

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SEPARATING; MIXING

B01 PHYSICAL OR CHEMICAL PROCESSES OR APPARATUS IN GENERAL

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](#))

NOTES

- This subclass covers:
 - evaporation, distillation, crystallisation, filtration, dust precipitation, gas cleaning, absorption, adsorption;
 - similar processes which are not concerned with, or limited to, separation, except in the case of absorption or adsorption.
- In this subclass, the terms or expressions are used with the meaning indicated:
 - "filtration" and analogous terms include straining solids from fluids. Filtration is a process that normally uses a filter medium;
 - "filter medium" is a porous material or porous arrangement of material used to filter solids from fluids;
 - "filtering element" is 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" is 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" is 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" consists of filtering elements combined with housings, cleaning arrangements, motor or the 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 operation 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.
- For apparatus used in drying or evaporation, class [F26](#) takes precedence over this subclass.
- Group [B01D 59/00](#) takes precedence over the other groups of this subclass and over other subclasses in class [B01](#).
- {In this subclass, combination sets [C-Sets] are used. The detailed information about the C-Sets construction and the associated syntax rules are found in the definitions of [B01D](#).}

WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

B01D 15/04	covered by	B01J 39/00 - B01J 49/90
B01D 17/022	covered by	B01D 17/0202
B01D 17/025	covered by	B01D 17/0208
B01D 17/028	covered by	B01D 17/0211
B01D 17/032	covered by	B01D 17/0214
B01D 17/035	covered by	B01D 17/0205
B01D 17/038	covered by	B01D 17/0217
B01D 17/05	covered by	B01D 17/047
B01D 17/09	covered by	B01D 17/005
B01D 25/133	covered by	B01D 25/285
B01D 25/168	covered by	B01D 25/285
B01D 29/37	covered by	B01D 29/336 , B01D 29/356
B01D 35/01	covered by	B01D 36/001
B01D 61/26	covered by	A61M 1/1656
B01D 61/34	covered by	A61M 1/16

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(continued) 2. {In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme. }

- 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](#))
- 1/0005 . {Evaporating devices suitable for floating on water}
 - 1/0011 . {Heating features}
 - 1/0017 . . {Use of electrical or wave energy ([B01D 1/0029](#) takes precedence)}
 - 1/0023 . . . {Induction heating}
 - 1/0029 . . {Use of radiation}
 - 1/0035 . . . {Solar energy (for treatment of water [C02F 1/14](#))}
 - 1/0041 . . {Use of fluids}
 - 1/0047 . . . {in a closed circuit ([B01D 3/007](#) takes precedence)}
 - 1/0052 . . . {Use of a liquid transfer medium or intermediate fluid, e.g. bain-marie}
 - 1/0058 . . {Use of waste energy from other processes or sources, e.g. combustion gas (for water treatment [C02F 1/16](#))}
 - 1/0064 . {Feeding of liquid into an evaporator}
 - 1/007 . . {the liquid feed being split up in at least two streams before entering the evaporator}
 - 1/0076 . . {Maintaining the liquid in the evaporator at a constant level}
 - 1/0082 . {Regulation; Control}
 - 1/0088 . {Cascade evaporators}
 - 1/0094 . {with forced circulation}
 - 1/02 . Evaporators with heating coils
 - 1/04 . Evaporators with horizontal tubes
 - 1/06 . Evaporators with vertical tubes
 - 1/065 . . {by film evaporating}
 - 1/08 . . with short tubes ([B01D 1/12](#) {[B01D 1/065](#)} take precedence)
 - 1/10 . . with long tubes, e.g. Kestner evaporators ([B01D 1/12](#) {[B01D 1/065](#)} take precedence)
 - 1/12 . . and forced circulation
 - 1/14 . with heated gases or vapours {or liquids} in contact with the liquid
 - 1/16 . by spraying ([B01D 1/22](#) takes precedence)
 - 1/18 . . to obtain dry solids ([B01D 1/24](#) takes precedence)
 - 1/20 . . Sprayers (in general [B05B](#))
 - 1/22 . by bringing a thin layer of the liquid into contact with a heated surface {([B01D 1/065](#) takes precedence)}
 - 1/221 . . {Composite plate evaporators}
 - 1/222 . . {In rotating vessels; vessels with movable parts}
 - 1/223 . . . {containing a rotor}
 - 1/225 {with blades or scrapers}
 - 1/226 {in the form of a screw or with helical blade members}
 - 1/227 {with brushes}
 - 1/228 . . . {horizontally placed cylindrical container or drum ([B01D 1/223](#) takes precedence)}
 - 1/24 . . to obtain dry solids
 - 1/26 . Multiple-effect evaporating
 - 1/28 . with vapour compression
- 1/2803 . . {Special features relating to the vapour to be compressed}
 - 1/2806 . . . {The vapour is divided in at least two streams and only a part of the vapour is compressed}
 - 1/2809 {At least two streams are compressed}
 - 1/2812 . . . {The vapour is coming from different sources}
 - 1/2815 {At least one source is a compressor}
 - 1/2818 . . . {Cleaning of the vapour before compression, e.g. demisters, washing of the vapour}
 - 1/284 . . {Special features relating to the compressed vapour}
 - 1/2843 . . . {The compressed vapour is divided in at least two streams}
 - 1/2846 . . . {The compressed vapour is not directed to the same apparatus from which the vapour was taken off}
 - 1/285 . . . {In combination with vapour from an other source}
 - 1/2853 {At least one of the other sources is a compressor, ejector}
 - 1/2856 . . . {The compressed vapour is used for heating a reboiler or a heat exchanger outside an evaporator}
 - 1/2881 . . {Compression specifications (e.g. pressure, temperature, processes)}
 - 1/2884 . . {Multiple effect compression ([B01D 1/2815](#) takes precedence)}
 - 1/2887 . . {The compressor is integrated in the evaporation apparatus}
 - 1/289 . . {Compressor features (e.g. constructions, details, cooling, lubrication, driving systems)}
 - 1/2893 . . . {Driving systems}
 - 1/2896 . . {Control, regulation}
 - 1/30 . Accessories for evaporators {; Constructional details thereof}
 - 1/305 . . {Demister (vapour-liquid separation)}
- 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](#))
- 3/001 . {Processes specially adapted for distillation or rectification of fermented solutions}
 - 3/002 . . {by continuous methods}
 - 3/003 . . {Rectification of spirit}
 - 3/004 . . . {by continuous methods}
 - 3/005 {Combined distillation and rectification}
 - 3/006 . {by vibration}
 - 3/007 . {Energy recuperation; Heat pumps}
 - 3/008 . {Liquid distribution}
 - 3/009 . {in combination with chemical reactions}
 - 3/02 . in boilers or stills
 - 3/04 . pipe stills
 - 3/06 . Flash distillation
 - 3/065 . . {Multiple-effect flash distillation (more than two traps)}

