis, ultrafiltration.

Separation of suspended particles from liquids by sedimentation, flocculation, settling, filtration or other processes.

Separation of dispersed particles from gases or vapours, by filtration, gravity, inertia or centrifugal forces, or using liquid as separating agent.

Similar processes which are not concerned with, or limited to, separation.

Relationships with other classification places

For apparatus used in drying or evaporation, F26B takes precedence over this subclass.

Separation of isotopes of the same chemical element is covered by group B01D 59/00, whatever process or apparatus is employed; this group therefore takes precedence over other groups of class B01.

References

Limiting references

This place does not cover:

Separating solids from solids by wet methods	B03B, B03D
Separating solids from solids using liquids or using pneumatic jigs or tables	B03B
Magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electric fields	B03C
Flotation, differential sedimentation	B03D

Centrifuges	B04B
Vortex apparatus, e.g. cyclones	B04C
Separating solids from solids by dry methods, e.g. sieving, screening, sifting or using gas currents	B07B
Presses per se for squeezing-out liquid from liquid-containing material	B30B 9/02
Making single crystals	C30B
Into single crystals	C30B 23/00
Manufacture of hollow fibres	D01D 5/24, D01F 1/08
Separation of difficult-to-condense gases or air by liquefaction	F25J 3/00
Condensers	F28B

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Treatment of milk by dialysis, reverse osmosis or ultrafiltration	A23C 9/142
Treatment of milk by electrodialysis	A23C 9/144
Suction cleaner filters	A47L 9/10
Artificial kidneys	A61M 1/14
Blood or infusion liquid filters	A61M 5/165
Filters for breathing-protection purposes	A62B 23/00
Screens or sieves per se	B07B 1/00
Extrusion filters	B29C 48/69
Filtering air for vehicles	B60H 3/06
Separating pneumatically-conveyed materials from propelling gas	B65G 53/60
Purification or separation of nitrogen	C01B 21/04
Treatment of water e.g. softening of water by ion-exchange	C02F, C02F 1/42
Treatment of water by dialysis, osmosis or reverse osmosis	C02F 1/44
Treatment of water by electrodialysis	C02F 1/469
Working-up unidentified gaseous mixtures obtained by cracking hydrocarbon oils	C10G 70/00
Cleaning coal gas	C10K
Working-up of natural gas, or synthetic natural gas	C10L 3/10
Apparatus for enzymology or microbiology with dialysis means	C12M 1/12
Production or purification of sugar juices, e.g. by osmosis	C13B 20/16
Extraction of sugar from molasses, e.g. by osmosis	C13B 35/08
Diaphragms for electrolysis	C25B 13/00, C25C 7/04
Filtering spinning solution or melt	D01D 1/10
Exhaust or silencing apparatus for machines or engines having means for removing solid constituents of exhaust	F01N 3/02
Air cleaners for the intakes of gas-turbine or jet-propulsion plants	F02C 7/05
Air cleaners for the intakes of combustion engines	F02M 35/024

Filters for liquid fuel specially adapted for, or arranged on, internal-combustion engines	F02M 37/22
Osmosis as energy source	F03G 7/00
Air cleaners for the intakes of compressors	F04B 39/16
Filtration of lubricants	F16N 39/06
Filtering in air-conditioning	F24F 3/16, F24F 8/10
Arrangement or mounting of filters in air-conditioning, air-humidification or ventilation	F24F 13/28
Investigating materials	G01N 30/00

Special rules of classification

Group B01D 59/00 (separation of isotopes) takes precedence over other groups of this subclass since it covers separation of isotopes of the same chemical element, whatever process or apparatus is employed.

Glossary of terms

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

Filtration	The separation of a fluid-solid mixture, involving passage of most of the fluid through a porous barrier which retains most of the solid particulates contained in the mixture; includes straining solids from fluids.
Filter medium	A porous barrier or porous arrangement of material, which lets a fluid pass while retaining most of the solids which were mixed with it.
Filtering element	A section of filter medium in addition to parts to which the medium is demountably or permanently fixed, including other sections of medium, end caps, peripheral frames or edge strips, but excluding housings.
Filter housing	The fluid-constraining impervious vessel, whether open or closed, which contains, or is adapted to contain one or more filtering elements or filter media.
Filter chamber	The space within a housing where filtering elements or filter media are located; partitions may divide a single housing into a plurality of chambers.
Filtering apparatus	Filtering elements combined with housings, cleaning arrangements, motor or like parts, which are characteristic of the particular type of apparatus. Ancillary devices such as pumps or valves are considered part of a filtering apparatus when inside the apparatus. Ancillary devices performing similar or different unit operations such as comminutors, mixers or non-filtering separators, whether or not inside the apparatus, are not considered part of a filtering apparatus. The term does not extend to apparatus, e.g. washing machines, of which the filter forms only a part.

B01D 1/00

Evaporating ({evaporation in general, e.g. of liquids for gas phase reactions B01B 1/005} ; removal of incrustation B08B; preparation of starch C08B 30/00; sugar industry C13; prevention of incrustation C23F; drying solid materials or objects by evaporating liquids therefrom F26)

Definition statement

This place covers:

This group covers document where evaporation of a mixture is used for separation of components of said mixture.

Document concerning specific application should not be classified in this group.

Means for contacting gas and liquid for the specific purpose of concentration by evaporation

This group does not cover :

Evaporation and concentration with attendant crystallisation is not classified in this group.

Relationships with other classification places

Concentrating by evaporation of liquid containing solids in solution or suspension and treating or recovering the concentrate are classified in B01D 21/00 and F26

Recovery of heat in the vapours evolved is classify in B01D 5/006

References

Limiting references

This place does not cover:

Distillation	B01D 3/00
Evaporation without separation	B01B 1/00
evaporation in general, e.g. of liquids for gas phase reactions	B01B 1/005
removal of incrustation	B08B
preparation of starch	C08B 30/00
sugar industry	C13
prevention of incrustation	C23F
drying solid materials or objects by evaporating liquids therefrom	F26

Informative references

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

food evaporation	A23C 1/12
juices evaporation	A23L 2/10
soups concentration	A23L 23/10
removal of incrustation	B08B
Water evaporation	C02F 1/02
preparation of starch	C08B 30/00

In sugar industry	C13B
Preventing incrustation	C23F
spent liquor concentration	D21C 11/10
Drying solid materials or objects by evpoarating liquids therefrom	F26B
heat exchanger construction	F28D 9/00

B01D 1/0017

{Use of electrical or wave energy (B01D 1/0029 takes precedence)}

References

Informative references

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

Microwave devices	H05B

B01D 1/0035

{Solar energy (for treatment of water C02F 1/14)}

References

Informative references

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

Water	C02F 1/14

B01D 1/065

{by film evaporating}

Definition statement

This place covers:

Evaporators with vertical tubes by film evaporating , e.g. documents describing a falling-film evaporator.

This subgroup does not cover the following:

Rising-film and wiped-film evaporators

Liquid being maintained as a film on a support by centrifugal force

Film supported on a travelling surface for evaporation

References

Informative references

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

Gas and liquid contact in film	B01D 53/00
Boilers, e.g.	F22B

Machines or apparatus for drying materials in loose, plastic or fluidised form	F26B 17/00
Heat exchanger	F28D

B01D 1/18

to obtain dry solids (B01D 1/24 takes precedence)

Definition statement

This place covers:

This class is for classifying documents where the feed is a liquid mixture and after treatment a stream of vapour is obtained as well as some solid(s).

References

Limiting references

This place does not cover:

Evaporating to obtain dry solids	B01D 1/24

Informative references

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

Granulation	B01J 2/00
Solid drying	F26B

B01D 1/20

Sprayers (in general B05B)

References

Informative references

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

Distillation in spray form	B01D 3/00
Sprayers	B05B

B01D 1/24

to obtain dry solids

Definition statement

This place covers:

This group is for classifying documents where the feed is a liquid mixture and after treatment a stream of vapour is obtained as well as some solid(s).

References

Informative references

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

Granulation	B01J 2/00
Solid drying	F26B

B01D 1/28

with vapour compression

References

Informative references

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

Distillation using compresses vapour as source of heat	B01D 3/00
Water	C02F 1/041
Compressor	F01D

B01D 3/00

Distillation or related exchange processes in which liquids are contacted with gaseous media, e.g. stripping ({evaporation in general, e.g. of liquids for gas phase reactions B01B 1/005;} gas chromatography B01D 15/08; destructive distillation C10B; preparation of alcoholic beverages by distillation C12H 6/02)

Definition statement

This place covers:

This group concerns distillation in general. Specific application should classified in the relevant group.

References

Informative references

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

Gas chromatography	B01D 15/08
Evaporation of liquids for gas phases reactions	B01B 1/005
Destructive distillation (pyrolysis)	C10B
Preparation of alcoholic beverages by distillation	C12H 6/02

Special rules of classification

Packing elements are classified in B01J 19/30, B01J 19/32 and corresponding Indexing Codes.

Documents with a simple reference to distillation as possible separation means or step should not be classified in B01D 3/00.

B01D 3/001

{Processes specially adapted for distillation or rectification of fermented solutions}

Definition statement

This place covers:

In B01D 3/001 are classified the documents dealing with alcohol batch distillation.

References

Informative references

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

More general alcohol distillation processes	C12F
Preparation of alcoholic beverages by distillation	C12H 6/02

B01D 3/002

{by continuous methods}

Definition statement

This place covers:

In B01D 3/001 are classified the documents dealing with alcohol continuous distillation.

B01D 3/003

{Rectification of spirit}

References

Informative references

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

Preparation of alcoholic beverages other that wine by distillation	C12H 6/02

B01D 3/008

{Liquid distribution}

Special rules of classification

Liquid feeder/distributor for all kind of columns (absorption) should be classified here.

B01D 3/009

{in combination with chemical reactions}

Definition statement

This place covers:

The chemical reaction is inside the distillation vessel.

This subgroup does not cover:

The chemical reaction only for assisting in the separation by distillation of a pre-existing

References

Informative references

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

Distillation using compresses vapour as source of heat	B01D 3/00
Purification, separation of hydrocarbons	C07C 7/00
Destructive distillation of carbonaceous materials for production of gas, coke	C10B 1/00
Working up tar, pitch, asphalt by chemical means	C10C 3/02

B01D 3/085

{using a rotary evaporator}

References

Informative references

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

Distillation using compresses vapour as source of heat	B01D 3/00
Laboratory apparatus	B01L 3/00
Machines or apparatus for drying solid materials with movements which is non-progressive	F26B 11/00

B01D 3/14

Fractional distillation {or use of a fractionation or rectification column}

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "Fractionation","rectification" and "distillation"

B01D 3/40

Extractive distillation

References

Limiting references

This place does not cover:

Azeotropic distillation	B01D 3/36

Informative references

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

Extraction	B01D 11/00

B01D 5/00

Condensation of vapours; Recovering volatile solvents by condensation (B01D 8/00 takes precedence; condensers F28B)

References

Limiting references

This place does not cover:

condensers	F28B

Informative references

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

Distillation	B01D 3/00
Condensation from gases	B01D 53/002
Water condensation from air	E03B 3/28
Heat exchanger construction	F28D 9/00

B01D 5/0003

{by using heat-exchange surfaces for indirect contact between gases or vapours and the cooling medium}

References

Informative references

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

Heat exchanger construction	F28D 9/00

B01D 7/00

Sublimation (B01D 8/00 takes precedence; freeze-drying F26)

Definition statement

This place covers:

Sublimation or antisublimation in general for separation.

References

Limiting references

This place does not cover:

Cold traps; cold baffles	B01D 8/00
Freeze-drying	F26

Informative references

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

Distillation	B01D 3/00
Cryogenic separation	F25J
Drying solids	F26B 3/00

Special rules of classification

Specific application should be classified in the relevant groups.

B01D 8/00

Cold traps; Cold baffles (pumps for evacuating by condensing or freezing F04B 37/08)

Definition statement

This place covers:

Only documents for separation should be classified in this group.

References

Informative references

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

Pumps for evacuating by condensing or freezing	F04B 37/08
Cryogenic separation	F25J

B01D 9/00

Crystallisation (crystallisation directly from the vapour phase B01D 7/02; making single crystals C30B {; crystallisation as part of the Bayer process also classified in C01F 7/14})

Relationships with other classification places

Making single crystals: C30B

References

Limiting references

This place does not cover:

Crystallisation directly from the vapour phase	B01D 7/02
Dairy products, e.g. milk, butter, cheese; milk or cheese substitutes: Concentration by freezing out the water	A23C 1/06
Preservation of foods or foodstuffs, in general, e.g. pasteurising, sterilising, specially adapted for foods or foodstuff: fractionated crystallisation	A23L 3/405
Medicinal preparations characterised by special physical form: Agglomerates; Granulates; Microbeadlets : Processes	A61K 9/1682
Crystallisation as part of the Bayer process is also classified in	C01F 7/14

Treatment of water, waste water or sewage by freezing	C02F 1/22
Purification/separation of acyclic or carbocyclic compounds by crystallisation	C07C 7/14
Production of sucrose; apparatus specially adapted therefor: Crystallisation; Crystallising apparatus; Separating crystals from mother liquors	C13B 30/00
Investigating or analyzing materials by crystallisation	G01N 25/147

Informative references

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

Processes leading to the formation of precipitates	B01D 2009/0086
Preservation of foods or foodstuffs, in general, e.g. pasteurising, sterilising, specially adapted for foods or foodstuff: by drying or kilning	A23L 3/40

Special rules of classification

No documents should be classified in B01D 9/02 as virtually all crystallisation processes are conducted using solutions of the target compound. Use B01D 9/04 if solvent is removed for concentration of solutions.

B01D 11/00

Solvent extraction

References

Limiting references

This place does not cover:

Separation of isotopes by solvent extraction	B01D 59/24
Tea extraction	A23F 3/16
Coffee: reducing alkaloid content by extraction of the beans with selective solvents other than water or aqueous bean extracts, including supercritical gases	A23F 5/206
Coffee: reducing alkaloid content by extraction of the beans with water, aqueous solutions without organic or inorganic solvents, or aqueous coffee extract	A23F 5/208
Extraction of coffee; Coffee extracts	A23F 5/24
Foods or foodstuffs; their preparation or treatment: natural spices obtained by solvent extraction	A23L 27/11
Foods or foodstuffs; their preparation or treatment : plant extracts	A23L 33/105
Cosmetic or similar toilet preparations containing material of vegetable origin, e.g. plant extracts	A61K 8/97
Preparation of oxyacids of phosphorus involving liquid-liquid extraction	C01B 25/46
Treatment of water, waste water or sewage by extraction	C02F 1/26
Purification/separation of acyclic or carbocyclic compounds by extraction	C07C 7/10

Separation/purification of compounds having hydroxy or O-metal groups bound to a carbon atom not belonging to a six-membered aromatic ring by liquid-liquid treatment	C07C 29/86
Working-up pitch, asphalt, bitumen by selective extraction	C10C 3/08
Production of liquid hydrocarbon mixtures from oil-shale, oil-sand, or non-melting solid carbonaceous or similar materials, e.g. wood, coal, by extraction	C10G 1/04
Refining of hydrocarbon oils in the absence of hydrogen, by extraction with selective solvents	C10G 21/00
Working-up used lubricants to recover useful products using extraction processes; apparatus therefor	C10M 175/005
Production of fats/fatty oils by extraction	C11B 1/10
Recovery/refining of essential oils/perfumes by solvent extraction	C11B 9/025
Extraction of hop using carbon dioxide	C12C 3/10
Extraction of metal compounds from ores or concentrates by wet processes	C22B 3/00
Treating radioactively contaminated material by solvent extraction	G21F 9/125

Informative references

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

Medicinal preparations containing material or reaction products thereof with undetermined constitution	A61K 35/00
Medicinal preparations of undetermined constitution containing material from algae, lichens, fungi or plants, or derivatives thereof, e.g. traditional herbal medicines	A61K 36/00
Processes of utilising sub-atmospheric or super-atmospheric pressure to effect chemical or physical change of matter; processes carried out under supercritical conditions	B01J 3/008
Cleaning using liquid gasses or supercritical fluids	B08B 7/0021
Cleaning electronic devices, e.g. semiconductors	C11D 2111/22
Preparing specimens for investigation: purifying, cleaning	G01N 1/34
Heating using microwaves	H05B 6/64

B01D 12/00

Displacing liquid, e.g. from wet solids or from dispersions of liquids or from solids in liquids, by means of another liquid

Relationships with other classification places

Displacing liquid normally aims at drying the solids and in this case should not be classified here, but rather in F26B 5/005 (see below).

References

Limiting references

This place does not cover:

Drying solid materials or objects by dipping them into or mixing them with a chemical liquid, e.g. organic; chemical, e.g. organic, dewatering aid	F26B 5/005

B01D 15/00

Separating processes involving the treatment of liquids with solid sorbents (using liquid sorbents B01D 11/00; ion exchange processes or materials, sorbent materials in general B01J, e.g. sorbents for chromatography B01J 20/281; for investigating or analysing materials G01N 30/00); Apparatus therefor

Definition statement

This place covers:

- Separating processes and apparatus for treating liquids involving non-selective adsorption with solid sorbents.
- Separating processes and apparatus for treating liquids involving moving solid sorbents.
- Separation processes and apparatus for treating liquids using selective adsorption, e.g. chromatography.
- Processes for separation by chromatography involving ion exchange materials and apparatus therefor.

References

Limiting references

This place does not cover:

Separating processes involving the treatment of liquids with liquid sorbents	B01D 11/00
Preparative gas chromatography	B01D 53/02
Separation of isotopes of the same chemical element	B01D 59/00
Sorbent materials	B01J 20/00- B01J 20/28097 ; B01J 20/30- B01J 20/3491
Sorbents used as stationary phases or packings for chromatography	B01J 20/281- B01J 20/292
Ion-exchange processes or materials	B01J 39/00- B01J 49/90
Ion-exchange materials used for chromatographic processes	B01J 39/26, B01J 41/20, B01J 45/00
Treatment processes of water by sorption	C02F 1/28- C02F 1/288
Treatment of water by ion-exchange	C02F 1/42
Investigative or analytical chromatography	G01N 30/00

Informative references

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

Modifying dairy products by dialysis, osmosis, filtration or ion-exchange	A23C 9/14
Treating blood or products derived there from	A61K 35/14, A61M 1/36
Medicinal preparations of undetermined constitution containing material from algae, lichens, fungi or plants, or derivatives thereof, e.g. traditional herbal medicines	A61K 36/00
Separation of optically active compounds	C07B 57/00
Purification of hydrocarbons by adsorption	C07C 7/12
Extraction, separation or purification of peptides by chromatography	C07K 1/16
Refining hydrocarbon oils with solid sorbents	C10G 25/00
Working-up of used lubricants with the use of adsorbents	C10M 175/0008
Refining fats or fatty oils by adsorption	C11B 3/10
Purification of alcoholic beverages with ion-exchange or adsorption materials	C12H 1/04
Separating or purifying microorganisms or enzymes	C12N 9/00
Processes for the isolation, preparation or purification of DNA or RNA	C12N 15/10
Purification of sugar juices using adsorption agents	C13B 20/12
Treating radioactively contaminated liquids by adsorption	G21F 9/12

Special rules of classification

- B01D 15/00 or B01D 15/02 are to be used for classifying non selective adsorption processes or apparatus other than chromatography involving the removal of a particular component from a liquid, e.g. removal of heavy metals such as mercury, sulphur containing compounds , PCB's from e.g. a hydrocarbon feedstock, a solvent, a caustic solution.
- Separation or purification processes by chromatography are classified in B01D 15/26 and subgroups according to the separation mechanism.
- Specific features related to chromatography processes or apparatus are classified in B01D 15/10 and subgroups.
- In order that group B01D 15/08 may provide a basis for a complete search with respect to chromatography in general, all subject matter of general interest is classified in this group even if it is classified primarily in the application-oriented groups, for example dairy products A23C 9/148, treatment of blood, e.g. A61M 1/36, optically active organic compounds C07B 57/00 or peptides C07K 1/16 (See Informative references).
- Other secondary non invention related information concerning chromatography can be classified with symbols B01D 15/08-B01D 15/428.
- Moreover, combination of these Indexing Code symbols should also be used when classifying documents relating to chromatographic processes involving several different type of interactions. For example, a multistep chromatographic process involving hydrophobic interaction chromatography followed by ion exchange chromatography should be classified in (B01D 15/327, B01D 15/361). A process using affinity chromatography followed by chromatography with an anion exchanger should be classified in (B01D 15/3804, B01D 15/363).

Glossary of terms

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

Adsorption	Separation process which involves the transfer and resulting equilibrium distribution of one or more solutes between a fluid phase and adsorbing particles.
Sorbent	A material which separates a constituent from a fluid mixture containing such constituents. The action in most instances is that of selective retention (i.e. the sorbent removes only the part of the fluid mixture for which it has the greatest affinity). The retained constituent cannot be removed by shaking, brushing or similar mechanical action, but generally can be removed by heating, pressure reduction, or use of a stripping or denuding fluid.
Chromatography	A process in which a liquid is flowed along a linear path comprising a sorbent, with which the liquid competes in affinity for a constituent of the liquid. The constituent is sorbed from the moving liquid by the relatively immobile sorbent and re-dissolved by a later passing portion of the liquid until an equilibrium of the sorbing-dissolving step is set up causing the constituent to concentrate in a specific volume of the sorbent and to move along the path of the liquid at a rate slower than such liquid.
Adsorption chromatography:	Separation is based mainly on the differences between the adsorption affinities of the sample components for the surface of an active solid.
Partition chromatography	Separation is based mainly on differences between the solubilities of the sample components in the stationary phase (gas chromatography) or on differences between the solubilities of the components in the mobile and stationary phases (liquid chromatography).
Exclusion chromatography	Separation is based mainly on exclusion effects, such as differences in molecular size (size- exclusion chromatography) and/or shape or charge.
Affinity chromatography	The particular variant of chromatography in which the unique biological specificity of the analyte and ligand interaction is utilised in the separation.
Bonded phase	A stationary phase which is covalently bonded to the support particles or to the inside wall of the column tubing.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

HPLC	High performance liquid chromatography, sometimes also referred to as high pressure liquid chromatography.

B01D 17/00

Separation of liquids, not provided for elsewhere, e.g. by thermal diffusion (devices for separating or removing fatty or oily substances or similar floating material from water, waste water, or sewage C02F 1/40; cleaning or keeping clear the surface of open water from oil or like materials E02B 15/04; arrangements for separating lubricants from refrigerants F25B 43/02)

Definition statement

This place covers:

Documents concerning separation of liquids not provided elsewhere should be given a group in B01D 17/00. In case of specific application, the document should be given a group in the relevant field only.

References

Informative references

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

Liquid solid separation	B01D 21/00
Filtration	B01D 37/00
Blood treatment	A61M
For cyclones	B04C
Waste water treatment	C02F 1/40
Petrol separation	C10G 33/00
For cleaning open water from oil	E02B 15/04
Fat separation	E03F 5/14
Drilling or well fluid separation	E21B
Separating lubricants from refrigerants	F25B 43/02
Drying solid	F26B 3/00

Special rules of classification

In the case of a document in the specific field of water treatment, the document should be given a the classification symbol B01D 17/00.

The wording of the title of the group could allow classification of documents for separation of miscible liquids. In practice only documents with separation of emulsion is classified in this group. Separation of miscible liquids should be classified in the relevant group(s) e.g. evaporation (B01D 1/00), distillation (B01D 3/00), permeation (B01D 61/00), filtration (B01D 39/00).

This group used combination of classes. This has been abandoned but reclassification is currently done.

If the phase to be separated comprises also solids (liquid-liquid-solid stream) and the separation step separates the three phases in three streams, then it should be classified in the relevant group in B01D 21/00.

B01D 17/0205

{by gas bubbles or moving solids}

References

Informative references

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

Flotation	B03D

B01D 17/0217

{by centrifugal force}

References

Informative references

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

Cyclones	B04C

B01D 17/045

{with coalescers}

Definition statement

This place covers:

Devices (or processes) with some grid for increasing coalescing of phases. The grid can have lipophilic or lipophobic composition.

B01D 17/047

{with separation aids}

Definition statement

This place covers:

Addition of a chemical agent to promote the separation of the phases.

B01D 17/048

{by changing the state of aggregation}

Definition statement

This place covers:

Documents describing inversion of phases (O/W to W/O and reciprocally) should be classified in this group

B01D 17/06

Separation of liquids from each other by electricity

References

Informative references

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

Magnetic or electrostatic separation	B03C
Microwave devices	H05B

B01D 19/00

Degasification of liquids

Definition statement

This place covers:

Documents involving degassing of a liquid should be given a group in this field. The constituent that is removed from the liquid is initially present in the liquid as a gas, e.g. air, oxygen, nitrogen, carbon dioxide, etc.

Degassing includes defoaming (B01D 19/02) and also stripping a gas from a liquid that was used in absorption of a gas from another gas (B01D 19/00).

Vaporising a liquid mixed in another liquid and then removing the vaporised liquid (now a gas) is not removing a constituent initially present as a gas from a liquid.

Degassing is B01D 19/00 and separation by evaporation is B01D 1/00

References

Informative references

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

Filtration	B01D 37/00
Blood treatment	A61M
Cyclones	B04C
Ink degassing	B41J 2/19

Special rules of classification

In practice, all documents about degassing of ink(s) are classified only in B41J 2/19.

B01D 19/0036

{Flash degasification (the other groups take precedence)}

Definition statement

This place covers:

Documents involving degassing by vacuum should be given this group.

The other groups in B01D 19/00 take precedence

B01D 19/0057

{the centrifugal movement being caused by a vortex, e.g. using a cyclone, or by a tangential inlet}

Definition statement

This place covers:

Degasification of liquids by modifying the liquid flow in vessels in which the centrifugal movement is caused by a vortex

References

Informative references

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

Cyclones	B04C

B01D 19/0063

{Regulation, control including valves and floats (for construction and details of valves F16K)}

References

Informative references

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

For detail of valves see	F16K

B01D 19/0084

{using an electric current}

References

Informative references

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

Electrostatic separation	B03C
Microwave devices	H05B

B01D 19/0089

{using a magnetic field (magnetic separation in general B03C 1/00)}

References

Informative references

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

Magnetic or electrostatic separation	B03C
Magnetic separation in general	B03C 1/00

Microwave devices	H05B

B01D 19/0094

{by using a vortex, cavitation}

Definition statement

This place covers:

Degasification of liquids by a method not covered by groups B01D 19/0005 - B01D 19/0042 and using a vortex

References

Informative references

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

Cyclones	B04C
Ultrasonic devices	B06B 3/00

B01D 19/02

Foam dispersion or prevention (during boiling B01B 1/02; during fermentation C12)

References

Informative references

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

Foam dispersion or prevention during boiling without separation	B01B 1/02
Foam dispersion or prevention during fermentation	C12C, C12G

B01D 21/00

Separation of suspended solid particles from liquids by sedimentation ({separation of ores or the like by sedimentation B03B 5/48 - B03B 5/60} ; differential sedimentation B03D 3/00; {purification of water, waste water, sewage or sludge C02F, e.g.} devices for separating or removing fatty or oily substances or similar floating material from water, waste water or sewage C02F 1/40)

Definition statement

This place covers:

- Devices for the separation of suspended solid particles from liquids by sedimentation in general, i.e., if the application of the device is subordinate.
- Devices for specific applications if there is a strong emphasis on the structural details of the device or if parts of the device are of general interest in the field of sedimentation. For example, a sedimentation device for waste water treatment, also classified in C02F, which discloses e.g. certain details of the scraper, should also be classified in B01D 21/00.

Relationships with other classification places

Documents which are primordially directed to the fields of waste water treatment (C02F), sewers (E03F) or other technical fields relating to the application of the apparatuses should only be classified in B01D 21/00 if the device disclosed therein shows structural details of general interest in B01D 21/00. Documents disclosing the mere presence of a sedimentation device, e.g. as a schematic block in a process flow diagram, as a schematic drawing after a sand filter etc., should not be classified in B01D 21/00. Instead, an appropriate index from the indexing scheme corresponding to B01D 21/00 should be assigned.

Documents disclosing a device relating to the technical the fields of the separation with centrifuges (B04B), the separation with free vortices, e.g. cyclones (B04C), the electric and magnetic separation (B03C), the filtration (B01D 24/00 - B01D 41/00), the flotation (B03D 1/00) or the differential sedimentation (B03D 3/00) should only be classified in B01D 21/00 if the general aspects of the disclosed device relate to B01D 21/00 and if it is deemed unjustified to assign a classification symbol in the respective other fields. This is normally the case if the disclosure lacks sufficient structural details to justify a classification in the above referred technical fields be assigned or because the feature relates to a side aspect. Examples for side aspects are the rough pre-filtration of the liquid to be clarified by sedimentation, the mere presence of a magnetic separator at an outlet of the sedimentation tank, or the introduction of gas bubbles in a limited region of the sedimentation device, e.g. close to the discharge opening for the clarified liquid.

References

Limiting references

This place does not cover:

Separation of liquids by sedimentation or centrifugal forces	B01D 17/00
Washing granular materials; Separating solids from solids by wet methods e.g. sink-float separation: separating the fractions of a mixture of solids with a liquid having a density in between the fractions	B03B
Magnetic or electrostatic separation devices	B03C
Flotation devices (also reactor-separator types)	B03D 1/00
Differential sedimentation: separating a mixture into its fractions by making use of a difference in sedimentation velocity, e.g. density gradient centrifugation	B03D 3/00
Centrifuges and structural details thereof	B04B
Cyclones and structural details thereof	B04C
Treatment of water, waste water, sewage, or sludge when no structural details of general interest are disclosed.	C02F

Informative references

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

Filters making use of electricity or magnetism	B01D 35/05
Treating manure	A01C 3/00
Devices used for fish ponds	A01K 61/00 and A01K 63/00
Treatment of water for aquaria	A01K 63/04
Processing slaughtering residues	A22B 5/00
Clarifying non-alcoholic beverages	A23L 2/70

Sedimentation devices for dental use	A61C 17/065
Sedimentation devices for medical purposes, body liquids	A61M 1/3693
Chemical or physical processes	B01J
Paint sludge treatment	B05B 14/462
Methods or apparatus specially adapted for transmitting mechanical vibrations	B06B 3/00
Removing chips from sawing machines	B23D 59/00
Removing chips from machine tools	B23Q 11/00
Ink filters for printers	B41J 2/17563
Barges for collection of pollution from open water	B63B 35/32
Fluidising means for discharging large containers	B65D 88/72
Treatment of water, waste water, sewage, or sludge when structural details of general interest are disclosed.	C02F
Refining hydrocarbon oils by centrifugation	C10G 31/10
Working-up lubricants	C10M 175/00
Clarifying alcoholic beverages	C12H 1/06
Apparatus for microbiology	C12M 1/00
Cleaning or keeping clear the surface of open water; Apparatus therefore	E02B 15/00
Kitchen sinks	E03C 1/00
Stormwater treatment	E03F 5/00
Other installations or implements for operating sewer systems (cleaning, emptying, maintenance)	E03F 7/00
Sludge tanker	E03F 7/10
Working-up Building material	E04G 21/00
Treatment of water for swimming pools	E04H 4/1209
Sedimentation devices used in drilling boreholes	E21B 21/00
Separation of well effluents	E21B 43/34
Measuring volume flow, mass flow or liquid level (e.g. indicating or measuring liquid level G01F 23/00)	G01F
Investigating and analysing materials by determining their chemical or physical properties (e.g. density G01N 9/00)	G01N
Control of non-electrical variables	G05D

Special rules of classification

In the absence of an indication to the contrary, classification is made for each technical feature shown in the document.

B01D 24/00

Filters comprising loose filtering material, i.e. filtering material without any binder between the individual particles or fibres thereof (B01D 27/02 takes precedence)

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Mechanical filtration without reaction, absorption or adsorption.

References

Limiting references

This place does not cover:

Cartridge filters of the throw-away type with cartridges made from a mass of loose material	B01D 27/02

Informative references

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

Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Chemical or physical processes	B01J
Treatment of water, waste water, sewage, or sludge only when no mechanical filtration is involved	C02F

B01D 24/001

{Making filter elements not provided for elsewhere}

References

Informative references

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

Making filter elements for filters formed by clamping together several filtering elements or parts	B01D 25/001
Making filter elements for cartridge filters of the throw-away type	B01D 27/005
Making filtering elements for other filters with filtering elements stationary during filtration	B01D 29/012
Making bag, cage, hose, tube, sleeve or like filtering elements	B01D 29/111

B01D 24/005

{Filters being divided into a plurality of cells or compartments (B01D 24/004 takes precedence)}

References

Limiting references

This place does not cover:

Arranged concentrically or coaxially	B01D 24/004

B01D 24/04

the filtering material being clamped between pervious fixed walls (B01D 24/10, B01D 24/20 take precedence)

References

Limiting references

This place does not cover:

The filtering material being held in a closed container	B01D 24/10
The filtering material being held in an open container	B01D 24/20

B01D 24/12

Downward filtration, the filtering material being supported by pervious surfaces (B01D 24/18 takes precedence)

References

Limiting references

This place does not cover:

Combined upward and downward filtration	B01D 24/18

B01D 24/14

Downward filtration, the container having distribution or collection headers or pervious conduits (B01D 24/18 takes precedence)

References

Limiting references

This place does not cover:

Combined upward and downward filtration	B01D 24/18

B01D 24/16

Upward filtration (B01D 24/18 takes precedence)

References

Limiting references

This place does not cover:

Combined upward and downward filtration	B01D 24/18

B01D 24/405

{Special treatment of the feed stream before contacting the filtering material, e.g. cutting (B01D 35/24, B01D 37/02, B01D 37/03 take precedence)}

References

Limiting references

This place does not cover:

Providing loose granular material to scratch the filters clean	B01D 35/24
Precoating the filter medium; Addition of filter aids to the liquid being filtered	B01D 37/02
Using flocculating agents	B01D 37/03

B01D 24/46

Regenerating the filtering material in the filter (B01D 24/44 takes precedence)

References

Limiting references

This place does not cover:

For discharging filter cake	B01D 24/44

B01D 24/4605

{by scrapers, brushes, nozzles or the like placed on the cake-side of the stationary filtering material and only contacting the external layer (B01D 24/4631 takes precedence)}

References

Limiting references

This place does not cover:

Counter-current flushing	B01D 24/4631

B01D 24/4668

{by moving the filtering element (B01D 24/4605 and B01D 24/4631 take precedence)}

References

Limiting references

This place does not cover:

By scrapers, brushes, nozzles or the like placed on the cake-side of the stationary filtering material and only contacting the external layer	B01D 24/4605
Counter-current flushing	B01D 24/4631

B01D 24/4846

{Retarding cake deposition on the filter during the filtration period, e.g. using stirrers (B01D 24/407 takes precedence)}

References

Limiting references

This place does not cover:

Provoking a tangential stream	B01D 24/407

B01D 24/4876

{in which the filtering elements are moved between filtering operations; particular measures for removing or replacing the filtering elements (B01D 24/46, B01D 24/4807 take precedence)}

References

Limiting references

This place does not cover:

Regenerating the filtering material in the filter	B01D 24/46
Handling the filter cake for purposes other than regenerating	B01D 24/4807

B01D 25/00

Filters formed by clamping together several filtering elements or parts of such elements (disc filters B01D 29/39)

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Disc filters	B01D 29/39

Informative references

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

Edge filtering elements, i.e. using impervious surfaces	B01D 29/44, B01D 29/46, B01D 29/48
Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Chemical or physical processes	B01J
Treatment of water, waste water, sewage, or sludge only when no mechanical filtration is involved	C02F

B01D 25/001

{Making filtering elements not provided for elsewhere}

References

Informative references

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

Making filter elements for filters comprising loose filtering material	B01D 24/001
Making filter elements for cartridge filters of the throw-away type	B01D 27/005
Making filtering elements for other filters with filtering elements stationary during filtration	B01D 29/012
Making bag, cage, hose, tube, sleeve or like filtering elements	B01D 29/111

B01D 25/002

{Clamping devices (B01D 25/12 and subgroups take precedence)}

References

Limiting references

This place does not cover:

Filter presses	B01D 25/12

B01D 25/127

with one or more movable filter bands arranged to be clamped between the press plates or between a plate and a frame during filtration, e.g. zigzag endless filter bands (B01D 25/172, B01D 25/176, B01D 25/19 take precedence)

References

Limiting references

This place does not cover:

Plate spreading means	B01D 25/172
Attaching the filter elements to the filter press plates	B01D 25/176
Clamping means for closing the filter press	B01D 25/19

B01D 25/21

Plate and frame presses (B01D 25/172, B01D 25/176, B01D 25/19 take precedence)

References

Limiting references

This place does not cover:

Plate spreading means	B01D 25/172
Attaching the filter elements to the filter press plates	B01D 25/176
Clamping means for closing the filter press	B01D 25/19

B01D 25/307

{with internal recirculation through the filtering element (B01D 37/02 takes precedence)}

References

Limiting references

This place does not cover:

Precoating the filter medium; Addition of filter aids to the liquid being filtered	B01D 37/02

B01D 25/34

by moving, {e.g. rotating,} the filter elements {(B01D 25/172, B01D 25/19 take precedence)}

References

Limiting references

This place does not cover:

Plate spreading means	B01D 25/172
Clamping means for closing the filter press	B01D 25/19

B01D 25/343

{Particular measures for replacing or isolating one or more filtering elements; Transport systems for the filtering apparatus (B01D 25/28, B01D 25/32, B01D 25/346, B01D 25/36 take precedence)}

References

Limiting references

This place does not cover:

Leaching or washing filter cakes in the filter	B01D 25/28
Removal of filter cakes	B01D 25/32
By vibration	B01D 25/346
By centrifugal force	B01D 25/36

B01D 27/00

Cartridge filters of the throw-away type

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Informative references

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

Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Chemical or physical processes	B01J
Treatment of water, waste water, sewage, or sludge only when no mechanical filtration is involved	C02F

B01D 27/005

{Making filter elements not provided for elsewhere}

References

Informative references

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

Making filter elements for filters comprising loose filtering material	B01D 24/001
Making filter elements for filters formed by clamping together several filtering elements or parts	B01D 25/001
Making filtering elements for other filters with filtering elements stationary during filtration	B01D 29/012
Making bag, cage, hose, tube, sleeve or like filtering elements	B01D 29/111

B01D 29/00

Filters with filtering elements stationary during filtration, e.g. pressure or suction filters, not covered by groups B01D 24/00 - B01D 27/00; Filtering elements therefor

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Mechanical filtration without reaction, absorption or adsorption.