- 3/08 . . in rotating vessels; Atomisation on rotating discs
([B01D 1/222](#) , [B01D 3/10](#) take precedence)
- 3/085 . . {using a rotary evaporator}
- 3/10 . . Vacuum distillation ([B01D 3/12](#) takes precedence)
- 3/101 . . {Recirculation of the fluid used as fluid working medium in a vacuum creating device}
- 3/103 . . {by using a barometric column}
- 3/105 . . {with the use of an ejector for creating the vacuum, the ejector being placed between evaporator or distillation devices}
- 3/106 . . {with the use of a pump for creating vacuum and for removing the distillate}
- 3/108 . . {using a vacuum lock for removing the concentrate during distillation}
- 3/12 . . Molecular distillation
- 3/14 . . Fractional distillation {or use of a fractionation or rectification column}
- 3/141 . . {where at least one distillation column contains at least one dividing wall}
- 3/143 . . {by two or more of a fractionation, separation or rectification step}
- 3/145 . . . {One step being separation by permeation}
- 3/146 . . . {Multiple effect distillation}
- 3/148 . . . {in combination with at least one evaporator}
- 3/16 . . Fractionating columns in which vapour bubbles through liquid ([packing elements B01J 19/30](#), [B01J 19/32](#))
- 3/163 . . . {Plates with valves}
- 3/166 . . . {Heating and/or cooling of plates}
- 3/18 . . . with horizontal bubble plates
- 3/20 Bubble caps; Risers for vapour; Discharge pipes for liquid
- 3/205 {Bubble caps}
- 3/22 . . . with horizontal sieve plates or grids; Construction of sieve plates or grids
- 3/225 {Dual-flow sieve trays}
- 3/24 . . . with sloping plates or elements mounted stepwise
- 3/26 . . Fractionating columns in which vapour and liquid flow past each other, or in which the fluid is sprayed into the vapour, or in which a two-phase mixture is passed in one direction
- 3/28 . . . Fractionating columns with surface contact and vertical guides, e.g. film action
- 3/30 . . Fractionating columns with movable parts or in which centrifugal movement is caused
- 3/32 . . Other features of fractionating columns {; Constructional details of fractionating columns not provided for in groups [B01D 3/16](#) - [B01D 3/30](#)}
- 3/322 . . . {Reboiler specifications}
- 3/324 . . . {Tray constructions}
- 3/326 {Tray supports}
- 3/328 {Sealing between the column and the trays}
- 3/34 . . with one or more auxiliary substances
- 3/343 . . {the substance being a gas}
- 3/346 . . . {the gas being used for removing vapours, e.g. transport gas}
- 3/36 . . Azeotropic distillation
- 3/38 . . Steam distillation
- 3/40 . . Extractive distillation
- 3/42 . . Regulation; Control
- 3/4205 . . {Reflux ratio control splitter}
- 3/4211 . . . {of columns}
- 3/4216 . . . {Head stream}
- 3/4222 . . . {Head- and side stream}
- 3/4227 . . . {Head- and bottom stream}
- 3/4233 . . . {Head- and feed stream}
- 3/4238 . . . {Head-, side- and bottom stream}
- 3/4244 . . . {Head-, side- and feed stream}
- 3/425 . . . {Head-, bottom- and feed stream}
- 3/4255 . . . {Head-, side-, bottom- and feed stream}
- 3/4261 . . . {Side stream}
- 3/4266 . . . {Side- and bottom stream}
- 3/4272 . . . {Side- and feed stream}
- 3/4277 . . . {Side-, bottom- and feed stream}
- 3/4283 . . . {Bottom stream}
- 3/4288 . . . {Bottom- and feed stream}
- 3/4294 . . . {Feed stream}
- 5/00** **Condensation of vapours; Recovering volatile solvents by condensation ([B01D 8/00](#) takes precedence; condensers [F28B](#))**
- 5/0003 . . {by using heat-exchange surfaces for indirect contact between gases or vapours and the cooling medium}
- 5/0006 . . {Coils or serpentines}
- 5/0009 . . {Horizontal tubes}
- 5/0012 . . {Vertical tubes}
- 5/0015 . . {Plates}
- 5/0018 . . {Dome shaped ([B01D 5/0066](#) takes precedence)}
- 5/0021 . . {Vortex}
- 5/0024 . . {Rotating vessels or vessels containing movable parts}
- 5/0027 . . {by direct contact between vapours or gases and the cooling medium}
- 5/003 . . . {within column(s)}
- 5/0033 . . {Other features}
- 5/0036 . . {Multiple-effect condensation; Fractional condensation}
- 5/0039 . . {Recuperation of heat, e.g. use of heat pump(s), compression}
- 5/0042 . . {Thermo-electric condensing; using Peltier-effect}
- 5/0045 . . {Vacuum condensation}
- 5/0048 . . {Barometric condensation}
- 5/0051 . . {Regulation processes; Control systems, e.g. valves}
- 5/0054 . . . {General arrangements, e.g. flow sheets}
- 5/0057 . . {in combination with other processes}
- 5/006 . . . {with evaporation or distillation}
- 5/0063 {Reflux condensation}
- 5/0066 {Dome shaped condensation}
- 5/0069 . . . {with degasification or deaeration}
- 5/0072 . . . {with filtration}
- 5/0075 . . . {with heat exchanging ([B01D 5/0039](#) takes precedence)}
- 5/0078 . . {characterised by auxiliary systems or arrangements}
- 5/0081 . . . {Feeding the steam or the vapours}
- 5/0084 . . . {Feeding or collecting the cooling medium ([B01D 5/0087](#) takes precedence)}
- 5/0087 . . . {Recirculating of the cooling medium}
- 5/009 . . . {Collecting, removing and/or treatment of the condensate}