References

Informative references

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

Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Membranes	B01D 63/00 - B01D 71/00
Filters for aquaria	A01K 63/045
Filters or strainers for coffee or tea makers	A47J 31/06
Deep fat fryers with means for filtering the frying liquid	A47J 37/1223
Filters for washing or rinsing machines for crockery or tableware	A47L 15/4202
Filters for dental appliances	A61C 17/065
Filter for medical purposes, body liquids	A61M 1/79
Chemical or physical processes	B01J
Filters for laboratory use	B01L
Paint filters	B05B 15/00
Separating solids from solids by sieving, screening	B07B
Filters for machine tools	B23Q 11/1069
Filters for extrusion moulding	B29C 48/69

Ink filters for printers	B41J 2/17563
Treatment of water, waste water, sewage, or sludge	C02F
Filters for molten metals	C22B 9/023
Filters for washing machines (laundering)	D06F 39/10
Filters in sewerage structures	E03F 5/00
Filters for swimming pools	E04H 4/1209
Filters used in drilling boreholes	E21B 21/00
Filters for oil used for lubricating machines	F01M 11/03
Filters for liquid fuel used in combustion engines	F02M 37/22
Filters for refrigeration machines, plants or systems	F25B 43/003

B01D 29/0093

{Making filtering elements not provided for elsewhere}

References

Informative references

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

Making filter elements for filters comprising loose filtering material	B01D 24/001
Making filter elements for filters formed by clamping together several filtering elements or parts	B01D 25/001
Making filter elements for cartridge filters of the throw-away type	B01D 27/005

B01D 29/071

{with curved filtering elements (B01D 29/072, B01D 29/073 take precedence)}

References

Limiting references

This place does not cover:

Ring shaped	B01D 29/072
With wound filtering sheets	B01D 29/073

B01D 29/085

Funnel filters; Holders therefor

References

Informative references

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

Funnels in general	B67C

B01D 29/09

with filtering bands, e.g. movable between filtering operations

References

Informative references

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

With one or more movable filter bands arranged to be clamped between the press plates or between a plate and a frame during filtration	B01D 25/127

B01D 29/114

{arranged for inward flow filtration (B01D 29/15, B01D 29/33 take precedence)}

References

Limiting references

This place does not cover:

Arranged for inward filtration	B01D 29/15
Arranged for inward filtration	B01D 29/33

B01D 29/117

{arranged for outward flow filtration (B01D 29/23, B01D 29/35 take precedence)}

References

Limiting references

This place does not cover:

Arranged for outward filtration	B01D 29/23
Arranged for outward filtration	B01D 29/35

B01D 29/50

with multiple filtering elements, characterised by their mutual disposition (B01D 29/39 takes precedence)

References

Limiting references

This place does not cover:

With hollow discs side by side on, or around , one or more tubes	B01D 29/39

B01D 29/60

integrally combined with devices for controlling the filtration

References

Informative references

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

Devices for taking out of action one or more units of multi-unit filters	B01D 35/12
Safety devices specially adapted for filtration	B01D 35/14
Controlling filtration processes	B01D 37/04

B01D 29/76

Handling the filter cake in the filter for purposes other than for regenerating (B01D 29/94 takes precedence)

References

Limiting references

This place does not cover:

For discharging the filter cake	B01D 29/94

B01D 29/828

{using screws (B01D 29/6476 takes precedence)}

References

Limiting references

This place does not cover:

With a rotary movement with respect to the filtering element	B01D 29/6476

B01D 29/86

Retarding cake deposition on the filter during the filtration period, e.g. using stirrers {(B01D 29/908 takes precedence)}

References

Limiting references

This place does not cover:

Provoking a tangential stream	B01D 29/908

B01D 29/885

{with internal recirculation through the filtering element (B01D 37/02 takes precedence)}

References

Limiting references

This place does not cover:

Precoating the filter medium ; addition of filter aids to the liquid being filtered	B01D 37/02

B01D 29/904

{directing the mixture to be filtered on the filtering element in a manner to clean the filter continuously (B01D 29/115, B01D 29/118, B01D 29/17, B01D 29/25, B01D 29/336, B01D 29/356, B01D 29/902, B01D 29/908 take precedence)}

References

Limiting references

This place does not cover:

Open-ended, the arrival of the mixture to be filtered and the discharge of the concentrated mixture are situated on both opposite sides of the filtering element	B01D 29/115
Open-ended	B01D 29/118
Open-ended, the arrival of the mixture to be filtered and the discharge of the concentrated mixture are situated on both opposite sides of the filtering element	B01D 29/17
Open-ended, the arrival of the mixture to be filtered and the discharge of the concentrated mixture are situated on both opposite sides of the filtering element	B01D 29/25
Open-ended, the arrival of the mixture to be filtered and the discharge of the concentrated mixture are situated on both opposite sides of the filtering element	B01D 29/336
Open-ended, the arrival of the mixture to be filtered and the discharge of the concentrated mixture are situated on both opposite sides of the filtering element	B01D 29/356
Containing liquid displacement elements or cores	B01D 29/902
Provoking a tangential stream	B01D 29/908

B01D 29/906

{Special treatment of the feed stream before contacting the filtering element, e.g. cutting (B01D 35/24, B01D 37/02, B01D 37/03 take precedence)}

References

Limiting references

This place does not cover:

Providing loose granular material to scratch the filters clean	B01D 35/24
Precoating the filter medium; Addition of filter aids to the liquid being filtered	B01D 37/02
Using flocculating agents	B01D 37/03

B01D 29/96

in which the filtering elements are moved between filtering operations; Particular measures for removing or replacing the filtering elements; Transport systems for filters (B01D 29/09, B01D 29/70 take precedence)

References

Limiting references

This place does not cover:

With filtering bands, e.g. movable between filtering operations	B01D 29/09
By forces created by movement of the filter element	B01D 29/70

B01D 33/00

Filters with filtering elements which move during the filtering operation (filters comprising loose filtering material moving or fluidised during filtration B01D 24/28 - B01D 24/36; centrifuges B04B)

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved.

References

Limiting references

This place does not cover:

Filters comprising loose filtering material moving or fluidised during filtration	B01D 24/28 - B01D 24/36
Centrifuges	B04B

Informative references

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

Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Membranes	B01D 63/00 - B01D 71/00
Filters for aquaria	A01K 63/045
Deep fat fryers with means for filtering the frying liquid	A47J 37/1223
Filters for washing or rinsing machines for crockery or tableware	A47L 15/4202
Filters for dental appliances	A61C 17/065
Filter for medical purposes, body liquids	A61M 1/79
Chemical or physical processes	B01J
Filters for laboratory use	B01L
Paint filters	B05B 15/00
Separating solids from solids by sieving, screening	B07B
Filters for machine tools	B23Q 11/1069
Filters for extrusion molding	B29C 48/69
Treatment of water, waste water, sewage, or sludge	C02F
Filters for molten metals	C22B 9/023
Filters for washing machines (Laundering)	D06F 39/10
Purification of the paper pulp suspension by mechanical means; Apparatus therefor	D21D 5/00
Filters for swimming pools	E04H 4/1209
Filters used in drilling boreholes	E21B 21/00
Filters for refrigeration machines, plants or systems	F25B 43/003

B01D 33/01

with translationally moving filtering elements, e.g. pistons (B01D 33/04 - B01D 33/327 take precedence)

References

Limiting references

This place does not cover:

with filtering bands or the likes supported on cylinders which are impervious for filtering	B01D 33/04
Tipping buckets, trays or like sections	B01D 33/327

B01D 33/06

with rotary cylindrical filtering surfaces, e.g. hollow drums (B01D 33/044 takes precedence {; rotating drums for paper-making D21B})

References

Limiting references

This place does not cover:

With filtering bands or the like supported on cylinders which are pervious for filtering	B01D 33/044

B01D 33/29

the movement of the filter elements being a combination of movements (B01D 33/19 takes precedence)

References

Limiting references

This place does not cover:

The table surface being divided in successively tilted sectors or cells	B01D 33/19

B01D 33/35

with multiple filtering elements characterised by their mutual disposition ({B01D 33/042} , B01D 33/21 take precedence)

References

Limiting references

This place does not cover:

Whereby the filtration and squeezing-out take place between at least two filtering bands	B01D 33/042
With hollow filtering discs transversely mounted on a hollow rotary shaft	B01D 33/21

B01D 33/46

by scrapers, brushes {nozzles} or the like acting on the cake-side of the filtering element {(B01D 33/503 takes precedence)}

References

Limiting references

This place does not cover:

The backwash arms, shoes acting on the cake side	B01D 33/503

B01D 33/58

Handling the filter cake in the filter for purposes other than for regenerating (B01D 33/76 takes precedence){the filter cake remaining on the filtering element}

References

Limiting references

This place does not cover:

For discharging the filter cake	B01D 33/76

B01D 33/70

having feed or discharge devices (B01D 33/82 takes precedence)

References

Limiting references

This place does not cover:

Means for pressure distribution	B01D 33/82

B01D 33/725

{Special treatment of the feed stream before contacting the filtering element, e.g. cutting (B01D 35/24, B01D 37/02, B01D 37/03 take precedence)}

References

Limiting references

This place does not cover:

Providing loose granular material to scratch the filters clean	B01D 35/24
Precoating the filter medium; Addition of filter aids to the liquid being filtered	B01D 37/02
Using flocculating agents	B01D 37/03

B01D 33/803

{in which the filtering elements are moved between filtering operations (B01D 33/52 takes precedence); Particular measures for removing or replacing the filtering elements; Transport systems for filters}

References

Limiting references

This place does not cover:

By forces created by movement of the filter element	B01D 33/52

B01D 35/00

Filtering devices having features not specifically covered by groups B01D 24/00 - B01D 33/00, or for applications not specifically covered by groups B01D 24/00 - B01D 33/00; Auxiliary devices for filtration; Filter housing constructions

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Mechanical filtration without reaction, absorption or adsorption.

References

Informative references

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

Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Membranes	B01D 63/00 - B01D 71/00
Filters for aquaria	A01K 63/045
Filters or strainers for coffee or tea makers	A47J 31/06
Deep fat fryers with means for filtering the frying liquid	A47J 37/1223
Filters for washing or rinsing machines for crockery or tableware	A47L 15/4202
Filters for dental appliances	A61C 17/065
Filter for medical purposes, body liquids	A61M 1/79
Chemical or physical processes	B01J
Filters for laboratory use	B01L
Magnetic separation of solid materials from liquids	B03C 5/00
Paint filters	B05B 15/00
Separating solids from solids by sieving, screening	B07B
Filters for extrusion molding	B29C 48/69
Ink filters for printers	B41J 2/17563
Treatment of water, waste water, sewage, or sludge only when no mechanical filtration is involved	C02F
Filters for molten metals	C22B 9/023
Filters for washing machines (laundering)	D06F 39/10
Filters in sewerage structures	E03F 5/00
Filters used in drilling boreholes	E21B 21/00
Filters for liquid fuel with pumps	F02M 37/14
Filters for liquid fuel with heating means	F02M 37/30
Filtering elements installed in valves	F16K
Filters for refrigeration machines, plants or systems	F25B 43/003

B01D 35/005

{Filters specially adapted for use in internal-combustion engine lubrication or fuel systems}

References

Informative references

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

Internal-combustion engine lubricating systems	F01M
Lubrication in general	F16N

B01D 35/02

Filters adapted for location in special places, e.g. pipe-lines, pumps, stop-cocks, (B01D 35/05 takes precedence; {water pipe system filters E03B 3/18, E03B 7/07; dirt catchers in sewers E03F; filters or strainers for pipe-lines in general B08B, E03F; object or dirt catching devices in sinks or the like E03C 1/26; suction strainers or filters for pumps F04B 53/005, F04D 29/70})

References

Limiting references

This place does not cover:

Floating filters	B01D 35/05

B01D 35/027

rigidly mounted in or on tanks or reservoirs (B01D 35/04 takes precedence)

References

Limiting references

This place does not cover:

Plug, tap or cock filters	B01D 35/04

B01D 35/22

Directing the mixture to be filtered on to the filters in a manner to clean the filters {(B01D 29/904 takes precedence)}

References

Limiting references

This place does not cover:

Directing the mixture to be filtered on the filtering element in a manner to clean the filter continuously	B01D 29/904

B01D 35/301

{Constructions of two or more housings (B01D 35/12 takes precedence)}

References

Limiting references

This place does not cover:

Devices for taking out of action one or more units of multi-unit filters	B01D 35/12

B01D 35/34

open-topped (B01D 35/31 takes precedence)

References

Limiting references

This place does not cover:

Including arrangements for environmental protection	B01D 35/31

B01D 36/00

Filter circuits or combinations of filters with other separating devices

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved.

References

Informative references

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

Gas Filters	B01D 46/00
Separation of gases or vapours	B01D 53/00
Membranes	B01D 63/00 - B01D 71/00
Filters or strainers for coffee or tea makers	A47J 31/06
Deep fat fryers with means for filtering the frying liquid	A47J 37/1223
Filters for washing or rinsing machines for crockery or tableware	A47L 15/4202
Filters for dental appliances	A61C 17/065
Filter for medical purposes, body liquids	A61M 1/79
Chemical or physical processes	B01J
Paint filters	B05B 15/00
Separating solids from solids by sieving, screening	B07B
Filters for extrusion molding	B29C 48/69
Ink filters for printers	B41J 2/17563

Treatment of water, waste water, sewage, or sludge	C02F
Filters for molten metals	C22B 9/023
Filters for washing machines (laundering)	D06F 39/10
Filters for sewerage structures	E03F 5/00
Filters used in drilling boreholes	E21B 21/00
Liquid fuel filters with water separation means	F02M 37/24
Filters for refrigeration machines , plants or systems	F25B 43/003

B01D 36/003

{Filters in combination with devices for the removal of liquids (B01D 35/185 takes precedence)}

References

Limiting references

This place does not cover:

Comprising a vapourizing unit	B01D 35/185

B01D 36/02

Combinations of filters of different kinds (B01D 29/50, B01D 33/35 take precedence)

References

Limiting references

This place does not cover:

With multiple filtering elements, characterized by their mutual disposition	B01D 29/50
With multiple filtering elements, characterized by their mutual disposition	B01D 33/35

B01D 37/00

Processes of filtration (processes specially adapted for filtering gases B01D 46/00)

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved.

References

Limiting references

This place does not cover:

Gas Filters	B01D 46/00

Informative references

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

Separation of gases or vapours	B01D 53/00
Membranes	B01D 63/00 - B01D 71/00
Filters or strainers for coffee or tea makers	A47J 31/06
Deep fat fryers with means for filtering the frying liquid	A47J 37/1223
Filters for washing or rinsing machines for crockery or tableware	A47L 15/4202
Filters for dental use	A61C 17/065
Filter for medical purposes, body liquids	A61M 1/79
Chemical or physical processes	B01J
Paint filters	B05B 15/00
Separating solids from solids by sieving, screening	B07B
Filters for extrusion molding	B29C 48/69
Ink filters for printers	B41J 2/17563
Treatment of water, waste water, sewage, or sludge	C02F
Treatment of oil (motor oil systems)	C10M 175/0091
Filters for molten metals	C22B 9/023
Filters for washing machines (laundering)	D06F 39/10
Filters for sewerage structures	E03F 5/00
Filters used in drilling boreholes	E21B 21/00
Filters for refrigeration machines , plants or systems	F25B 43/003

B01D 39/00

Filtering material for liquid or gaseous fluids

Definition statement

This place covers:

Mainly materials for mechanical filtration, however materials with additives e.g. adsorbents are also included. Also composite filtering materials with combined activity (mechanical filtration, adsorption, antimicrobial action etc. are also under the present group.

B01D 39/08

Filter cloth, i.e. woven, knitted or interlaced material (metallic B01D 39/10)

References

Limiting references

This place does not cover:

Metallic material	B01D 39/10, B01D 39/12

B01D 39/14

Other self-supporting filtering material {; Other filtering material (non-woven fabrics in general D04H 3/00)}

Definition statement

This place covers:

This subgroup covers non-woven, foamy, porous films and bonded particulate filter materials.