B01D

5/0093	. . {Removing and treatment of non condensable gases}	11/02	. of solids
5/0096	. . {Cleaning (cleaning in general B08B)}		NOTE
7/00	Sublimation (B01D 8/00 takes precedence; freeze-drying F26)		Combinations of characteristics of individual groups, e.g. B01D 11/0226 and B01D 11/028 are expressed as B01D 11/0226 + B01D 11/028
7/02	. Crystallisation directly from the vapour phase (into single crystals C30B 23/00)	11/0203	. . {with a supercritical fluid}
8/00	Cold traps; Cold baffles (pumps for evacuating by condensing or freezing F04B 37/08)	11/0207	. . {Control systems}
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)	11/0211	. . {in combination with an electric or magnetic field}
9/0004	. {cooling by heat exchange (by evaporation of components of the mixture to be separated B01D 9/0013 ; refrigeration machines F25B)}	11/0215	. . {Solid material in other stationary receptacles}
9/0009	. . {by direct heat exchange with added cooling fluid}	11/0219	. . . {Fixed bed of solid material}
9/0013	. . {by indirect heat exchange}	11/0223	. . . {Moving bed of solid material (see also B01D 11/0261)}
9/0018	. {Evaporation of components of the mixture to be separated}	11/0226	. . . . {with the general transport direction of the solids parallel to the rotation axis of the conveyor, e.g. worm}
9/0022	. . {by reducing pressure}	11/023	. . . . {using moving bands, trays fixed on moving transport chains}
9/0027	. . {by means of conveying fluid, e.g. spray-crystallisation (spray-drying F26B)}	11/0234	. . . . {using other slow rotating arms or elements, whereby the general transport direction of the solids is not parallel to the rotation axis, e.g. perpendicular (B01D 11/0238 takes precedence)}
9/0031	. . {by heating (B01D 9/0022 , B01D 9/0027 take precedence)}	11/0238	. . . . {on fixed or rotating flat surfaces, e.g. tables combined with rotating elements or on rotating flat surfaces}
9/0036	. {Crystallisation on to a bed of product crystals; Seeding}	11/0242	. . . . {in towers, e.g. comprising contacting elements}
9/004	. {Fractional crystallisation; Fractionating or rectifying columns}	11/0246	. . . . . {comprising rotating means}
9/0045	. . {Washing of crystals, e.g. in wash columns}	11/0249	. . . . . {comprising jet means}
9/005	. {Selection of auxiliary, e.g. for control of crystallisation nuclei, of crystal growth, of adherence to walls; Arrangements for introduction thereof}	11/0253	. . . {Fluidised bed of solid materials}
9/0054	. . {Use of anti-solvent}	11/0257	. . . . {using mixing mechanisms, e.g. stirrers, jets (B01D 11/0242 takes precedence)}
9/0059	. {General arrangements of crystallisation plant, e.g. flow sheets}	11/0261	. . {comprising vibrating mechanisms, e.g. mechanical, acoustical}
9/0063	. {Control or regulation (control per se G05)}	11/0265	. . . {Applying ultrasound}
9/0068	. {Prevention of crystallisation}	11/0269	. . {Solid material in other moving receptacles (B01D 11/0238 takes precedence)}
9/0072	. {Crystallisation in microfluidic devices}	11/0273	. . . {in rotating drums}
9/0077	. {Screening for crystallisation conditions or for crystal forms}	11/0276	. . . . {with the general transport direction of the solids parallel to the rotation axis of the conveyor, e.g. spirals}
9/0081	. {Use of vibrations, e.g. ultrasound}	11/028	. . {Flow sheets}
2009/0086	. {Processes or apparatus therefor}	11/0284	. . . {Multistage extraction}
2009/009	. . {Separation of organic compounds by selective or extractive crystallisation with the aid of auxiliary substances forming complex or molecular compounds, e.g. with ureum, thiourem or metal salts}	11/0288	. . {Applications, solvents}
2009/0095	. . . {with the aid of other complex forming substances than ureum, thiourem or metal salts}	11/0292	. . {Treatment of the solvent}
9/02	. from solutions	11/0296	. . . {Condensation of solvent vapours (condensation in general B01D 5/00)}
9/04	. . concentrating solutions by removing frozen solvent therefrom	11/04	. of solutions which are liquid
11/00	Solvent extraction	11/0403	. . {with a supercritical fluid}
2011/002	. {Counter-current extraction}	11/0407	. . . {the supercritical fluid acting as solvent for the solute}
2011/005	. {Co-current extraction}	11/0411	. . . {the supercritical fluid acting as solvent for the solvent and as anti-solvent for the solute, e.g. formation of particles from solutions}
2011/007	. {Extraction using a solvent in the gas phase}	11/0415	. . {in combination with membranes}
		11/0419	. . {in combination with an electric or magnetic field or with vibrations}
		11/0423	. . . {Applying ultrasound}
		11/0426	. . {Counter-current multistage extraction towers in a vertical or sloping position}

- 11/043 . . . {with stationary contacting elements, sieve plates or loose contacting elements}
- 11/0434 . . . {comprising rotating mechanisms, e.g. mixers, rotational oscillating motion, mixing pumps}
- 11/0438 . . . {comprising vibrating mechanisms, electromagnetic radiations}
- 11/0442 . . . {Mixers with gas-agitation}
- 11/0446 . . {Juxtaposition of mixers-settlers}
- 11/0449 . . . {with stationary contacting elements}
- 11/0453 . . . {with narrow passages limited by plates, walls, e.g. helically coiled tubes ([B01D 11/0461](#) takes precedence)}
- 11/0457 . . . {comprising rotating mechanisms, e.g. mixers, mixing pumps}
- 11/0461 . . . {mixing by counter-current streams provoked by centrifugal force}
- 11/0465 . . . {comprising vibrating mechanisms, radiations}
- 11/0469 . . . {with gas agitation}
- 11/0473 . . . {Jet mixers, venturi mixers}
- 11/0476 . . {Moving receptacles, e.g. rotating receptacles}
- 11/048 . . . {Mixing by counter-current streams provoked by centrifugal force, in rotating coils or in other rotating spaces}
- 11/0484 . . {Controlling means}
- 11/0488 . . {Flow sheets}
- 11/0492 . . {Applications, solvents used}
- 11/0496 . . {by extraction in microfluidic devices}
- 12/00 Displacing liquid, e.g. from wet solids or from dispersions of liquids or from solids in liquids, by means of another liquid**
- 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**
- 15/02 . with moving adsorbents
- 15/08 . Selective adsorption, e.g. chromatography
- NOTE**
- 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](#)
- 15/10 . . characterised by constructional or operational features
- 15/12 . . . relating to the preparation of the feed
- 15/125 {Pre-filtration}
- 15/14 . . . relating to the introduction of the feed to the apparatus
- 15/16 . . . relating to the conditioning of the fluid carrier
- 15/161 {Temperature conditioning}
- 15/163 {Pressure or speed conditioning}
- 15/165 {Flash chromatography}
- 15/166 {Fluid composition conditioning, e.g. gradient}
- 15/168 {pH gradient, chromatofocusing, i.e. separation according to the isoelectric point pI}
- 15/18 . . . relating to flow patterns
- 15/1807 {using counter-currents, e.g. fluidised beds}
- 15/1814 {recycling of the fraction to be distributed}
- 15/1821 {Simulated moving beds}
- 15/1828 {characterized by process features}
- 15/1835 {Flushing}
- 15/1842 {characterized by apparatus features}
- 15/185 {characterized by the components to be separated}
- 15/1857 {Reactive simulated moving beds}
- 15/1864 {using two or more columns}
- 15/1871 {placed in series}
- 15/1878 {for multi-dimensional chromatography}
- 15/1885 {placed in parallel}
- 15/1892 {the sorbent material moving as a whole, e.g. continuous annular chromatography, true moving beds}
- 15/20 . . . relating to the conditioning of the sorbent material
- 15/203 {Equilibration or regeneration}
- 15/206 {Packing or coating}
- 15/22 . . . relating to the construction of the column
- 15/24 . . . relating to the treatment of the fractions to be distributed
- {Intermediate storage of effluents}
- {Adding materials to the effluents}
- {Fraction collectors}
- . . . characterised by the separation mechanism
- {Adsorption chromatography}
- . . . Partition chromatography
- 15/305 {Hydrophilic interaction chromatography [HILIC]}
- 15/32 . . . Bonded phase chromatography
- 15/322 {Normal bonded phase}
- 15/325 {Reversed phase}
- 15/327 {with hydrophobic interaction}
- 15/34 . . . Size selective separation, e.g. size exclusion chromatography, gel filtration, permeation
- {Perfusive chromatography}
- 15/36 . . . involving ionic interaction
- 15/361 {Ion-exchange}
- 15/362 {Cation-exchange}
- 15/363 {Anion-exchange}
- 15/364 {Amphoteric or zwitterionic ion-exchanger}
- 15/365 {Ion-exclusion}
- 15/366 {Ion-pair, e.g. ion-pair reversed phase}
- 15/367 {Ion-suppression}
- 15/368 {Cation- pi interaction}
- 15/38 . . . involving specific interaction not covered by one or more of groups [B01D 15/265](#) - [B01D 15/36](#)
- 15/3804 {Affinity chromatography}
- 15/3809 {of the antigen-antibody type, e.g. protein A, G, L chromatography}
- 15/3814 {of the substrate or co-factor - enzyme type}
- 15/3819 {of the nucleic acid-nucleic acid binding protein type}