References

Limiting references

This place does not cover:

Loose filtering material	B01D 39/02
Filter cloths	B01D 39/08
Metallic screens, expanded films	B01D 39/10, B01D 39/12

Informative references

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

Non-woven fabrics in general	D04H 3/00

B01D 39/1607

{the material being fibrous (B01D 39/18 takes precedence)}

References

Limiting references

This place does not cover:

Fibrous cellulosic material	B01D 39/18

B01D 39/18

the material being cellulose or derivatives thereof ({cork or peat B01D 39/1646} ; making filter paper D21F 11/14)

References

Informative references

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

Cork or peat particulate filters	B01D 39/1646
Making filter paper	D21F 11/14

B01D 39/20

of inorganic material, e.g. asbestos paper, metallic filtering material of non-woven wires (porous ceramic material {C04B 38/00} ; sintering metals C22C 1/04; {making porous sintered metal bodies B22F 3/10, honeycomb filters B01D 46/2418, materials used for filtering exhaust gases of an internal combustion engine F01N 3/022, ceramic honeycomb structures C04B 38/0006})

References

Informative references

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

Honeycomb filters	B01D 46/2418
Making porous sintered bodies	B22F 3/10
Ceramic honeycomb structure	C04B 38/0006
Honeycomb filters used for filtering exhaust gases of an internal combustion engine	F01N 3/022

B01D 39/2055

{Carbonaceous material (solid sorbent compositions comprising free carbon B01J 20/20)}

References

Informative references

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

Solid sorbent compositions comprising free carbon	B01J 20/20

Special rules of classification

- Reclassification of the documents of this subgroup into its subgroups B01D 39/2058, B01D 39/2062 and B01D 39/2065 is pending

B01D 41/00

Regeneration of the filtering material or filter elements outside the filter for liquid or gaseous fluids

References

Limiting references

This place does not cover:

Regeneration of liquid filters under:	B01D 24/00, B01D 25/00, B01D 29/00, B01D 33/00
Regeneration of gas filters under:	B01D 46/00

B01D 43/00

Separating particles from liquids, or liquids from solids, otherwise than by sedimentation or filtration (flotation processes B03D 1/00; drying solid materials or objects F26B)

References

Limiting references

This place does not cover:

Separation of immiscible liquids	B01D 17/00
Sedimentation or flotation	B01D 21/00, B03D 1/00
Liquid filtration	B01D 24/00 - B01D 33/00
Gas filtration	B01D 46/00

B01D 45/00

Separating dispersed particles from gases or vapours by gravity, inertia, or centrifugal forces

Definition statement

This place covers:

- Separators used for filtering particles out of a gas or vapour.
- Only mechanical separation is taking place, no reaction, no absorption or adsorption is involved

References

Informative references

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

Centrifuges	B04B
Cyclones	B04C

B01D 45/04

by utilising inertia (B01D 45/12 takes precedence)

References

Limiting references

This place does not cover:

Separating dispersed particles by centrifugal forces	B01D 45/12

B01D 46/00

Filters or filtering processes specially modified for separating dispersed particles from gases or vapours (filtering elements B01D 24/00-B01D 35/00; filtering material B01D 39/00; their regeneration outside the filters B01D 41/00)

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Filtering elements	B01D 24/00 - B01D 35/00
Filter material	B01D 39/00
Regeneration of filtering material or filter elements outside the filter for liquid or gaseous fluids	B01D 41/00

Informative references

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

Separating particles using centrifugal forces or inertia	B01D 45/00
Separation of gases or vapours	B01D 53/00
Membranes	B01D 63/00 - B01D 71/00
Suction cleaners having filters	A47L 9/10
Sterilisation of air	A61L 9/00
Sterilization of air by filtration	A61L 9/16
Chemical or physical processes	B01J
Filters for laboratory use	B01L
Magnetic filters	B03C 1/00
Electrostatic filters	B03C 3/00
Centrifuges	B04B
Cyclones	B04C
Separating solids from solids by sieving, screening	B07B
Air conditioning systems for vehicles including filters	B60H 3/06
Ceramic honeycomb structures per se	C04B 38/0006
Exhaust filters for internal combustion engines	F01N 3/021
Intake systems for internal combustion engines	F02M 35/024
Filters for kitchen	F24C 15/2035
Air conditioning systems comprising filters	F24F 8/10

B01D 46/0005

{Mounting of filtering elements within casings, housings or frames (B01D 46/2422 takes precedence)}

References

Limiting references

This place does not cover:

Mounting of honeycomb bodies	B01D 46/2422

B01D 46/0046

{provoking a tangential stream (B01D 46/0045 takes precedence)}

References

Limiting references

This place does not cover:

Flow guiding by feed devices using vanes	B01D 46/0045

B01D 46/0052

{with filtering elements moving during filtering operation (B01D 46/22, B01D 46/32 take precedence)}

References

Limiting references

This place does not cover:

Filters having travelling belts	B01D 46/22
Loose filtering material moving during filtration	B01D 46/32

B01D 46/24492

{Pore diameter}

Definition statement

This place covers:

Specific pore diameter with numerical values, distribution of pores, pore diameter in relationship with other parameters.

Special rules of classification

Pore diameter ranges indicated in the description and not related to the core of the invention are not classified.

Glossary of terms

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

Pore diameter	The greatest distance between any two points on the boundary of the inside or outside of cylindrical and non-cylindrical openings in a filter

B01D 46/2451

{characterized by the geometrical structure, shape, pattern or configuration or parameters related to the geometry of the structure}

Special rules of classification

Multiple classification is used in the subgroups (common rule).

Each invention aspect is classified, e.g. plugs having a specific geometry and a specific thickness will be classified in B01D 46/2459 and in B01D 46/2482.

B01D 46/2498

{The honeycomb filter being defined by mathematical relationships}

Definition statement

This place covers:

This group covers specific ratios with numerical values and mathematical equations or inequations.

B01D 46/528

{using wound sheets (B01D 46/527 takes precedence)}

References

Limiting references

This place does not cover:

Particle separators using folded material comprising flutes in wound arrangement	B01D 46/527

B01D 50/00

Combinations of methods or devices for separating particles from gases or vapours

Definition statement

This place covers:

- Separators used for filtering particles out of a gas or vapour.
- Only mechanical separation or filtration perhaps in combination with a liquid as separating agent is taking place, no reaction, no absorption or adsorption is involved

B01D 51/00

Auxiliary pretreatment of gases or vapours to be cleaned (preventing dust fires A62C; pretreatment specially adapted for magnetic or electrostatic separation B03C)

References

Informative references

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

Preventing dust fires	A62C
Pretreatment specially adapted for magnetic or electrostatic separation	B03C

Special rules of classification

These groups are, if possible, to be combined with groups from B01D 53/00 or symbols from B01D 53/00, B01D 2251/00, B01D 2256/00, B01D 2257/00 and B01D 2259/00 (multiple classification)

B01D 53/00

Separation of gases or vapours; Recovering vapours of volatile solvents from gases; Chemical or biological purification of waste gases, e.g. engine exhaust gases, smoke, fumes, flue gases, aerosols, (recovery of volatile solvents by condensation B01D 5/00; sublimation B01D 7/00; cold traps, cold baffles B01D 8/00; working-up undefined gaseous mixtures obtained by cracking hydrocarbon oils C10G 70/00; cleaning coal gas C10K; working-up of natural gas, or synthetic natural gas, C10L 3/10; separation of difficult-to-condense gases or air by liquefaction F25J; for investigating materials G01N 30/00)

Definition statement

This place covers:

Catalytic treatment of gases in B01D 53/00 is only for waste gases, i.e. catalytic treatment or synthesis of other gases such as commercially relevant gases (e.g. synthesis or natural gas) is not classified in B01D 53/00).

Relationships with other classification places

Cleaning coal gas: C10K

Separation of difficult-to-condense gases or air by liquefaction: F25J

References

Limiting references

This place does not cover:

Catalytic treatment of exhaust gases from engine exhaust gases (a waste gas)	B01D 53/94 - B01D 53/9495

Informative references

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

Recovery of volatile solvents by condensation	B01D 5/00
Sublimation	B01D 7/00
Cold traps	B01D 8/00
Working-up undefined gaseous mixtures obtained by cracking hydrocarbon oils	C10G 70/00
Working-up of natural gas, or synthetic natural gas	C10L 3/10
Drying air in air conditioning systems	F24F 3/1423
Investigating materials	G01N 30/00

Special rules of classification

B01D 53/00 - B01D 53/326 are generally applied for all gases except for waste gases. Waste gases are mainly dealt with in B01D 53/34 - B01D 53/96. In cases where no appropriate treatment concept can be found for waste gases, the groups

B01D 53/00 - B01D 53/326 can be given (ex: B01D 53/002 or B01D 53/32).

B01D 53/002

{by condensation}

Relationships with other classification places

- B05D 5/00

Condensation of vapours; recovering volatile solvents by condensation

- F25J

Separation of difficult-to-condense gases or air by liquefaction

References

Limiting references

This place does not cover:

Cryogenic condensation only for carbon dioxide (CO 2)	B01D 53/002
Condensation of water vapour	B01D 53/265
Solidifying carbon dioxide	C01B 32/55
Other gas mixtures	F25J 1/00

B01D 53/007

{by irradiation}

References

Informative references

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

Disinfection, sterilisation or deodorisation of air	A61L 9/18- A61L 9/22

Special rules of classification

This group (and corresponding additional information symbols) is often given for waste gases, too.

Symbols B01D 2259/80 - B01D 2259/816 are to applied where possible.

Concepts applying photo-catalytic treatment should be given the symbol B01D 2255/804.

B01D 53/02

by adsorption, e.g. preparative gas chromatography {(solid sorbent compositions B01J 20/00, preparation of inorganic compounds or elements C01)}

Definition statement

This place covers:

Only specific solid adsorbent materials, i.e. not for documents covering general aspects of adsorption.

Relationships with other classification places

Solid sorbent compositions.	B01J 20/00
Preparation of inorganic compounds or elements	C01

Special rules of classification

Symbols B01D 2253/00 and B01D 2257/00 are to be applied where appropriate.

Documents from other technical fields in which adsorption is mentioned as one of many possible applications or a minor aspect. For such cases, B01D 53/02 should be given.

B01D 53/04

with stationary adsorbents {(B01D 53/025 takes precedence)}

Definition statement

This place covers:

General adsorption process aspects.

This group is often used for (general) regeneration aspects and new combinations of known adsorbents for specific gases.

References

Limiting references

This place does not cover:

Takes precedence	B01D 53/025
Documents from other technical fields in which adsorption is mentioned as one of many possible applications or a minor aspect	B01D 53/04
Controlling processes and pressure & temperature swing adsorption processes	B01D 53/0454, B01D 53/047- B01D 53/053

Special rules of classification

Symbols to be applied where possible: B01D 2253/00; B01D 2256/00; B01D 2257/00; B01D 2259/40083 - B01D 2259/4583.

B01D 53/0407

{Constructional details of adsorbing systems}

Definition statement

This place covers:

Apparatus (mechanical) related concepts (as opposed to process related inventions classified in B01D 53/04).

Special rules of classification

Symbols to be applied where possible: B01D 2253/00; B01D 2256/00; B01D 2257/00; B01D 2259/45 - B01D 2259/4583.

B01D 53/0431

{Beds with radial gas flow}

Definition statement

This place covers:

Concepts with an annular bed in form of a hollow cylinder.

B01D 53/0438

{Cooling or heating systems}

Definition statement

This place covers:

Mainly regeneration systems.

Special rules of classification

Very relevant symbols to be applied where possible: B01D 2259/40083 - B01D 2259/40098.

B01D 53/0446

{Means for feeding or distributing gases}

Definition statement

This place covers:

Concepts focussed on ducts, manifolds, flow dividers, pumps, valves, etc.

Special rules of classification

Symbols for (specific) valves: B01D 2259/40003 and B01D 2259/40005.

B01D 53/0454

{Controlling adsorption (controlling temperature swing adsorption B01D 53/0462, controlling pressure swing adsorption B01D 53/047)}

References

Limiting references

This place does not cover:

Documents relating to temperature swing adsorption (TSA)	B01D 53/0462
Documents relating to pressure swing adsorption (PSA)	B01D 53/047

B01D 53/047

Pressure swing adsorption

Definition statement

This place covers:

PSA processes characterised by a sequences of cycle steps

Special rules of classification

Symbols to be allocated: B01D 2259/40007 - B01D 2259/4148 ; B01D 2253/00; B01D 2256/00; B01D 2257/00; B01D 2259/45 - B01D 2259/4583;

Documents from other technical fields in which PSA is mentioned as one of many possible applications or a minor aspect. For such cases, B01D 53/047 should be given.

B01D 53/0473

{Rapid pressure swing adsorption}

Definition statement

This place covers:

RPSA processes characterised by a sequences of cycle steps

Special rules of classification

Symbols to be allocated: B01D 2259/40007 - B01D 2259/4148 ; B01D 2253/00; B01D 2256/00; B01D 2257/00; B01D 2259/45 - B01D 2259/4583;

Documents from other technical fields in which RPSA is mentioned as one of many possible applications or a minor aspect. For such cases, B01D 53/0473 should be given.

B01D 53/0476

{Vacuum pressure swing adsorption}

Definition statement

This place covers:

VPSA processes characterised by a sequences of cycle steps.

Special rules of classification

Symbols to be allocated: B01D 2259/40007 - B01D 2259/4148 ; B01D 2253/00; B01D 2256/00; B01D 2257/00; B01D 2259/45 - B01D 2259/4583;

Documents from other technical fields in which VPSA is mentioned as one of many possible applications or a minor aspect. For such cases, B01D 53/0476 should be given.

B01D 53/053

with storage or buffer vessel

Special rules of classification

Symbols to be allocated: B01D 2259/40007 - B01D 2259/4148 ; B01D 2253/00; B01D 2256/00; B01D 2257/00; B01D 2259/45 - B01D 2259/4583;

B01D 53/06

with moving adsorbents, e.g. rotating beds {(B01D 53/025 takes precedence)}

Definition statement

This place covers:

Moving (e.g. rotating or oscillating) adsorbent structures or units, e.g. rotating beds.

References

Limiting references

This place does not cover:

Separation of gases or vapours with wetted absorbents	B01D 53/025

Informative references

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

Drying air in air conditioning systems	F24F 3/1423

Special rules of classification

Systems for drying air by solid bed adsorption (classified in B01D 53/261) are also classified in this group where possible.

B01D 53/08

according to the "moving bed" method

Definition statement

This place covers:

Concepts where adsorbent particles travel (mainly by gravity) through a reactor and are often, after regeneration, reintroduced.

Glossary of terms

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

In the patent documents the following expressions/words "Fliessbett, Wanderbett" (German) ,"fluidized bed" and "moving bed" are often used as synonyms.

B01D 53/10

with dispersed adsorbents

Definition statement

This place covers:

Concepts where (loose) adsorbent particles are dispersed into a gas stream for a short residence (contact) time.

References

Limiting references

This place does not cover:

Concepts with loose particles being held for a longer residence time in a fluidized state	B01D 53/12

Informative references

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

Arrangement or devices for treating smokes or fumes	F23J 15/00

B01D 53/12

according to the "fluidised technique"

Definition statement

This place covers:

Concepts with loose particles being held for a longer residence time in a fluidized state.

References

Informative references

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

Arrangement or devices for treating smokes or fumes	F23J 15/00

B01D 53/14

by absorption

Definition statement

This place covers:

Concepts using liquid physical and chemical solvents

References

Informative references

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

Treatment of gaseous fuels, natural gas or synthetic natural gas	C10L 3/10

Special rules of classification

Symbols to be allocated where appropriate B01D 2252/00

Documents from other technical fields in which absorption is mentioned as one of many possible applications or a minor aspect. For such cases, B01D 53/14 should be given.

B01D 53/1493

{Selection of liquid materials for use as absorbents}

References

Informative references

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

Acyclic or carboxylic compounds	C07C
Treatment of gaseous fuels, natural gas or synthetic natural gas	C10L 3/10

Special rules of classification

Symbols B01D 2252/00 are to be used in combination with this group.

B01D 53/18

Absorbing units; Liquid distributors therefor (B01D 3/16, B01D 3/26, B01D 3/30 take precedence; packing elements B01J 19/30, B01J 19/32)

Definition statement

This place covers:

Apparatus (mechanical) aspects of absorption columns or units.

References

Limiting references

This place does not cover:

Fractionating columns	B01D 3/16, B01D 3/26, B01D 3/30

Informative references

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

Packing elements	B01J 19/30, B01J 19/32

B01D 53/22

by diffusion (manufacturing semi-permeable membranes B01D 67/00; form, structure or properties of semi-permeable membranes B01D 69/00; material for semi-permeable membranes B01D 71/00)

Definition statement

This place covers:

The groups B01D 53/22 - B01D 53/229 cover gas separation concepts using membranes.

References

Informative references

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

Apparatus and accessoirs in general for separation processes using semipermeable membranes	B01D 63/00, B01D 65/00
Manufacturing semipermeable membranes	B01D 67/00
Form, structure or properties of semi-permeable membranes	B01D 69/00
Material for semipermeable membranes	B01D 71/00

B01D 53/24

by centrifugal force (centrifuges B04B; cyclones B04C)

References

Limiting references

This place does not cover:

Centrifugal separation of particles or aerosols from a gas stream	B01D 45/00

Informative references

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

Separating dispersed particles or aerosols from gases or vapours	B01D 45/00
Centrifuges	B04B
Apparatus using free vortex flow, e.g. cyclones	B04C

B01D 53/26

Drying gases or vapours

Definition statement

This place covers:

Concepts for removing water vapour from a gas.

References

Informative references

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

Dehumidification in air conditioning systems	F24F 3/14

B01D 53/261

{by adsorption}

Definition statement

This place covers:

Use of solid sorbents as drying agents.

References

Informative references

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

Dehumidification in air conditioning systems	F24F 3/14

Special rules of classification

For apparatus related features, documents are often classified in B01D 53/0407 - B01D 53/0446, B01D 53/06, B01D 53/0407 - B01D 53/0446, B01D 53/06

B01D 53/263

{by absorption}

Definition statement

This place covers:

Gas drying concepts using a liquid drying agent (solvent).

References

Informative references

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

Dehumidification in air conditioning systems	F24F 3/14

Special rules of classification

Symbols B01D 2252/00 are to be used where possible.

B01D 53/265

{by refrigeration (condensation)}

References

Informative references

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

Condensation of vapours	B01D 5/00
Collecting potable water from air	E03B 3/28
Steam or vapour condensers	F28B
Heat exchange and heat transfer apparatus	F28D, F28F

B01D 53/268

{by diffusion}

Definition statement

This place covers:

Gas drying concepts using membranes.

References

Informative references

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

Separation of gases by diffusion	B01D 53/22
Apparatus and accessoirs in general for separation processes using semipermeable membranes	B01D 63/00, B01D 65/00
Manufacturing semipermeable membranes	B01D 67/00
Form, structure or properties of semi-permeable membranes	B01D 69/00
Material for semipermeable membranes	B01D 71/00

B01D 53/28

Selection of materials for use as drying agents

Special rules of classification

B01D 2252/00; B01D 2253/00;

B01D 53/30

Controlling by gas-analysis apparatus (regulating non electrical variables in general G05D)

References

Informative references

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

Investigating or analysing materials by determining their chemical or physical properties	G01N
Controlling or regulating systems or variables	G05B, G05D, G05F

B01D 53/32

by electrical effects other than those provided for in group B01D 61/00

Definition statement

This place covers:

Concepts using electric discharge or corona discharge, e.g. a plasma treatment.

References

Informative references

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

Separation by high-voltage electrical fields	B03C

Special rules of classification

All documents using an electrical plasma are classified her. The corresponding symbol for those documents is B01D 2259/818.

Symbols B01D 2259/80 - B01D 2259/818 are to be applied where appropriate.

B01D 53/323

{by electrostatic effects or by high-voltage electric fields}

Definition statement

This place covers:

Concepts using electric fields where no discharge takes place.