- 15/3823 {of other types, e.g. avidin, streptavidin, biotin}
- 15/3828 {Ligand exchange chromatography, e.g. complexation, chelation or metal interaction chromatography}
- 15/3833 {Chiral chromatography}
- 2015/3838 {Ligand exchange chromatography, e.g. complexation chromatography, chelation chromatography, metal interaction chromatography}
- 15/3842 {Micellar chromatography}
- 15/3847 {Multimodal interactions}
- 15/3852 {using imprinted phases or molecular recognition; using imprinted phases}
- 15/3857 {Reaction chromatography}
- 15/3861 {using an external stimulus}
- 15/3866 {using ultra-sound}
- 15/3871 {using light}
- 15/3876 {modifying the temperature}
- 15/388 {modifying the pH}
- 15/3885 {Using electrical or magnetic means}
- 2015/389 {using ultra-sound}
- 2015/3895 {using light}
- 15/40 using supercritical fluid as mobile phase or eluent
- 15/42 characterised by the development mode, e.g. by displacement or by elution
- 15/422 {Displacement mode}
- 15/424 {Elution mode}
- 15/426 {Specific type of solvent}
- 15/428 {Frontal mode}
- 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)**
- NOTE**
- in this group, documents are classified and arranged according to a combination system limited to the symbols of the group and subgroups of [B01D 17/00](#). In this system each combination is indicated, also of subgroups depending from the same group, e.g. [B01D 17/041](#) + [B01D 17/042](#)
- 17/005 {by thermal diffusion}
- 17/02 Separation of non-miscible liquids
- 17/0202 {by ab- or adsorption}
- 17/0205 {by gas bubbles or moving solids}
- 17/0208 {by sedimentation}
- 17/0211 {with baffles}
- 17/0214 {with removal of one of the phases}
- 17/0217 {by centrifugal force}
- 17/04 Breaking emulsions
- 17/041 {with moving devices}
- 17/042 {by changing the temperature}
- 17/044 {by changing the pressure}
- 17/045 {with coalescers}
- 17/047 {with separation aids}
- 17/048 {by changing the state of aggregation}
- 17/06 Separation of liquids from each other by electricity
- 17/08 {Thickening liquid suspensions by filtration}
- 17/085 {with membranes}
- 17/10 {with stationary filtering elements}
- 17/12 Auxiliary equipment particularly adapted for use with liquid-separating apparatus, e.g. control circuits
- 19/00 Degasification of liquids**
- 19/0005 {with one or more auxiliary substances}
- 19/001 {by bubbling steam through the liquid ([B01D 19/0042](#), [B01D 19/0047](#) and [B01D 19/0052](#) take precedence)}
- 19/0015 {in contact columns containing plates, grids or other filling elements}
- 19/0021 {by bringing the liquid in a thin layer}
- 19/0026 {in rotating vessels or in vessels containing movable parts}
- 19/0031 {by filtration}
- 19/0036 {Flash degasification (the other groups take precedence)}
- 19/0042 {modifying the liquid flow ([B01D 19/0021](#) takes precedence)}
- 19/0047 {Atomizing, spraying, trickling}
- 19/0052 {in rotating vessels, vessels containing movable parts or in which centrifugal movement is caused ([B01D 19/0026](#) takes precedence)}
- 19/0057 {the centrifugal movement being caused by a vortex, e.g. using a cyclone, or by a tangential inlet}
- 19/0063 {Regulation, control including valves and floats (for construction and details of valves [F16K](#))}
- 19/0068 {General arrangements, e.g. flowsheets ([B01D 19/0063](#) takes precedence)}
- 19/0073 {by a method not covered by groups [B01D 19/0005](#) - [B01D 19/0042](#)}
- 19/0078 {by vibration}
- 19/0084 {using an electric current}
- 19/0089 {using a magnetic field (magnetic separation in general [B03C 1/00](#))}
- 19/0094 {by using a vortex, cavitation}
- 19/02 Foam dispersion or prevention (during boiling [B01B 1/02](#); during fermentation [C12](#))
- 19/04 by addition of chemical substances
- NOTES**
1. Antifoam compositions containing a specific compound as the main substance are only classified in the, for this specific compound, corresponding [B01D 19/0404](#) subgroup (e.g. polysiloxanes receive the classification [B01D 19/0409](#)); when the specific compound(s) is (are) not the main substance, then the attributed classification for this compound(s) is a combination of [B01D 19/0404](#) + the corresponding [B01D 19/0404](#) subgroup(s), (e.g. hydrocarbons containing silica are classified in [B01D 19/0404](#) + [B01D 19/0409](#)).
- If the main substance is a mixture containing more than one specific compound, then the attributed classification is a combination of the corresponding [B01D 19/0404](#) subgroup of the specific compounds, (e.g. benzene sulfonate

B01D

B01D 19/04
(continued)

and an amide are classified in [B01D 19/0413](#) + [B01D 9/02](#)).

2. In groups [B01D 19/0404](#) - [B01D 19/0495](#), in the absence of an indication to the contrary, an invention is classified in the last appropriate place].

- 19/0404 . . . {characterised by the nature of the chemical substance}
19/0409 {compounds containing Si-atoms}
19/0413 {compounds containing N-atoms}
19/0418 {compounds containing P-atoms}
19/0422 {compounds containing S-atoms}
19/0427 {compounds containing halogen-atoms}
19/0431 {containing aromatic rings}
19/0436 {with substituted groups}
19/044 {which contain Si-atoms}
19/0445 {which contain N-atoms}
19/045 {which contain P-atoms}
19/0454 {which contain S-atoms}
19/0459 {which contain halogen-atoms}
19/0463 {containing rings other than aromatic rings}
19/0468 {with substituted groups}
19/0472 {which contain Si-atoms}
19/0477 {which contain N-atoms}
19/0481 {which contain P-atoms}
19/0486 {which contain S-atoms}
19/049 {which contain halogen-atoms}
19/0495 {containing hetero rings}

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](#))

NOTE

{ Attention is made to the following places of filters:

liquid-liquid separation, e.g. for filtering elements made hydrophilic or hydrophobic, [B01D 12/00](#), [B01D 17/00](#), [B01D 43/00](#); filtering material and its regeneration, as well as filtering aids, [B01D 39/00](#); gas or air filters in general [B01D 46/00](#);

aquarium filters [A01K 63/04](#); filters for cigars and cigarettes [A24D 3/00](#); filters for coffee or tea-making machines [A47J 31/06](#); filters for frying fat [A47J 37/12](#); filters for suction cleaners [A47L 9/10](#); blood or infusion liquid filters [A61M 5/165](#); filtration devices for laboratory use [B01L](#); "dewatering" ore or coal slurry [B03B 5/48](#); magnetic filters [B03C 1/00](#); screens or sieves per se [B07B 1/00](#);

filters for lubricating and cooling systems in turning, boring or milling machines [B23Q 11/10](#);

filters for cooling systems in grinding machines [B24B 55/00](#); extrusion filters [B29C 48/69](#);

filter presses [B30B 9/02](#); purification of process water, drinking water and waste water [C02F](#);

filters for alcoholic beverages [C12H 1/00](#);

filtering spinning solution or melt [D01D 1/10](#);

filters for washing machines [D06F 39/10](#);
filters or strainers for papermaking [D21D](#);
filters in water collecting systems [E03B 3/18](#), [E03B 7/07](#);
subsoil filters for boreholes [E21B 43/02](#);
air filters for internal-combustion engines [F02M 35/02](#);
filters for pumps [F04B 39/16](#), [F04D 29/70](#);
filters in pipe systems [F16L 55/24](#);
filtration of lubricants [F16N 39/06](#);
filters for volume measuring apparatus [G01F 15/12](#) }

- 21/0003 . {Making of sedimentation devices, structural details thereof, e.g. prefabricated parts}
21/0006 . {Settling tanks provided with means for cleaning and maintenance}
21/0009 . {Settling tanks making use of electricity or magnetism (electric ultra filters [B01D 61/425](#); filters making use of electricity or magnetism [B01D 35/06](#); magnetic or electrostatic separation [B03C](#))}
21/0012 . {Settling tanks making use of filters, e.g. by floating layers of particulate material}
21/0015 . {Controlling the inclination of settling devices}
21/0018 . {provided with a pump mounted in or on a settling tank}
21/0021 . . {provided with a jet pump}
21/0024 . {Inlets or outlets provided with regulating devices, e.g. valves, flaps ([B01D 21/24](#) takes precedence)}
21/0027 . {Floating sedimentation devices}
21/003 . {Sedimentation tanks provided with a plurality of compartments separated by a partition wall ([B01D 21/0039](#) takes precedence)}
21/0033 . . {Vertical, perforated partition walls ([B01D 21/2422](#) takes precedence)}
21/0036 . . {Horizontal partition walls}
21/0039 . {Settling tanks provided with contact surfaces, e.g. baffles, particles}
21/0042 . . {Baffles or guide plates}
21/0045 . . {Plurality of essentially parallel plates}
21/0048 . . {Plurality of plates inclined in alternating directions}
21/0051 . . {Plurality of tube like channels}
21/0054 . . {Plates in form of a coil}
21/0057 . . {with counter-current flow direction of liquid and solid particles}
21/006 . . {with co-current flow direction of liquid and solid particles}
21/0063 . . {with cross-flow flow direction of liquid and solid particles}
21/0066 . . {with a meandering flow pattern of liquid or solid particles}
21/0069 . . {Making of contact surfaces, structural details, materials therefor}
21/0072 . . . {Means for adjusting, moving or controlling the position or inclination of the contact surfaces, e.g. for optimising the particle-liquid separation, for removing the settled particles, for preventing fouling}
21/0075 . . . {Contact surfaces having surface features}
21/0084 . {Enhancing liquid-particle separation using the flotation principle ([flotation in general B03D 1/00](#))}