References

Informative references

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

Separation by high-voltage electrical fields	B03C

Special rules of classification

Symbols B01D 2259/80 - B01D 2259/818 are to be applied where appropriate.

B01D 53/326

{in electrochemical cells}

References

Informative references

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

Electrolytic or electrophoretic processes for the production of (.e.g. gaseous) compounds	C25B

B01D 53/34

Chemical or biological purification of waste gases

Special rules of classification

The treatment of waste gases is divided into chemical concepts (B01D 53/34 - B01D 53/83), biological concepts (B01D 53/84, B01D 53/85) and catalytic concepts (B01D 53/86 - B01D 53/90).

Exhaust (waste) gases from internal combustion engines are classified in B01D 53/92 (non catalytic) and in B01D 53/94 - B01D 53/9495 (catalytic).

B01D 53/343

{Heat recovery}

Special rules of classification

Symbols B01D 2259/65 - B01D 2259/657 are to be applied where appropriate.

B01D 53/346

{Controlling the process}

Definition statement

This place covers:

Controlling concepts for chemical and biological waste gas treatments.

References

Limiting references

This place does not cover:

Controlling catalytic processes	B01D 53/8696
Controlling catalytic processes involving engine exhaust gases	B01D 53/9495

Informative references

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

Controlling or regulating systems or variables	G05B, G05D, G05F

Special rules of classification

This group should, if possible, be allocated in combination with another group and/or additional information symbol specifying the chemical or biological waste gas treatment concept.

B01D 53/38

Removing components of undefined structure

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8678 - B01D 53/8687

Informative references

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

Arrangement or devices for treating smokes or fumes	F23J 15/00

Special rules of classification

This group should, if sensible, be allocated in combination with another group selected from B01D 53/74 - B01D 53/83 and/or symbol selected notably from B01D 2258/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators

B01D 53/40

Acidic components (B01D 53/44 takes precedence)

References

Limiting references

This place does not cover:

Organic components	B01D 53/44
Catalytic treatments	B01D 53/8678- B01D 53/8687

Informative references

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

Arrangement or devices for treating smokes or fumes	F23J 15/00

Special rules of classification

This group should, if sensible, be allocated in combination with another group selected from B01D 53/74 - B01D 53/83 and/or symbols selected notably from B01D 2258/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators

B01D 53/42

Basic components (B01D 53/44 takes precedence)

References

Limiting references

This place does not cover:

Organic components	B01D 53/44
Catalytic treatments	B01D 53/8678 - B01D 53/8687

Special rules of classification

This group should, if sensible, be allocated in combination with another group selected from B01D 53/74 - B01D 53/83 and/or symbols selected notably from B01D 2258/00.

B01D 53/44

Organic components

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8678 - B01D 53/8687

Special rules of classification

This group should, if sensible, be allocated in combination with another group selected from B01D 53/74 - B01D 53/83 and/or symbol selected notably from B01D 2258/00.

B01D 53/46

Removing components of defined structure

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8671

B01D 53/48

Sulfur compounds

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8603

B01D 53/485

{containing only one sulfur compound other than sulfur oxides or hydrogen sulfide}

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8606

B01D 53/50

Sulfur oxides (B01D 53/60 takes precedence)

References

Limiting references

This place does not cover:

Removing sulfur dioxide or sulfur trioxide from gases other than waste gases by absorption with solvents	B01D 53/1481
Simultaneously removing sulphur oxides and nitrogen oxides	B01D 53/60
Corresponding group for catalytic treatments	B01D 53/8609

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides	C01B 17/04

B01D 53/501

{by treating the gases with a solution or a suspension of an alkali or earth-alkali or ammonium compound}

References

Limiting references

This place does not cover:

Removing sulfur dioxide or sulfur trioxide from gases other than waste gases by absorption with solvents	B01D 53/1481

Informative references

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

Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

B01D 53/502

{characterised by a specific solution or suspension}

References

Informative references

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

Removing sulfur dioxide or sulfur trioxide by absorption with solvents	B01D 53/1481
Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

Special rules of classification

This group should, if sensible, be allocated in combination with symbol selected notably from B01D 2251/00.

B01D 53/504

{characterised by a specific device}

Definition statement

This place covers:

Constructional (mechanical) concepts related to desulfurization.

References

Informative references

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

Separating dispersed particles from gases, air or vapours	B01D 47/00
Absorbing units, liquid distributors therefore	B01D 53/18

Spraying apparatus, nozzles.	B05B

Special rules of classification

Examples for concepts in this group are scrubbers, sprayers, contactors

B01D 53/505

{in a spray drying process}

Definition statement

This place covers:

Inter alia concepts involving semi-solid reagents such as slurries.

References

Informative references

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

Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

B01D 53/507

{by treating the gases with other liquids}

References

Limiting references

This place does not cover:

Removing sulfur dioxide or sulfur trioxide from gases other than waste gases by absorption with solvents	B01D 53/1481

Special rules of classification

This group should, if sensible, be allocated in combination with symbols selected notably from B01D 2251/00 and from B01D 2252/00

B01D 53/508

{by treating the gases with solids}

References

Informative references

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

Solid gas separation processes in general	B01D 53/81

Special rules of classification

This group should, if sensible, be allocated in combination with symbols selected notably from B01D 2251/00 and B01D 2253/00.

B01D 53/52

Hydrogen sulfide

References

Limiting references

This place does not cover:

Removing hydrogen sulfide from gases other than waste gases by absorption with solvents	B01D 53/1468
Corresponding group for catalytic treatments	B01D 53/8612

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides	C01B 17/04

Special rules of classification

Treatment concepts with regenerable solvents are also classified in B01D 53/1468 (even waste gases).

This group should, if sensible, be allocated in combination with symbol selected notably from B01D 2251/00.

B01D 53/523

{Mixtures of hydrogen sulfide and sulfur oxides}

References

Limiting references

This place does not cover:

Corresponding group for catalytic treatments:	B01D 53/8615

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides	C01B 17/04
Arrangement or devices for treating smokes or fumes liquids	F23J 15/00

Special rules of classification

This group should, if sensible, be allocated in combination with symbol selected notably from B01D 2251/00.

B01D 53/526

{Mixtures of hydrogen sulfide and carbon dioxide}

References

Limiting references

This place does not cover:

Removing hydrogen sulfide and carbon dioxide from gases other than waste gases by absorption with solvents	B01D 53/1462 .
Corresponding group for catalytic treatments	B01D 53/8618

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides	C01B 17/04

Special rules of classification

This group should, if sensible, be allocated in combination with symbols selected notably from B01D 2251/00 - B01D 2251/90

B01D 53/54

Nitrogen compounds

References

Limiting references

This place does not cover:

Corresponding group for catalytic treatments	B01D 53/8621

B01D 53/56

Nitrogen oxides (B01D 53/60 takes precedence)

References

Limiting references

This place does not cover:

Simultaneously removing sulphur oxides and nitrogen oxides	B01D 53/60
Corresponding group for catalytic treatments	B01D 53/8625

B01D 53/565

{by treating the gases with solids}

References

Informative references

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

Solid gas separation processes in general	B01D 53/81

B01D 53/58

Ammonia

References

Limiting references

This place does not cover:

Corresponding group for catalytic treatments	B01D 53/8634

Informative references

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

Separation of ammonia by absorption or condensation	C01C 1/0458
Separation of ammonia from gases or vapours	C01C 1/12

B01D 53/60

Simultaneously removing sulfur oxides and nitrogen oxides

References

Limiting references

This place does not cover:

Corresponding group for catalytic treatments	B01D 53/8637

Informative references

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

General processes for purification of waste gases	B01D 53/77, B01D 53/80, B01D 53/88
Arrangement or devices for treating smokes or fumes liquids	F23J 15/00

B01D 53/62

Carbon oxides

References

Limiting references

This place does not cover:

Catalytic removal of carbon monoxide:	B01D 53/864

Informative references

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

Solidifying carbon dioxide	C01B 32/55
Arrangement or devices for treating smokes or fumes liquids	F23J 15/00
Separation of carbon dioxide by liquefaction or solidification	F25J

Special rules of classification

Treatment concepts with regenerable solvents are also classified in B01D 53/1475 (even for waste gases).

This group should, if sensible, be allocated in combination with symbol selected notably from B01D 2251/00, B01D 2252/00 and B01D 2258/00.

Frequent examples are concepts resulting in carbonate salt precipitation.

Carbon monoxide is also classified here. This is specified by symbol B01D 2257/502.

Note that carbon dioxide in a mixture with hydrogen sulfide is (also) classified in B01D 53/526.

B01D 53/64

Heavy metals or compounds thereof, e.g. mercury

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8665

Special rules of classification

Mercury is to be specified by B01D 2257/602.

B01D 53/66

Ozone

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8675

B01D 53/68

Halogens or halogen compounds

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8659

Informative references

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

Exhaust treatment in chemical vapour deposition processes	C23C 16/4412

Special rules of classification

Halogens to be removed can further be specified in B01D 2257/00.

B01D 53/685

{by treating the gases with solids}

Special rules of classification

This group should, if sensible, be allocated in combination with symbols selected notably from B01D 2251/00 and B01D 2253/00.

B01D 53/70

Organic halogen compounds

References

Limiting references

This place does not cover:

Catalytic treatments	B01D 53/8662

B01D 53/72

Organic compounds not provided for in groups B01D 53/48 - B01D 53/70, e.g. hydrocarbons

Special rules of classification

This group should, if sensible, be allocated in combination with another group or symbol specifying the component to be removed and/or the treatment concept.

B01D 53/73

After-treatment of removed components

Special rules of classification

This group should, if sensible, be allocated in combination with another group or symbol specifying the component to be removed and/or the treatment concept.

B01D 53/74

General processes for purification of waste gases; Apparatus or devices specially adapted therefor (B01D 53/92 takes precedence)

References

Limiting references

This place does not cover:

Chemical or biological purification of engine exhaust gases	B01D 53/92

Special rules of classification

This group should, if sensible, be allocated in combination with another group or symbol specifying the component to be removed and/or the treatment concept.

B01D 53/75

Multi-step processes

Definition statement

This place covers:

Processes comprising a sequence of different treatment steps. The individual steps as such do not represent the inventive concept.

References

Limiting references

This place does not cover:

A catalytic treatment with more than one catalytic step	B01D 53/869

Special rules of classification

Sequence of steps may comprise a (one single) catalytic step.

This group should, if sensible, be allocated in combination with another group or symbol specifying the component to be removed and/or the treatment concept (e.g. B01D 53/00).

B01D 53/77

Liquid phase processes

References

Informative references

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

Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the component to be removed and/or the reactants used.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/78

with gas-liquid contact

References

Informative references

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

Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the component to be removed and/or the reactants used.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/79

Injecting reactants

References

Informative references

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

Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the component to be removed and/or the reactants used B01D 2251/00 and B01D 2252/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/80

Semi-solid phase processes, i.e. by using slurries

References

Informative references

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

Arrangement or devices for treating smokes or fumes using washing liquids	F23J 15/04

Special rules of classification

This group should, if sensible, be allocated in combination with symbols specifying the component to be removed or the reactants used B01D 2251/00, B01D 2253/00, B01D 2252/00,B01D 2257/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/81

Solid phase processes

Relationships with other classification places

Arrangement or devices for treating smokes or fumes	F23J 15/00

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the component to be removed or the reactants used B01D 2251/00, B01D 2253/00, B01D 2252/00, B01D 2257/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/82

with stationary reactants

Relationships with other classification places

Arrangement or devices for treating smokes or fumes	F23J 15/00

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the component to be removed or the reactants used B01D 2251/00, B01D 2253/00, B01D 2252/00, B01D 2257/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/83

with moving reactants

Relationships with other classification places

Arrangement or devices for treating smokes or fumes	F23J 15/00

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the component to be removed and/or the reactants used B01D 2251/00, B01D 2253/00, B01D 2252/00, B01D 2257/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators

B01D 53/84

Biological processes

Definition statement

This place covers:

All biological concepts except those using solid bed reactors.

References

Limiting references

This place does not cover:

Concepts with solid bed reactor	B01D 53/85

Special rules of classification

symbol for specific microorganisms B01D 2251/95; symbol for bio-catalytic aspects (enzymes) B01D 2255/804.

B01D 53/85

with gas-solid contact

Definition statement

This place covers:

Concepts with solid bed reactor.

References

Informative references

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

Solid bed reactors for water treatment	C02F 3/10 - C02F 3/103

Special rules of classification

Symbol for specific microorganisms B01D 2251/95; Symbol for bio-catalytic aspects (enzymes) B01D 2255/804.

B01D 53/86

Catalytic processes

References

Limiting references

This place does not cover:

Catalytic concepts for engine exhaust gases	B01D 53/94 - B01D 53/9495

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00.

Special rules of classification

All groups B01D 53/86 - B01D 53/90 should, if sensible, be allocated in combination with symbols specifying the catalytic substances used B01D 2255/00.

Concepts applying photo-catalytic treatment should be given the symbol B01D 2255/804.

B01D 53/8609

{Sulfur oxides}

References

Limiting references

This place does not cover:

Removing sulfur oxides and hydrogen sulfide:	B01D 53/8603
Simultaneously removing sulfur oxides and nitrogen oxides:	B01D 53/8637

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides.	C01B 17/04

B01D 53/8612

{Hydrogen sulfide}

References

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides.	C01B 17/04

B01D 53/8615

{Mixtures of hydrogen sulfide and sulfur oxides}

References

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides.	C01B 17/04

B01D 53/8618

{Mixtures of hydrogen sulfide and carbon dioxides}

References

Informative references

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

Production of sulfur from gaseous compounds including gaseous sulfides.	C01B 17/04

B01D 53/8625

{Nitrogen oxides}

Definition statement

This place covers:

Process related concepts (e.g. controlling) with known catalyst compositions.

References

Limiting references

This place does not cover:

Simultaneously removing sulfur oxides and nitrogen oxides	B01D 53/8637

Special rules of classification

This group can be combined with B01D 53/8696 for controlling concepts.

B01D 53/8628

{Processes characterised by a specific catalyst}

References

Limiting references

This place does not cover:

Catalysts for engine exhaust gases (e.g. from cars)	B01D 53/9409

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Concepts classified here must further specify the catalytic substance in B01D 2255/00.

B01D 53/8634

{Ammonia}

References

Limiting references

This place does not cover:

Catalysts for internal combustion engines (e.g. cars)	B01D 53/9436

B01D 53/8646

{Simultaneous elimination of the components (B01D 53/8656 takes precedence)}

Definition statement

This place covers:

Process related concepts with known three-way-catalyst (TWC) compositions.

References

Limiting references

This place does not cover:

Successive elimination of the components	B01D 53/8656
Three-way-catalysts for engine exhaust gases (e.g. cars):	B01D 53/9445 - B01D 53/9454

Special rules of classification

This group may be combined with B01D 53/8696 for controlling concepts.

B01D 53/865

{characterised by a specific catalyst}

References

Limiting references

This place does not cover:

Three-way-catalysts for engine exhaust gases (e.g. cars)	B01D 53/9445 - B01D 53/9454

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Concepts classified here must further specify the catalytic substance in B01D 2255/00.

B01D 53/8653

{characterised by a specific device}

Definition statement

This place covers:

Apparatus (mechanics) related concepts with known catalytic substances.

References

Limiting references

This place does not cover:

Three-way-catalysts for internal combustion engines (e.g. cars)	B01D 53/9445 - B01D 53/9454

B01D 53/8656

{Successive elimination of the components}

Definition statement

This place covers:

Concepts including the sequential removal of carbon monoxide or hydrocarbons and nitrogen oxides.

References

Limiting references

This place does not cover:

Sequential removal for gases from internal combustion engines (e.g. cars):	B01D 53/9459

B01D 53/8659

{Removing halogens or halogen compounds}

References

Informative references

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

Exhaust treatment in chemical vapour deposition processes	C23C 16/4412

Special rules of classification

Halogens to be removed can further be specified in B01D 2257/00. Other symbols from B01D 2255/00 and B01D 2258/00 should be allocated where appropriate.

B01D 53/8662

{Organic halogen compounds}

References

Informative references

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

Exhaust treatment in chemical vapour deposition processes	C23C 16/4412

Special rules of classification

Halogens to be removed can further be specified in B01D 2257/00. Other symbols from B01D 2255/00 and B01D 2258/00 should be allocated where appropriate.

B01D 53/8665

{Removing heavy metals or compounds thereof, e.g. mercury}

Special rules of classification

Symbols from B01D 2255/00, B01D 2257/00 and B01D 2258/00 should be allocated where appropriate.

B01D 53/8668

{Removing organic compounds not provided for in B01D 53/8603 - B01D 53/8665}

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the catalyst used and the component to be removed B01D 2255/00, B01D 2257/00.

B01D 53/8671

{Removing components of defined structure not provided for in B01D 53/8603 - B01D 53/8668}

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the catalyst used and the component to be removed B01D 2255/00, B01D 2257/00.

B01D 53/8678

{Removing components of undefined structure}

Special rules of classification

This group should, if sensible, be allocated in combination with symbol specifying the catalyst used B01D 2255/00 and the origin of the waste gas B01D 2258/00.

Examples of such gases are flue gases from power plants, blast furnaces or waste incinerators.

B01D 53/869

{Multiple step processes}

Definition statement

This place covers:

Sequential catalytic treatment of waste gases comprising two or more catalytic steps.

References

Limiting references

This place does not cover:

A multistep treatment comprising only one catalytic step	B01D 53/75

Special rules of classification

Single treatment steps may be allocated the Indexing Code B01D 53/00.

B01D 53/8693

{After-treatment of removed components}

Special rules of classification

Symbols for specifying the removed components should be allocated.

B01D 53/8696

{Controlling the catalytic process}

References

Limiting references

This place does not cover:

Controlling catalytic processes involving internal combustion engines	B01D 53/9495

Informative references

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

Investigating or analysing materials by determining their chemical or physical properties	G01N
Controlling or regulating systems or variables	G05B, G05D, G05F

Special rules of classification

This group should be allocated in combination with another group and/or symbol specifying the component to be removed.

B01D 53/88

Handling or mounting catalysts

Definition statement

This place covers:

Concepts related to mechanical appliances of catalytic material on structures or apparatus.

References

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

This group should be allocated in combination with symbol notably for specifying the catalyst B01D 2255/00 and the component to be removed B01D 2257/00.

A frequent example is the application of a photo-catalytic material (B01D 2255/802) onto a structure.

B01D 53/885

{Devices in general for catalytic purification of waste gases}

Relationships with other classification places

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

This group should be allocated in combination with symbol notably for specifying the catalyst B01D 2255/00 and the component to be removed B01D 2257/00.

A frequent example is the application of a photo-catalytic material (B01D 2255/802) onto a structure.

B01D 53/90

Injecting reactants

References

Informative references

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

Exhaust treatment aspects for vehicles	F01N, F02D

Special rules of classification

This group should be allocated in combination with symbol notably for specifying the reactant B01D 2251/00, the catalyst B01D 2255/00 and the component to be removed B01D 2257/00.

A common example for an injected reactant is a liquid reducing agent such as ammonia.

B01D 53/92

of engine exhaust gases (exhaust {or silencing} apparatus {for internal combustion engines, machines or engines in general}, having means for purifying, {rendering innocuous} or otherwise treating exhaust gases F01N 3/00)

Definition statement

This place covers:

The groups B01D 53/92 - B01D 53/927 cover all treatment concepts for engine exhaust gases except catalytic treatment

References

Limiting references

This place does not cover:

Catalytic treatment concepts for engine exhaust gases	B01D 53/94 - B01D 53/9495

Informative references

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

Exhaust treatment aspects for vehicles	F01N, F02D
Exhaust or silencing apparatus for internal combustion engines, machines or engines in general, having means for purifying, rendering innocuous or otherwise treating exhaust gases	F01N 3/00

Special rules of classification

The groups B01D 53/92 - B01D 53/927 can be combined with other groups or symbol chosen from B01D 53/00 - B01D 53/96 to characterise the treatment concept.

B01D 53/94

by catalytic processes

References

Limiting references

This place does not cover:

Catalytic processes not involving engine exhaust gases	B01D 53/86

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00
Exhaust treatment aspects for vehicles	F01N, F02D

Special rules of classification

All groups B01D 53/94 - B01D 53/9495 should, if sensible, be allocated in combination with symbol specifying the catalytic substances used B01D 2255/00.

B01D 53/9409

{Nitrogen oxides}

Definition statement

This place covers:

Process related concepts (e.g. controlling) with known catalyst compositions.

References

Informative references

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

Controlling combustion engines	F02D

Special rules of classification

This group can be combined with B01D 53/9495 for controlling concepts.

B01D 53/9413

{Processes characterised by a specific catalyst}

References

Limiting references

This place does not cover:

Removing nitrous oxides (N2O)	B01D 53/9427

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9418

{for removing nitrogen oxides by selective catalytic reduction [SCR] using a reducing agent in a lean exhaust gas}

Definition statement

This place covers:

Concepts where the reducing agent is added under constant lean exhaust gas conditions.

References

Limiting references

This place does not cover:

Adding reducing agent under alternating lean and rich exhaust gas conditions	B01D 53/9422

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9422

{for removing nitrogen oxides by NOx storage or reduction by cyclic switching between lean and rich exhaust gases (LNT, NSC, NSR)}

Definition statement

This place covers:

Concepts where the reducing agent is added under alternating lean and rich exhaust gas conditions.

References

Limiting references

This place does not cover:

Adding reducing agent under constant lean exhaust gas conditions	B01D 53/9418

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00
Controlling exhaust gas conditions with means other than the combustion engine	F01N
Controlling combustion engines (e.g. lambda value)	F02D

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9427

{for removing nitrous oxide}

References

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9431

{Processes characterised by a specific device}

Definition statement

This place covers:

Apparatus (mechanics) related concepts with known catalytic substances.

References

Informative references

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

Exhaust treatment systems in vehicles	F01N

B01D 53/944

{Simultaneously removing carbon monoxide, hydrocarbons or carbon making use of oxidation catalysts (three-way-catalysts [TWC] B01D 53/9445)}

Definition statement

This place covers:

Oxidation catalysts (e.g. DOC) and filters coated with oxidation catalysts;

References

Limiting references

This place does not cover:

Catalysts for gasoline engines (except lean burn engines)	B01D 53/9445

Informative references

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

Three-way-catalysts (TWC)	B01D 53/9445
Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

If applicable, this group should be given in combination with symbols chosen from B01D 2255/902 and B01D 2255/903.

Further Indexing Codes specifying the catalytic substance are to be allocated B01D 2255/00, notably B01D 2255/915.

B01D 53/9445

{Simultaneously removing carbon monoxide, hydrocarbons or nitrogen oxides making use of three-way catalysts [TWC] or four-way-catalysts [FWC]}

Definition statement

This place covers:

Process related concepts (e.g. controlling) with known catalyst compositions.

References

Informative references

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

Controlling combustion engines	F02D

Special rules of classification

This group can be combined with B01D 53/9495 for controlling concepts.

B01D 53/945

{characterised by a specific catalyst}

References

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9454

{characterised by a specific device}

Definition statement

This place covers:

Apparatus (mechanics) related concepts with known catalytic substances.

References

Informative references

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

Exhaust treatment systems in vehicles	F01N

B01D 53/9459

{Removing one or more of nitrogen oxides, carbon monoxide, or hydrocarbons by multiple successive catalytic functions; systems with more than one different function, e.g. zone coated catalysts (layered catalysts with only one function B01D 53/9413, B01D 53/944 or B01D 53/945)}

Definition statement

This place covers:

Processes and apparatuses where the gas successively passes different catalysts (including zone-coated catalysts and wall-flow filters with different coatings on inlet and outlet channels)

References

Informative references

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

Layered catalysts with only one function	B01D 53/9413, B01D 53/944, B01D 53/945

Special rules of classification

Symbols to be allocated are notably selected from B01D 2255/902, B01D 2255/903, B01D 2255/904 and B01D 2255/9155

B01D 53/9463

{with catalysts positioned on one brick}

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9468

{in different layers}

Definition statement

This place covers:

Wall-flow filters with different layers on the walls.

References

Limiting references

This place does not cover:

Layered catalysts on flow through substrates are generally not regarded as having different successive functions	B01D 53/9413, B01D 53/944, B01D 53/945

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00, notably B01D 2255/902.

B01D 53/9472

{in different zones}

References

Informative references

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

Catalysts in general	B01J 21/00 - B01J 38/00

Special rules of classification

Symbols specifying the catalytic substance are to be allocated B01D 2255/00, notably B01D 2255/903.

B01D 53/9477

{with catalysts positioned on separate bricks, e.g. exhaust systems}

Definition statement

This place covers:

Exhaust systems where a specific sequence of catalytic functions is given, for example DOC-DPF or LNT-SCR. It also covers exhaust systems where the DPF is not coated.

Special rules of classification

This group is also given if a specific order is indicated and the DPF has no catalytic function.

Symbols specifying the catalytic substance are to be allocated B01D 2255/00.

B01D 53/9495

{Controlling the catalytic process}

References

Informative references

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

Controlling combustion engines (e.g. lambda value)	F02D

Special rules of classification

This group should be allocated in combination with another group and/or additional information symbols specifying the treatment concept B01D 53/94 - B01D 53/949.

B01D 53/96

Regeneration, reactivation or recycling of reactants

Special rules of classification

This group should, if sensible, be allocated in combination with another group or symbols specifying the reactant used B01D 2251/00 or B01D 2252/00, component to be removed B01D 2257/00 or the treatment concept, e.g. B01D 53/00.

B01D 57/00

Separation, other than separation of solids, not fully covered by a single other group or subclass, e.g. B03C

Definition statement

This place covers:

Any process for separation not fully covered by any of the other groups in B01D provided that it is not related to the separation of solid particles.

References

Limiting references

This place does not cover:

Separation by distillation	B01D 3/00
Separation by extraction	B01D 11/00
Separation by sorption	B01D 15/00
Separation of liquids from liquids	B01D 17/00
Degasification of liquids	B01D 19/00
Dead end filtration processes	B01D 37/00
Gas separation	B01D 53/00
Membrane separation processes	B01D 61/00

Informative references

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

Electrodialysis and electro-osmosis	B01D 61/42 - B01D 61/56
Dielectrophoresis	B03C 5/005
Treatment of water, waste water, sewage, or sludge by electrochemical separation	C02F 1/469
Preparation of peptides by electrophoresis	C07K 1/26
Electrophorectic production of compounds or non-metals	C25B 7/00
Analysis processes using electrophoresis	G01N 27/26

Special rules of classification

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all these relevant sub groups are given.

B01D 57/02

by electrophoresis (treatment of water, waste water, sewage or sludge by electrophoresis C02F 1/469; electrophoretic production of compounds or non-metals C25B 7/00; investigating or analysing materials by using electrophoresis G01N 27/26)

Definition statement

This place covers:

B01D 57/02 includes only processes involving migration of species due to an electrical potential in the absence of any kind of separation membrane. Otherwise the respective subgroups of B01D 61/42 apply. The class is given for preparative purposes only (opposed to investigation or analysis purposes).

References

Informative references

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

Treatment of water, waste water, sewage or sludge by electrophoresis	C02F 1/469
Electrophoretic production of compounds or non-metals	C25B 7/00
Investigating or anaylsing materials by using electrophoresis	G01N 27/26

B01D 59/00

Separation of different isotopes of the same chemical element (preventing occurrence of critical conditions when producing fissile material G21; shielding from radioactivity G21F)

Definition statement

This place covers:

The separation of isotopes of the SAME element. A starting compound comprising several isotopes of the same element is separated in at least two fractions wherein each fraction is enriched/depleated in

a least one of the isotopes in comparison with the starting material and with the other fraction(s). This implies that the difference in isotopes ratios is not only due to radioactive decay

Relationships with other classification places

Preventing occurrence of critical conditions when producing fissile material G21; shielding from radioactivity G21F

References

Limiting references

This place does not cover:

The preparation of nuclides, (e.g. for medical purposes) from other elements (e. g. preparation of 99Tc from 99Mo and their separation from the mother solution (when these are not separated from other isotopes of the same element (otherwise B01D 59/00).	G21G
Mass spectrometers.	H01J 49/00

Informative references

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

Preventing occurence of critical conditions when producing fissile material	G21
Shielding from radioactivity	G21F

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "isotopes" and "nuclides"

B01D 59/44

Separation by mass spectrography (particle spectrometers or separator tubes H01J 49/00)

Definition statement

This place covers:

Processes for separating isotopes by using mass spectrometers.

References

Limiting references

This place does not cover:

Mass spectrometers	H01J 49/00

B01D 59/50

Separation involving two or more processes covered by different groups selected from groups B01D 59/02, B01D 59/10, B01D 59/20, B01D 59/22, B01D 59/28, B01D 59/34, B01D 59/36, B01D 59/38, B01D 59/44

Special rules of classification

Document relating to isotopes separation using more than one process should get the class B01D 59/50 and symbols (depending on the information disclosed) of each of separation process (B01D 59/10, B01D 59/20, B01D 59/22, B01D 59/28, B01D 59/34, B01D 59/36, B01D 59/38, B01D 59/44).

B01D 61/00

Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis or ultrafiltration; Apparatus, accessories or auxiliary operations specially adapted therefor (separation of gases or vapours by diffusion B01D 53/22)

Definition statement

This place covers:

Processes for separation of liquid feed by means of a membrane in general which selectively allows passage of components from liquid feed mixtures including suspensions of particles, heterogeneous or homogeneous mixtures.

Apparatus specifically used in the processes are also classified here.

These types of membrane processes include:

- Pressure driven membrane separation processes as microfiltration, ultrafiltration, nanofiltration, reverse osmosis,
- Concentration gradient based membrane separation as forward osmosis, dialysis
- Membrane separation processes based on an electrical gradient such as electrodialysis, electro-osmosis and electro-ultrafiltration
- Thermally based separation processes (based on a gradient of the activities of a component) as pervapouration, membrane distillation
- Processes applying liquid separation membranes; either immobilised in a porous matrix or in suspension
- Sequences applying combinations of such membrane processes

For microfiltration processes only cross-flow processes, i.e. applying a tangential flow of the feed solution over the membrane) are considered.

Relationships with other classification places

A close relationship exists between membrane microfiltration and the field of filtration (B01D 25/00 - B01D 35/00).

Generally all cross-flow filtration applications (control of deposits on the filter) are regarded as falling into B01D 61/00-B01D 61/58, while dead end filters (cake filtration) should be covered by the filtration groups.

A close relationship exists between membrane separation processes covered by B01D 61/00 and certain application fields, such as water treatment systems (C02F 1/44), gas separation (B01D 53/22), battery and fuel cell electrochemical processes (H01M) and haemodialysis blood separation

processes (A61M 1/00 and subgroups). When applicable, groups from B01D 61/00 - B01D 61/58 are given in addition to groups related to the application fields.

References

Limiting references

This place does not cover:

Processes for separation of gases or vapour by means of membranes	B01D 53/22

Informative references

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

Degasification of liquids by filtration (i.e. with membranes)	B01D 19/0031
Dead end filtration processes and devices	B01D 25/00, B01D 27/00, B01D 29/00, B01D 33/00, B01D 35/00
Electrophoresis for separation	B01D 57/02
Membrane modules for membrane separation	B01D 63/00
Membrane cleaning or sterilisation	B01D 65/02
Prevention of membrane fouling	B01D 65/08
Membrane testing	B01D 65/10
Milk preparation by dialysis, reverse osmosis or ultrafiltration	A23C 9/142
Milk preparation by electrodialysis	A23C 9/144
Cheese preparation by dialysis or ultrafiltration	A23C 19/0285
Concentration or drying of juices by membrane processes	A23L 2/082
Clarifying or fining of non-alcoholic beverages using membranes	A23L 2/74
Bandages or dressings	A61F 13/00
Galenical forms by sustained drug release by osmosis	A61K 9/0004
Drug containing films, membranes or sheets	A61K 9/7007
Methods or apparatus for sterilizing material using filtration	A61L 2/022
Blood dialysis systems and blood oxygenation processes with membranes	A61M 1/16
Filtering material out of the blood by passing it through a membrane, i.e. haemofiltration, diafiltration	A61M 1/34
Feeding or removing reactants or products to or from the catalyst bed of a reactor through a membrane	B01J 8/009
Membrane reactors	B01J 19/1893, B01J 19/2475
Separation of hydrogen by diffusion	C01B 3/501
Preparation of oxygen by making use of membranes	C01B 13/0251
Purification or separation of nitrogen by making use of membranes	C01B 21/0438
Physical processing of noble gases by making use of membranes	C01B 23/0042
Treatment of water, waste water, sewage, or sludge by means of by dialysis, osmosis or reverse osmosis	C02F 1/44

Treatment of water, waste water, sewage, or sludge by electrochemical separation	C02F 1/469
Multistage treatment of water, waste water, or sewage	C02F 9/00
Multistage treatment of water with portable or detachable small-scale treatment devices	C02F 9/20
Purification of acyclic or carboxylic compounds using membranes	C07C 7/00
Preparation of peptides by ultrafiltration or reverse osmosis	C07K 1/34
Refining hydrocarbon oils by dialysis	C10G 31/11
Dewatering or demulsification of hydrocarbon oils by filtration	C10G 33/06
Working up of undefined normally gaseous mixtures using membranes	C10G 70/045
Working up used lubricants by ultrafiltration or osmosis	C10M 175/06
Refining or fats or fatty oils including ultrafiltration or dialysis	C11B 3/008
Removal of precipitate or added materials from alcoholic beverages by filtration	C12H 1/063
Preparation of other alcoholic beverages using membranes	C12H 3/04
Enzymology or microbiology with dialysis means	C12M 1/12
Tissue, human, animal or plant cell or virus culture apparatus with ultrafiltration, inverse osmosis or dialysis means	C12M 3/06
Extracting or separation of nucleic acids from biological samples by membranes	C12N 15/1017
Purification of sugar juices using membranes	C13B 20/165
Electrolysis	C25B
Electrophoretic production of compounds or non-metals	C25B 7/00
Apparatus for feeding liquid fuel having water separation means as membranes	F02M 37/24
Osmotically driven micro pumps	F04B 19/006
Fuel cells	H01M 8/00
Batteries comprising separators	H01M 50/40

Special rules of classification

Classification in multiple groups:

In case a specific application is addressed, the respective application class/group/subgroup has to also be assigned, e.g. a membrane purification process of specific carboxylic acid amines, is also classified in C07C 231/24.

As long as no details on the membrane process or the apparatus for carrying out said process are disclosed, no groups from B01D 61/00 - B01D 61/58 are given in addition. However, if such details are given, the respective B01D 61/00 - B01D 61/58 group should be given in addition.

Subgroup and main group:

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all of these relevant subgroups are given.

Classification of additional information:

The classification of additional information is obligatory and useful for retrieving documents. Often, aspects of cleaning, maintenance or stable operation are disclosed in connection with the processes.

This information is to be classified under CPC groups B01D 65/02, B01D 65/08 and the symbols under B01D 2321/00.

Further details of subgroups:

B01D 61/0022, B01D 61/026, B01D 61/0271, B01D 61/146, B01D 61/1471, B01D 61/244, B01D 61/2461, B01D 61/3621, B01D 61/3631, B01D 61/3641, B01D 61/3651, B01D 61/423, B01D 61/4251, B01D 61/4271 and B01D 61/4281 include multi-step processes with more than one process step of the same kind of membrane separation process.

B01D 61/026, B01D 61/0271 and B01D 61/029 include sequences of reverse osmosis [RO] steps, sequences of nanofiltration [NF] steps as well as mixed RO-NF sequences.

B01D 61/146, B01D 61/147 and B01D 61/149 include sequences of ultrafiltration [UF] steps, sequences of microfiltration [MF] steps as well as mixed MF-UF sequences.

B01D 61/58: Multi-step processes comprising two or more membrane-separation steps of different kind must be classified in B01D 61/58 in combination with the subgroup for the specific steps. The symbols relating to the specific process steps in B01D 61/00 - B01D 61/56 are given as additional information.

B01D 61/08, B01D 61/18, B01D 61/28, B01D 61/366 and B01D 61/46: These groups apply in case a whole membrane plant structure suitable to carry out a membrane process is addressed. They include also microfluidic devices. Membrane modules as such are classified in B01D 63/00.

B01D 61/10 and B01D 61/20 apply for specific parts of the membrane plant not being the membrane module (e.g. specific pumps, valves, heat exchangers etc.) and which are not relevant for the module alone, which is classified in B01D 65/00.

B01D 61/147: The group includes microfiltration processes only of the cross-flow type (i.e. no dead-end). Dead-end filtration is classified in B01D 25/00 - B01D 35/00.

B01D 61/04 and B01D 61/16: In these subgroups, the type of pre-treatment must be specified with the indexing orthogonal codes B01D 2311/04, if applicable as a C-Set as described below.

B01D 61/461 - B01D 61/468: If applicable, multiple of these groups can be given to characterise the apparatus.

Group B01D 61/461 covers a single cell or a single pair of membranes whereas groups B01D 61/462 - B01D 61/467 cover the sequence of a plurality of pairs of membranes.

B01D 2311/00: The groups under B01D 2311/00 specify details to the membrane separation process and control (as controlled parameters or additional unit operations involved).