- 21/0087 . . {Settling tanks provided with means for ensuring a special flow pattern, e.g. even inflow or outflow ([B01D 21/2411](#) takes precedence)}
- 21/009 . . {Heating or cooling mechanisms specially adapted for settling tanks}
- 21/0093 . . {Mechanisms for taking out of action one or more units of a multi-unit settling mechanism}
- 21/0096 . . {Safety mechanisms specially adapted for settling tanks ([B01D 21/22](#) takes precedence)}
- 21/01 . . using flocculating agents (for purifying water [C02F 1/52](#); for liquid radioactive waste [G21F 9/10](#))
- 21/02 . . Settling tanks {with single outlets for the separated liquid}
- 21/04 . . . with moving scrapers
- 21/06 . . . with rotating scrapers
- 21/08 . . provided with flocculating compartments
- 21/10 . . {Settling tanks with multiple outlets for the separated liquids}
- 21/12 . . . {with moving scrapers}
- 21/14 . . . {with rotating scrapers}
- 21/16 . . . {provided with flocculating compartments}
- 21/18 . . Construction of the scrapers or the driving mechanisms for settling tanks
- 21/183 . . . {with multiple scraping mechanisms}
- 21/186 . . . {with two or more scrapers fixed at different heights on a central rotating shaft}
- 21/20 . . Driving mechanisms
- 21/22 . . Safety mechanisms
- 21/24 . . Feed or discharge mechanisms for settling tanks
- 21/2405 . . . {Feed mechanisms for settling tanks}
- 21/2411 {having a tangential inlet}
- 21/2416 {Liquid distributors with a plurality of feed points}
- 21/2422 {Vertically arranged feed points}
- 21/2427 . . . {The feed or discharge opening located at a distant position from the side walls}
- 21/2433 . . . {Discharge mechanisms for floating particles}
- 21/2438 {provided with scrapers on the liquid surface for removing floating particles}
- 21/2444 . . . {Discharge mechanisms for the classified liquid}
- 21/245 . . . {Discharge mechanisms for the sediments}
- 21/2455 {Conveyor belts}
- 21/2461 {Positive-displacement pumps; Screw feeders; Trough conveyors}
- 21/2466 {Mammoth pumps, e.g. air lift pumps}
- 21/2472 {Means for fluidising the sediments, e.g. by jets or mechanical agitators}
- 21/2477 {Centrifugal pumps}
- 21/2483 {Means or provisions for manually removing the sediments}
- 21/2488 . . . {bringing about a partial recirculation of the liquid, e.g. for introducing chemical aids}
- 21/2494 . . . {provided with means for the removal of gas, e.g. noxious gas, air}
- 21/26 . . Separation of sediment aided by centrifugal force {or centripetal force} ([centrifuges B04B](#); [cyclones B04C](#))
- 21/262 . . . {by using a centrifuge}
- 21/265 . . . {by using a vortex inducer or vortex guide, e.g. coil ([B01D 21/0054](#) takes precedence)}
- 21/267 . . . {by using a cyclone}
- 21/28 . . Mechanical auxiliary equipment for acceleration of sedimentation, e.g. by vibrators or the like
- 21/283 . . . {Settling tanks provided with vibrators}
- 21/286 . . . {Means for gentle agitation for enhancing flocculation}
- 21/30 . . Control equipment
- 21/302 . . . {Active control mechanisms with external energy, e.g. with solenoid valve}
- 21/305 . . . {Control of chemical properties of a component, e.g. control of pH}
- 21/307 . . . {Passive control mechanisms without external energy, e.g. using a float}
- 21/32 . . . Density control of clear liquid or sediment, e.g. optical control {; Control of physical properties}
- 21/34 . . . Controlling the feed distribution; Controlling the liquid level {; Control of process parameters}

Filtration; Filtering material, regeneration thereof

- 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)**
- 24/001 . . {Making filter elements not provided for elsewhere}
- 24/002 . . {with multiple filtering elements in parallel connection}
- 24/004 . . . {arranged concentrically or coaxially}
- 24/005 . . . {Filters being divided into a plurality of cells or compartments ([B01D 24/004](#) takes precedence)}
- 24/007 . . {with multiple filtering elements in series connection}
- 24/008 . . . {arranged concentrically or coaxially}
- 24/02 . . with the filter bed stationary during the filtration
- 24/04 . . . the filtering material being clamped between pervious fixed walls ([B01D 24/10](#), [B01D 24/20](#) take precedence)
- 24/042 {the filtering material being held in a flexible porous bag}
- 24/045 {with at least one flat vertical wall}
- 24/047 {with vertical tubes distributing the liquid to be filtered or for collecting filtrate}
- 24/06 the pervious walls comprising a series of louvres or slots
- 24/08 the filtering material being supported by at least two pervious coaxial walls
- 24/10 . . . the filtering material being held in a closed container
- 24/105 {downward filtration without specifications about the filter material supporting means}
- 24/12 Downward filtration, the filtering material being supported by pervious surfaces ([B01D 24/18](#) takes precedence)
- 2024/125 {spray heads specially adapted therefor}
- 24/14 Downward filtration, the container having distribution or collection headers or pervious conduits ([B01D 24/18](#) takes precedence)
- 2024/145 {spray heads specially adapted therefor}
- 24/16 Upward filtration ([B01D 24/18](#) takes precedence)
- 2024/162 {spray heads specially adapted therefor}
- 24/165 {the filtering material being supported by pervious surfaces}
- 24/167 {the container having distribution or collection headers or pervious conduits}
- 24/18 Combined upward and downward filtration