In B01D 2311/00, C-Sets have to be used, if applicable, to identify additional process operations taking place in the feed stream, the permeate stream or the concentrate stream, or before the plant starts operation.

B01D 2313/00: The groups under B01D 2313/00 specify details related to membrane modules or apparatus.

B01D 2315/00: The groups under B01D 2315/00 specify details relating to the membrane module operation (e.g. batch processes or submerged operation).

B01D 2317/00: The groups under B01D 2317/00 specify the membrane module arrangements within a plant or an apparatus (e.g. series/parallel connections).

B01D 2319/00: The groups under B01D 2319/00 specify the membrane module arrangements within a single housing (e.g. series/parallel connections).

B01D 61/002

{Forward osmosis or direct osmosis}

References

Informative references

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

Actuators for pressure-retarded osmosis	F03G 7/015

B01D 61/02

Reverse osmosis; Hyperfiltration {; Nanofiltration}

Definition statement

This place covers:

Pressure-driven membrane processes for separation with membranes relating to reverse osmosis, nanofiltration and hyperfiltration.

Special rules of classification

The respective processes are covered by subgroups of B01D 61/00.

The subgroup B01D 61/025 also covers processes comprising at least two process steps of hyperfiltration.

The subgroup B01D 61/026 covers processes comprising at least two process steps of reverse osmosis.

The subgroup B01D 61/0271 covers processes comprising at least two process steps of nanofiltration.

The subgroup B01D 61/029 covers multistep processes comprising at least two different kinds of processes selected from reverse osmosis, hyperfiltration or nanofiltration.

Multiple classification is to be performed when applicable.

B01D 61/081

{used at home, e.g. kitchen}

Definition statement

This place covers:

Apparatuses which are compact and suitable for private use, for instance household applications.

References

Informative references

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

Water treatment only using household-type filters for producing potable water, e.g. pitchers, bottles, faucet-mounted devices	C02F 1/003

B01D 61/246

{Membrane extraction}

Definition statement

This place covers:

Aspects relating specifically to the membrane separation process and its apparatus.

References

Informative references

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

Solvent extraction in combination with membranes	B01D 11/0415

B01D 61/364

{Membrane distillation}

Definition statement

This place covers:

The process of membrane distillation and apparatus therefor.

References

Informative references

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

Distillation per se	B01D 3/00

B01D 61/365

{Osmotic distillation or osmotic evaporation}

References

Informative references

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

Distillation per se	B01D 3/00

B01D 61/58

Multistep processes

Definition statement

This place covers:

Any multi-step process comprising more than one different membrane separation process and not solely falling within B01D 61/026, B01D 61/0271, B01D 61/029, B01D 61/146, B01D 61/1471, B01D 61/149, B01D 61/244, B01D 61/2461, B01D 61/3621, B01D 61/3631, B01D 61/3641, B01D 61/3651, B01D 61/423, B01D 61/4251, B01D 61/4271, B01D 61/4281.

Special rules of classification

The last place rule does not apply.

All possible symbols within B01D 61/026, B01D 61/0271, B01D 61/029, B01D 61/146, B01D 61/1471, B01D 61/149, B01D 61/244, B01D 61/2461, B01D 61/3621, B01D 61/3631, B01D 61/3641, B01D 61/3651, B01D 61/423, B01D 61/4251, B01D 61/4271, B01D 61/4281 should be assigned.

B01D 63/00

Apparatus in general for separation processes using semi-permeable membranes

Definition statement

This place covers:

Modules for membrane-based separation processes. These modules could be suitable for liquid (B01D 61/00 - B01D 61/58) and/or gaseous (B01D 53/22) feed/ permeate streams.

The devices classified in this group provide details on the integration of a selective separation membrane into a technically applicable module concept as e.g.:

- a membrane plate with support structure, closed edges and permeate duct
- a spiral wound module with permeate core pipe
- a hollow fibre-type module potted in tube sheets
- a rotating membrane disc mounted to a shaft
- tubular membrane module
- flat membrane module
- pleat-type membrane module
- rotary, reciprocated or vibrated module

The technical concept may include membrane fixing or sealing means or certain feed or permeate side ducts or spaces.

Relationships with other classification places

The groups for apparatus specifically adapted for a certain membrane separation process classified in B01D 61/08, B01D 61/18, B01D 61/28, B01D 61/366 and B01D 61/46 concern a plant wide concept of design. This does not exclude that a specific module concept is disclosed in combination to this concept, which is then classified in B01D 63/00 in addition if applicable.

If a document does not focus on the concept of incorporation of the membrane into the module but on membrane unrelated details (e.g. housing, end caps or locks), the relevant classification would be B01D 65/00. This does not exclude that a specific module concept is disclosed in combination to this concept, which is then classified in B01D 63/00 in addition if applicable.

A specific structure of the membrane as such (like the cross-sectional structure of a hollow fibre or a membrane with surface irregularities) is classified in the relevant B01D 69/00 groups.

References

Informative references

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

Dead end filtration processes and devices	B01D 25/00, B01D 27/00, B01D 29/00, B01D 33/00, B01D 35/00
Separation of gases or vapours by diffusion	B01D 53/22

Drying gases or vapours by filtration	B01D 53/266
Processes of separation using semi-permeable membranes	B01D 61/00
Membrane apparatus specifically adapted for a reverse osmosis or nanofiltration process	B01D 61/08
Membrane apparatus specifically adapted for an ultrafiltration or microfiltration process	B01D 61/18
Apparatus for dialysis	B01D 61/28
Apparatus for electrodialysis	B01D 61/46
Details of membrane modules not related to the membrane parts such as housing or locks	B01D 65/00
Membrane bonding or sealing	B01D 65/003
Processes specially adapted for manufacturing semi-permeable membrane for separation processes	B01D 67/00
Semi-permeable membranes for separation processes characterised by their form, structure	B01D 69/00
Material of semi-permeable membrane for separation processes	B01D 71/00
Honeycomb catalysts and wall flow filters	B01D 2255/915, B01D 2255/9155
Bandages or dressings	A61F 13/00
Drug containing films, membranes or sheets	A61K 9/7007
Methods or apparatus for sterilizing material using filtration	A61L 2/022
Blood dialysis systems, blood oxygenation devices and blood filtration devices with do not focus on the design of the membrane module as such	A61M 1/16, A61M 1/34
Membrane reactors	B01J 19/1893, B01J 19/2475
Multiwell filters	B01L 3/50255
Treatment of water, waste water, sewage, or sludge by means of by dialysis, osmosis or reverse osmosis	C02F 1/44
Treatment of water, waste water, sewage, or sludge by electrochemical separation	C02F 1/469
Membrane bioreactors	C02F 3/1268
Mobile apparatus and plants, e.g. mounted on a vehicle	C02F 2201/008
Enzymology or microbiology with dialysis means	C12M 1/12
Tissue, human, animal or plant cell or virus culture apparatus with ultrafiltration, inverse osmosis or dialysis means	C12M 3/06
Honeycomb structures not relevant for membrane separation, e.g. silencers or catalysts	F01N 3/0222, B01J 35/56
Apparatus for feeding liquid fuel having water separation means as membranes	F02M 37/24
Osmotically driven micropumps	F04B 19/006
Fuel cells	H01M 8/00
Batteries comprising separators	H01M 50/40

Special rules of classification

Classification of additional information:

The classification of additional information is obligatory.

The subgroups under B01D 2313/00 specify details to the membrane modules.

B01D 2315/00 relates to membrane module operation details.

Subgroup indexing codes under B01D 2319/00 specify the membrane module arrangements within a single housing (e.g. series/parallel connections).

Subgroup and main group:

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all of these relevant subgroups are given.

Membrane separation modules as such are to be classified in B01D 63/00 - B01D 63/16 despite their field of application (e.g. though gas separation processes with membranes are classified in B01D 53/22, the modules as such are to be classified in B01D 63/00 - B01D 63/16).

Usually all stand-alone types of modules are classified in B01D 63/00 unless they are an integral part of a specific device such as e.g. lab-on-a-chip, multi-well membrane filters, gas detectors, implantable dialysis means or degasification means in ink jet cartridges.

Further details of subgroups:

B01D 63/00: The subgroup B01D 63/00 is used for module concepts not falling in any of the subgroups.

B01D 63/066: This group applies for honeycomb structures with through-going channels, i.e. suitable for cross-flow. The structurally similar exhaust gas filters (wall flow filters) and catalysts with channels closed at one end are not classified here. (cf. off-gas treatment subgroups B01D 2255/915 and B01D 2255/9155).

The subgroups of B01D 69/04 do not apply for honeycomb structures. Honeycomb filters for gas separation are classified in B01D 46/2418 and subgroups.

B01D 63/067 and B01D 63/14: B01D 63/067 covers tubular membranes bent/pleated along their length dimension (e.g. u-shape) while the subgroup B01D 63/14 covers pleated flat membranes (often arranged in a closed circle).

B01D 63/16: The subgroup B01D 63/16 partly overlaps with the corresponding apparatus classes in B01D 33/00 (filters with moving elements), especially with the subgroup B01D 33/15. The documents are classified with respect to their intended application, i.e. if one of the applications falling under B01D 61/00 is covered, B01D 63/16 would apply.

The subgroups under B01D 2315/02 and B01D 2315/04 further specify membrane module arrangements falling under B01D 63/16.

B01D 63/089

{Modules where the membrane is in the form of a bag, membrane cushion or pad}

Definition statement

This place covers:

Modules wherein the bag-, cushion- or pad-form membrane can be flat but also encompasses additional configurations.

B01D 63/101

{Spiral winding}

Definition statement

This place covers:

Details relating to the action/process of winding the membranes into a spiral-wound membrane module as well as details relating to the apparatus used for winding the membranes if applicable.

References

Informative references

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

Shaping, joining by spiral winding	B29C 53/56 - B29C 53/562
Component parts and operations for shaping, joining by winding	B29C 53/80 - B29C 53/845
Winding spirally to join sheet- or web-like material to tubular articles	B29C 63/12 - B29C 63/145
Membrane, diaphragm indexing codes associated with plastic shaping, joining	B29L 2031/755
Unwinding webs in general	B65H 16/00
Winding webs in general	B65H 18/00

B01D 65/00

Accessories or auxiliary operations, in general, for separation processes or apparatus using semi-permeable membranes

Relationships with other classification places

Dead-end filtration devices, accessories and auxiliary operations are classified according to B01D 25/00 - B01D 35/00.

References

Informative references

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

Accessories and auxiliary operations of dead-end filtration devices	B01D 25/00, B01D 27/00, B01D 29/00, B01D 33/00, B01D 35/00
Accessories specifically adapted for forward osmosis process	B01D 61/0024
Accessories specifically adapted for a reverse osmosis or nanofiltration process	B01D 61/10
Accessories specifically adapted for an ultrafiltration or microfiltration process	B01D 61/20
Accessories specifically for apparatus for dialysis	B01D 61/30

Accessories specifically adapted for pervaporation, membrane distillation, liquid permeation, vapour permeation, osmotic distillation or osmotic evaporation	B01D 61/368
Accessories specifically for apparatus for electrodialysis	B01D 61/52
Regeneration of electrodialysis devices	B01D 61/54
Membrane modules as such	B01D 63/00
Sterilisation in general	A61L 2/00
Accessories and auxiliary operations specifically for apparatus for blood dialysis and filtration	A61M 1/16, A61M 1/34
Cleaning and fouling prevention in general	B08B
Water treatment processes by membrane technology	C02F 1/44
Aerating systems for activated sludge systems	C02F 3/00
Testing of material in general	G01N
Investigating permeability, pore-volume, or surface area of porous materials	G01N 15/08

Special rules of classification

Classification of additional information:

Subgroup and main group:

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all these relevant subgroups are given.

Further details of subgroups:

B01D 65/00 and B01D 65/003 are given together with the relevant subgroups under B01D 2313/00, which specify details to the membrane modules and apparatus which might be of relevance.

B01D 65/00: Accessories for modules and membrane plants which are not directly interrelated with a specific module type, e.g. end caps B01D 65/00 or membrane sealing B01D 65/003.

B01D 65/02: Membrane cleaning and sterilisation, i.e. actions taken or means specifically designed for treating the membrane in between cycles of steady filtration operation.

B01D 65/02 and B01D 65/08: When aeration occurs during filtration operation B01D 65/08 applies. When aeration takes place during cleaning cycles B01D 65/02 applies. Combination of aeration during filtration operation and during cleaning cycles are classified in both groups.

The application of usual cross-flow conditions is not classified in B01D 65/08.

If the process control is of relevance for either membrane cleaning or prevention of membrane fouling, the respective control groups of B01D 61/00 have to be given, if applicable, in combination with the relevant groups under B01D 2311/00.

The classification of additional information is obligatory:

For membrane cleaning processes, B01D 65/02 is given together with the relevant symbols under B01D 2321/00 that specify details of membrane cleaning operations.

For measures for fouling prevention, B01D 65/08 is given together with the relevant symbols under B01D 2321/00 that specify details of membrane fouling prevention operations.

B01D 65/08: Prevention of membrane fouling, i.e. actions taken or means specifically designed for influencing the steady state operation conditions such that fouling is controlled (e.g. aeration during filtration or static mixers etc.).

B01D 65/10: Testing of membranes or membrane apparatus, i.e. devices and methods for determining integrity of the membrane and/or the whole module or for determining characteristic parameters as retention, permeability etc.

B01D 65/06

with special washing compositions

Special rules of classification

The use of indexing codes B01D 2321/16 - B01D 2321/168 with B01D 65/06 is mandatory.

B01D 67/00

Processes specially adapted for manufacturing semi-permeable membranes for separation processes or apparatus

Definition statement

This place covers:

Processes for the production of membranes for separation applications per se, i.e. including the production of the selective layer if applicable onto the support structure or self-supporting.

Semipermeable membranes comprise a continuous layer of material with or without pores capable for mass transfer of a certain species, solvent or gas.

Further process for after-treatment of a membrane are covered under B01D 67/0081

Relationships with other classification places

Production of hollow fibre membranes are classified under B01D 69/08.

In situ polymerization processes as e.g. interfacial polymerization are classified in B01D 69/125. The spinning of hollow fibres is additionally classified in B01D 69/087 and subgroups.

Production of specific shapes of membranes is in the relevant subgroups of B01D 69/00.

Membrane materials are classified under B01D 71/00.

Filter materials using woven or non-woven selective layers or loose particles for separation purposes are classified in B01D 39/00.

The following fields have their own classification schemes for manufacture of membrane:

Membrane specifically manufactured/ adapted for the application in fuel cells (H01M 8/1018 and subgroups).

Production of ion exchange material films/ membranes (C08J 5/22).

Production of battery separators (H01M 50/40).

Double classification with B01D 69/00 may occur if the structures produced are suitable to be used in membrane separation processes.

C08 covers organic macromolecular compounds, their preparation or chemical working-up and compositions based thereon.

References

Informative references

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

Manufacture of hollow fibre membranes	B01D 69/08
Separate or in situ-formation of thin film membranes	B01D 69/122 and B01D 69/125
Membrane material as such	B01D 71/00
Additives used in the membrane preparation	B01D 2323/218
Surface coating to prevent activation of blood	A61L 33/00
Production of catalysts by surface coating processes	B01J 37/02
Shaping by stretching	B29C 55/00
Surface treatment with plasma in general	B29C 59/00
Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts by moulding material on a relatively small portion (e.g. hollow fibre potting) of the preformed parts	B29C 70/845
Microstructural devices	B81B
Micromachined membranes	B81C 1/00158
After-treatment of mortars, concrete, artificial stone or ceramics by coating or impregnating	C04B 41/45
Manufacture of films of plastics	C08J 5/18
Manufacture of shaped structures of ion- exchange resin films, membranes, or diaphragms	C08J 5/22
Electroless plating in general	C23C 18/16
Aluminium anodization in general	C25D 11/04
Membranes for fuel cells	H01M 8/1018
Constructional details or processes of manufacture of separators, membranes, diaphragms for batteries	H01M 50/40

Special rules of classification

Classification in multiple groups:

If only the preparation of the support is defined in detail, the corresponding subgroup in B01D 69/10 must be assigned. The preparation of the support is not classified in B01D 67/00.

Classification of additional information:

The classification of additional information is obligatory.

The subgroups under B01D 2323/00 specify details to the membrane manufacturing methods.

The respective subgroups under B01D 61/00 are given as additional information if a membrane is specifically produced for a membrane process (as e.g. nanofiltration; B01D 61/027 given as additional information).

B01D 69/02 is used in combination with the relevant groups under B01D 2325/00 if the manufacturing process results in specific properties of the membrane product.

Subgroup and main group:

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all these relevant subgroups are given.

Further details of subgroups:

B01D 67/0079: Subgroup B01D 67/0079 concerns the production process of membrane active layers comprising both organic and inorganic materials (as e.g. mixed matrix membranes in B01D 69/148 or hybrid organic inorganic membranes as polysilsesquioxanes). Structures e.g. comprising an inorganic support and an organic separation layer are also to be classified in B01D 67/0079, and also in B01D 69/10 (specific support) if applicable. In addition, the materials of the individual membrane layers of a composite membrane should be classified under B01D 71/00 subgroups. The support material is, however, not classified in B01D 71/00.

B01D 67/0081: The after-treatment subgroups under B01D 67/0081 apply if the membrane separation layer structure is basically maintained but modified in its properties (e.g. rendered hydrophilic or coated without closing the pores).

B01D 67/0093: If specific (e.g. charged) groups are added to the polymer solution before membrane formation, B01D 71/82 takes precedence.

Grafting supported by radiation or plasma is classified in B01D 67/009.

B01D 2323/42: This subgroup is used if details of the manufacturing apparatus are given (dies, roller arrangements, treatment chambers). Details of the spinneret for hollow fibre membranes are classified in B01D 69/085.

B01D 67/00045

{by additive layer techniques, e.g. selective laser sintering [SLS], selective laser melting [SLM] or 3D printing}

References

Informative references

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

Shaping or joining of plastics	B29C
Additive manufacturing	B33Y

B01D 67/0079

{Manufacture of membranes comprising organic and inorganic components}

Definition statement

This place covers:

Processes for formation of membranes made of or comprising metal organic framework [MOF].

Relationships with other classification places

Disclosures also encompassing the membranes per se made of or comprising metal organic framework [MOF] as separating components should be placed also in B01D 71/028.

B01D 67/0088

{Physical treatment with compounds, e.g. swelling, coating or impregnation}

References

Informative references

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

Involving chemical reactions	B01D 67/0093

B01D 67/00933

{by addition of a layer chemically bonded to the membrane}

References

Informative references

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

Adhesives	C09J

B01D 69/00

Semi-permeable membranes for separation processes or apparatus characterised by their form, structure or properties; Manufacturing processes specially adapted therefor

Relationships with other classification places

In general, the production of membranes per se is classified under B01D 67/00; however, production of hollow fibre membranes is classified under B01D 69/08.

In situ polymerization processes, such as interfacial polymerization, are classified in B01D 69/125.

The spinning of hollow fibres is additionally classified in B01D 69/087 and subgroups, and the production of specific shapes of membranes is classified in the relevant areas of B01D 69/00.

Production of membrane modules is classified under B01D 63/00.

Membrane materials are classified under B01D 71/00.

Filter materials using woven or non-woven selective layers or loose particles for separation purposes are to be classified under B01D 39/00.

The following fields have their own classification schemes for manufacture:

Membranes specifically manufactured/adapted for application in fuel cells (H01M 8/1018 and subgroups).

Production of ion exchange material films/membranes (C08J 5/22).

Production of battery separators (H01M 50/40).

References

Informative references

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

Membrane modules	B01D 63/00
Production processes for membranes other than hollow fibre spinning	B01D 67/00
Membrane material as such	B01D 71/00
Additives used in the membrane preparation	B01D 2323/218
Surface coating to prevent activation of blood	A61L 33/00
Diffusers made of flexible or rigid material	B01F 23/2312
Catalysts characterised by their shape or configuration, in the form of membranes	B01J 35/59
Production of catalysts by surface coating processes	B01J 37/02
Shaping by stretching	B29C 55/00
Surface treatment with plasma in general	B29C 59/00
Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts by moulding material on a relative small portion (e.g. hollow fibre potting) of the preformed parts	B29C 70/845
Micro structural devices	B81B
Micromachined membranes	B81C 1/00158
Tubular air diffusers	C02F 3/201
After-treatment of mortars, concrete, artificial stone or ceramics by coating or impregnating	C04B 41/45
Manufacture of films of plastics	C08J 5/18
Manufacture of shaped structures of ion- exchange resin films, membranes, or diaphragms	C08J 5/22
Electroless plating in general	C23C 18/16
Aluminium anodization in general	C25D 11/04
Formation of filaments (e.g. electro-spinning	D01D 5/00
Manufacture of hollow fibres	D01D 5/24
Manufacture of hollow fibres/spinnerets therefore	D01F 1/08
Hoses and pipes made of rubber	F16L 11/12
Membranes for fuel cells	H01M 8/1018
Constructional details or processes of manufacture of separators, membranes, diaphragms for batteries	H01M 50/40

Special rules of classification

Classification of additional information:

If the membrane manufacturing process is defined for a specific material or group of materials, the relevant groups under B01D 71/00 are given in addition. In case of multiple layers, the material of each layer is specified by the respective subgroups under B01D 71/00. Support structure materials are, however, not classified in B01D 71/00.

The classification of additional information is obligatory:

The symbols under B01D 61/00 are used as additional information if a membrane is specifically produced for a certain membrane process (as e.g. nanofiltration; B01D 61/02, given as additional information).

Subgroup and main group:

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all these relevant subgroups are given.

Further details of subgroups:

B01D 69/02 is used in combination with the relevant groups under B01D 2325/00 if the manufacturing process results in specific properties of the membrane product.

B01D 69/04 does not apply for honeycomb structures/monoliths with multiple channels. These kinds of devices are rather classified in B01D 63/066. Only if, for example, special cross-sectional shapes of the channels or surface undulations are present, subgroups under B01D 69/04 can be given in addition to B01D 63/066.

B01D 69/085 and B01D 69/087: Spinning processes and spinnerets for hollow fibres. For further details of the phase inversion process of the spinning of hollow fibres, subgroups of B01D 67/0009 can be given additionally.

B01D 69/10: Specific membrane supports. B01D 69/10 is used for supports not bonded to the selective membrane layer or if only details of the support layer are defined or if the type of support is very unique (as e.g. membranes supported in the pores).

B01D 69/12: Composite membranes, i.e. comprising more than one layer, the layers being integrated. This subgroup is used if support and selective membrane layer form a composite structure, in which both parts are relevant (e.g. by means of the type of bonding or membrane formation or relation of parameters of the support and the selective layer). In particular, if each layer taken separately can be considered a semi-permeable membrane, the structure is considered to be a composite membrane.

B01D 69/122 and B01D 69/125: Subgroups B01D 69/122 and B01D 69/125 cover the manufacturing of ultra-thin (Thin film) membranes on a support and are given in addition to the relevant subgroups in B01D 67/00.

B01D 69/14: Mixed-matrix membranes, i.e. the separation layer comprises a heterogeneous mixture of at least two materials.

B01D 69/141: This subgroup applies if the composition of the membrane solution is relevant for the coagulation process.

B01D 69/061

{Membrane bags or membrane cushions}

Definition statement

This place covers:

Properties of the membranes as such being in the form of membrane bags, pads or cushions, whereas B01D 63/089 covers the membrane module features.

Modules wherein the membrane is not necessarily in the form of a flat bag, cushion or pad.

B01D 69/1213

{Laminated layers}

References

Informative references

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

Layered products	B32B

B01D 69/1214

{Chemically bonded layers, e.g. cross-linking}

References

Informative references

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

After-treatment by addition of a layer chemically bonded to the membrane	B01D 67/00933

B01D 71/00

Semi-permeable membranes for separation processes or apparatus characterised by the material; Manufacturing processes specially adapted therefor

Definition statement

This place covers:

Membranes characterised by a specific material used for the separation layer and methods of preparation specifically adapted for the respective material (e.g. a specific polymer synthesis).

Relationships with other classification places

Generally, the production methods of membranes are covered under B01D 67/00.

Production of specific shapes of membranes falls within the relevant subgroups of B01D 69/00.

Gas separation membranes characterised by their material are additionally classified under B01D 53/228.

Filter materials using woven or non-woven selective layers or loose particles for separation purposes are classified in B01D 39/00.

The following fields have their own classification schemes for manufacture:

Membrane specifically manufactured/adapted for the application in fuel cells (H01M 8/1018 and subgroups).

The production of ion exchange material films/membranes (C08J 5/22).

Production of battery separators (H01M 50/40).

Double classification with groups of B01D 67/00 may occur if the structures produced are suitable to be used in membrane separation processes.

C08 covers organic macromolecular compounds, their preparation or chemical working-up and compositions based thereon.

References

Informative references

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

Membrane production methods	B01D 67/00
Form, structure or properties of membrane materials	B01D 69/00
Hollow-fibre membrane production	B01D 69/08
Surface coating to prevent activation of blood	A61L 33/00
Sorbents; zeolites, synthetic molecular sieves	B01J 20/18
Catalysts comprising molecular sieves; zeolites	B01J 29/00
Production of catalysts by surface-coating processes	B01J 37/02
Shaping by stretching	B29C 55/00
Surface treatment with plasma in general	B29C 59/00
Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts by moulding material on a relatively small portion (e.g. hollow fibre potting) of the preformed parts	B29C 70/845
Microstructural devices	B81B
Micromachined membranes	B81C 1/00158
Characteristic membranes for the separation of hydrogen by diffusion	C01B 3/503
Characteristic membranes for the preparation of oxygen by making use of membranes	C01B 13/0255
Characteristic membranes for the purification or separation of nitrogen by making use of membranes	C01B 21/0444
Characteristic membranes for the physical processing of noble gases by making use of membranes	C01B 23/0047
Compounds having molecular sieve and base exchange properties	C01B 39/00
After-treatment of mortars, concrete, artificial stone or ceramics by coating or impregnating	C04B 41/45
Manufacture of films of plastics	C08J 5/18
Manufacture of shaped structures of ion- exchange resin films, membranes, or diaphragms	C08J 5/22
Electroless plating in general	C23C 18/16
Aluminium anodisation in general	C25D 11/04
Manufacture of hollow fibres	D01D 5/24
Manufacture of hollow fibres/ spinnerets therefore	D01F 1/08
Membranes for fuel cells	H01M 8/1018
Constructional details or processes of manufacture of separators, membranes, diaphragms for batteries	H01M 50/40

Special rules of classification

Classification of additional information:

If the membrane manufacturing process is defined for a specific material or group of materials, the relevant groups under B01D 71/00 are given in addition.

The classification of additional information is obligatory:

The subgroup B01D 69/02, in combination with the relevant subgroups under B01D 2325/00, has to be used if the manufacturing process results in specific properties of the membrane product.

The respective subgroups under B01D 61/00 are used if a membrane is specifically capable for a certain membrane process (as e.g. nanofiltration; B01D 61/027).

If a mixed-matrix membrane is classified under B01D 69/141, the material classification symbol of B01D 71/00 of the continuous phase is given in addition if relevant.

For a blend of two polymers in the separation layer both relevant groups are given.

Support materials according to B01D 69/10 are not classified under B01D 71/00.

In general, the relevant subgroup is given and not the head group. If more than one subgroup of a single head group is relevant for a document, all these relevant subgroups are given.

Further details of subgroups:

B01D 71/76: The individual copolymers in B01D 71/76 are classified with symbols under B01D 71/00.

B01D 71/78 is given if a polymer is grafted before membrane formation. Otherwise B01D 67/0093 applies.

B01D 71/82 is given if a polymer solution is treated before membrane formation by adding specific groups. Otherwise B01D 67/0093 applies.

B01D 71/028

{Molecular sieves (carbon B01D 71/021)}

Definition statement

This place covers:

Membranes made of or comprising metal organic framework [MOF] as separating components.

Relationships with other classification places

Disclosures also encompassing processes for formation of membranes made of or comprising metal organic framework [MOF] should be classified also in B01D 67/0079.

B01D 2201/00

Details relating to filtering apparatus

Definition statement

This place covers:

- Filters used for filtering particles out of a liquid.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Casings, housings or mounting for filters specially adapted for separating dispersed particles from gases or vapours	B01D 2265/00
Multiple filter elements specially adapted for separating dispersed particles from gases or vapours	B01D 2267/00
Sealing for filters specially adapted for separating dispersed particles from gases or vapours	B01D 2271/00
Filter media structures for filters specially adapted for separating dispersed particles from gases or vapours	B01D 2275/00
Filters specially adapted for separating dispersed particles from gases or vapours characterised by the position of the filter in relation to the gas stream	B01D 2277/00
Filters adapted for separating dispersed particles from gages or vapours specially modified for specific uses	B01D 2279/00

B01D 2221/00

Applications of separation devices

Definition statement

This place covers:

This group relates to the application of the separation devices. It should be assigned if the application implicitly requires certain features (e.g. for separators installed in gullies, a shortcut between inlet and outlet for the fluid to be treated) and if it is deemed not necessary to assign a class corresponding to the technical field of application (E03F in the example before) or if a field of application is not reflected by a class (e.g. cleaning the polluted ambient air in cities).

Relationships with other classification places

If there exists a field of application, a invention information symbol in that field should be assigned rather than an symbol in the present group.

References

Informative references

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

Attention is drawn to the following places, which may be of interest for search (especially for mechanical features):

Filters making use of electricity or magnetism	B01D 35/05
Treating manure	A01C 3/00
Condensing atmospheric humidity	A01G 15/00
Air conditioning for animal housing	A01K 1/00
Devices used for fish ponds	A01K 61/00 and A01K 63/00
Treatment of water for aquaria	A01K 63/04

Processing slaughtering residues	A22B 5/00
Clarifying non-alcoholic beverages	A23L 2/70
vacuum cleaners	A47L 9/18
Sedimentation devices for dental use	A61C 17/065
Sedimentation devices for medical purposes, body liquids	A61M 1/3693
Chemical or physical processes	B01J
Separation of particles from gases and vapours by electrostatic effect	B03C 3/00
Paint sludge treatment	B05B 14/462
Details of spraying plants	B05B 15/00
Spraying devices using ultrasonic energy	B05B 17/06
Methods or apparatus specially adapted for transmitting mechanical vibrations	B06B 3/00
Preventing escape of fumes from the area where they are produced	B08B 15/00
Removing chips from sawing machines	B23D 59/00
Removing chips from machine tools	B23Q 11/00
Removing dust for machines for working stones	B28D 7/02
Ink filters for printers	B41J 2/17563
Barges for collection of pollution from open water	B63B 35/32
Fluidising means for discharging large containers	B65D 88/72
Devices for separating the materials from propellant gas in material conveyors	B65G 53/62
Treatment of water, waste water, sewage, or sludge when structural details of general interest are disclosed.	C02F
Refining hydrocarbon oils by centrifugation	C10G 31/10
Dust removal from combustible gases containing carbon monoxide	C10K 1/02
Working-up lubricants	C10M 175/00
Clarifying alcoholic beverages	C12H 1/06
Apparatus for microbiology	C12M 1/00
Dust arrester for blast furnaces	C21B 7/22
Offtakes or separating apparatus for converter waste gases or dust in the manufacture of carbon-steel	C21C 5/40
After treatment in chemical coating in semiconductor industry	C23C 16/56
Details of domestic laundry driers	D06F 58/00
Treatment of exhaust gases along roads	E01C 1/005
Dispersing fog	**E01H13/10**
Cleaning or keeping clear the surface of open water; Apparatus therefore	E02B 15/00
Obtaining drinking water from atmospheric humidity	E03B 3/18
Kitchen sinks	E03C 1/00
Other installations or implements for operating sewer systems (cleaning, emptying, maintenance)	E03F 7/00
Sludge tanker	E03F 7/10

Treatment of water for swimming pools	E04H 4/1209
Sedimentation devices used in drilling boreholes	E21B 21/00
Separation of well effluents	E21B 43/34
Purifying air before leaving the crankcase	F01M 13/04
Exhaust or silencing apparatus having means for purifying	F01N 3/02
Exhaust or silencing apparatus for marine propulsion	F01N 13/004
Combustion air cleaners	F02M 35/02
Exhaust ducts	F23J 11/00
Treating smoke and fumes using Washing fluids	F23J 15/04
Removing cooking fumes	F24C 15/20
Air conditioning	F24F 3/00
Direct contact trickle coolers	F28C 1/00
Removal of water droplets from fuel cell exhaust gases	H01M 8/04156

B01D 2239/00

Aspects relating to filtering material for liquid or gaseous fluids

Definition statement

This place covers:

Details of filtering material as put forward under the corresponding maingroup B01D 39/00

References

Informative references

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

Antibacterial additives	B01D 46/0028; B01D 2239/0442
Electret	B01D 46/0032; B01D 2239/0435
Adsorbents	B01D 46/0036; B01D 2239/0407
Fire retardant/Heat resistant properties	B01D 46/0093; B01D 2239/0457
Nanofibers	B01D 46/546; B01D 2239/025
More than one layers in the filter material	B01D 2275/10; B01D 2239/065
Wound layers	B01D 2275/105; B01D 2239/0695
Porosity, Pore size	B01D 2275/30 and subgroups; B01D 2239/1208, B01D 2239/1216

B01D 2265/00

Casings, housings or mounting for filters specially adapted for separating dispersed particles from gases or vapours

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2267/00

Multiple filter elements specially adapted for separating dispersed particles from gases or vapours

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2271/00

Sealings for filters specially adapted for separating dispersed particles from gases or vapours

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2273/00

Operation of filters specially adapted for separating dispersed particles from gases or vapours

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2275/00

Filter media structures for filters specially adapted for separating dispersed particles from gases or vapours

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2277/00

Filters specially adapted for separating dispersed particles from gases or vapours characterised by the position of the filter in relation to the gas stream

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2279/00

Filters adapted for separating dispersed particles from gases or vapours specially modified for specific uses

Definition statement

This place covers:

- Filters used for filtering particles out of a gas.
- Only mechanical filtering is taking place, no reaction, no absorption or adsorption is involved

References

Limiting references

This place does not cover:

Details for filters specially adapted for separating dispersed particles from liquids	B01D 2201/00

Informative references

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

Filter materials	B01D 39/00 and B01D 2239/00
Filtration in suction cleaners	A47L 9/10
Filtration in sterilisation	A61L 9/00
Air bags	B60R 21/16
Filtration of exhaust gases from IC engines	F01N 3/021
Filtration of intake air for IC engines	F02M 35/024
Filtration in air conditioning	F24F 8/10

B01D 2311/00

Details relating to membrane separation process operations and control

Special rules of classification

These subgroups describe additional information and are used in accordance with the Rules for B01D 61/00 - B01D 71/00.

Combination sets (C-Sets):

C-Sets statement:

- In group B01D 2311/00, additional process steps taking place before the plant starts operation (B01D 61/02), in the feed stream (B01D 61/04), in the permeate stream (B01D 61/06) or the concentrate stream (B01D 61/08) are classified in the form of C-Sets.
- In these C-Sets, the base symbol is selected from B01D 2311/02-B01D 2311/08 whereas the subsequent symbol(s) representing the processes related to are taken from the groups B01D 2311/10-B01D 2311/2696. The base symbol identifies where the additional operation takes place and the subsequent symbols identify which process are carried out.
- All disclosed operations taking place in a process are classified in one C-Set for the feed, permeate or concentrate streams respectively.

C-Sets syntax rules:

- Each C-Sets can contain two or more symbols.
- The order of subsequent symbols in these C-Sets is not relevant.
- Alternative embodiments or operation are classified as separate C-Sets.

C-Sets examples:

Reverse osmosis process with

- the feed stream comprising a pre-filtration and an optional pH regulation of the feed or as an alternative to pH regulation, an ion exchange

the permeate stream comprising a UV irradiation, is classified as B01D 2311/04, B01D 2311/2649, B01D 2311/18) (filtration and pH control in feed stream),

(B01D 2311/04, B01D 2311/2649, B01D 2311/2623) (alternative, filtration and ion exchange in feed stream) and

(B01D 2311/06, B01D 2311/2619) (UV irradiation in permeate stream).

B01D 2313/00

Details relating to membrane modules or apparatus

Special rules of classification

These subgroups describes additional information and has to be used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.

B01D 2315/00

Details relating to the membrane module operation

Special rules of classification

These subgroups describes additional information and has to be used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.

B01D 2317/00

Membrane module arrangements within a plant or an apparatus

References

Informative references

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

Membrane assemblies with one housing	B01D 2319/00

Special rules of classification

The subgroups of B01D 2317/00 describe additional information and are used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.

B01D 2319/00

Membrane assemblies within one housing

References

Informative references

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

Module or elements arrangements within a plant or an apparatus	B01D 2317/00

Special rules of classification

The subgroups of B01D 2319/00 describes additional information and are used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.

B01D 2321/00

Details relating to membrane cleaning, regeneration, sterilization or to the prevention of fouling

Special rules of classification

These subgroups describes additional information and has to be used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.

B01D 2323/00

Details relating to membrane preparation

Special rules of classification

These subgroups describes additional information and has to be used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.

B01D 2325/00

Details relating to properties of membranes

Special rules of classification

These subgroups describes additional information and has to be used in accordance with the Rules for subgroups B01D 61/00 - B01D 71/00.