- 24/183 {the filtering material being supported by pervious surfaces}
- 24/186 {the container having distribution or collection headers or pervious conduits}
- 24/20 . . the filtering material being provided in an open container
- 24/205 {Downward filtration without specifications about the filter material supporting means}
- 24/22 . . . Downward filtration, the filter material being supported by pervious surfaces
- 24/24 . . . Downward filtration, the container having distribution or collection headers or pervious conduits
- 24/26 . . . Upward filtration
- 24/263 {the filtering material being supported by pervious surfaces}
- 24/266 {the container having distribution or collection headers or pervious conduits}
- 24/28 . . with the filter bed moving during the filtration (with the filter bed fluidised [B01D 24/36](#))
- 24/30 . . Translation
- 24/305 . . . {Vibrations}
- 24/32 . . Rotation
- 24/34 . . with the filtering material and its pervious support moving (tipping buckets, trays or like sections [B01D 33/327](#))
- 24/36 . . with the filter bed fluidised during the filtration (with the filter bed being stationary [B01D 24/02](#))
- 24/38 . . Feed or discharge devices
- 24/383 . . {using multiple way valves}
- 24/386 . . {internal recirculation}
- 24/40 . . for feeding
- 24/402 . . . {containing fixed liquid displacement elements or cores}
- 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)}
- 24/407 . . . {provoking a tangential stream}
- 24/42 . . for discharging filtrate
- 24/425 . . . {containing fixed liquid displacement elements or cores}
- 24/44 . . for discharging filter cake, e.g. chutes
- 24/46 . . Regenerating the filtering material in the filter ([B01D 24/44](#) takes precedence)
- 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)}
- 24/461 . . . {by scrapers}
- 24/4615 . . . {by brushes}
- 24/4621 . . . {by nozzles acting on the cake side of the filter material, or by fluids acting in co-current direction with the feed stream}
- 24/4626 . . {Construction of spray heads specially adapted for regeneration of the filter material or for filtrate discharging}
- 24/4631 . . {Counter-current flushing, e.g. by air}
- 24/4636 . . . {with backwash shoes; with nozzles}
- 24/4642 . . . {with valves, e.g. rotating valves}
- 24/4647 {with a rectilinear movement of the closing means}
- 24/4652 . . . {by using gasbumps}
- 24/4657 . . . {by using membranes}
- 24/4663 . . . {by using pistons}
- 24/4668 . . {by moving the filtering element ([B01D 24/4605](#) and [B01D 24/4631](#) take precedence)}
- 24/4673 . . . {using rotary devices or vibration mechanisms, e.g. stirrers}
- 24/4678 . . . {using free vortex flow}
- 24/4684 . . . {using spray devices}
- 24/4689 . . . {Displacement of the filtering material to a compartment of the filtering device for regeneration}
- 24/4694 . . {containing filter material retaining means (e.g. screens, balls) placed on the surface of the filter material}
- 24/48 . . integrally combined with devices for controlling the filtration
- 24/4807 . . {Handling the filter cake for purposes other than regenerating}
- 24/4815 . . . {for washing}
- 24/4823 . . . {for drying}
- 24/483 {by compression}
- 24/4838 {by gases or by heating}
- 24/4846 . . . {Retarding cake deposition on the filter during the filtration period, e.g. using stirrers ([B01D 24/407](#) takes precedence)}
- 24/4853 . . {by clearness or turbidity measuring}
- 24/4861 . . {by flow measuring}
- 24/4869 . . {by level measuring}
- 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)}
- 24/4884 . . {by pressure measuring}
- 24/4892 . . {by temperature measuring}
- 25/00 Filters formed by clamping together several filtering elements or parts of such elements (disc filters [B01D 29/39](#))**
- 25/001 . . {Making filtering elements not provided for elsewhere}
- 25/002 . . {Clamping devices ([B01D 25/12](#) and subgroups take precedence)}
- 25/003 . . {integrally combined with devices for controlling the filtration}
- 25/004 . . . {by clearness or turbidity measuring}
- 25/005 . . . {by flow measuring}
- 25/006 . . . {by level measuring}
- 25/007 . . . {by pressure measuring}
- 25/008 . . . {by temperature measuring}
- 25/02 . . in which the elements are pre-formed independent filtering units, e.g. modular systems
- 25/12 . . Filter presses, i.e. of the plate or plate and frame type
- 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)
- 25/1275 . . . {the plates or the frames being placed in a non-vertical position}
- 25/164 . . Chamber-plate presses, i.e. the sides of the filtering elements being clamped between two successive filtering plates ([B01D 25/127](#), [B01D 25/172](#), [B01D 25/176](#), [B01D 25/19](#) take precedence)

- 25/1645 . . . {the plates being placed in a non-vertical position}
- 25/172 . . Plate spreading means (removal of filter cakes [B01D 25/32](#))
- 25/176 . . attaching the filter element to the filter press plates, e.g. around the central feed hole in the plates
- 25/19 . . Clamping means for closing the filter press, e.g. hydraulic jacks
- 25/21 . . Plate and frame presses ([B01D 25/172](#), [B01D 25/176](#), [B01D 25/19](#) take precedence)
- 25/215 . . . {Construction of the filter plates, frames}
- 25/22 . . Cell-type filters
- 25/24 . . Cell-type roll filters
- 25/26 . . Cell-type stack filters
- 25/28 . . Leaching or washing filter cakes in the filter {handling the filter cake for purposes other than regenerating}
 - 25/281 . . {specially for chamber filter presses}
 - 25/282 . . {for drying}
 - 25/284 . . . {by gases or by heating}
 - 25/285 . . . {by compression using inflatable membranes}
 - 25/287 . . . {by compression using pistons}
 - 25/288 . . {Retarding cake deposition on the filter during the filtration period, e.g. using stirrers}
- 25/30 . . Feeding devices {; Discharge devices}
- 25/302 . . {specially adapted for chamber filter presses}
- 25/305 . . {for discharging filtrate}
- 25/307 . . {with internal recirculation through the filtering element ([B01D 37/02](#) takes precedence)}
- 25/32 . . Removal of the filter cakes
 - 25/322 . . {specially for chamber filter presses}
 - 25/325 . . {counter-current flushing, e.g. by air bumps}
 - 25/327 . . . {with backwash shoes, with nozzles}
 - 25/34 . . by moving, {e.g. rotating,} the filter elements {([B01D 25/172](#), [B01D 25/19](#) take precedence)}
- 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)}
- 25/346 . . . {by vibration}
- 25/36 . . . by centrifugal force
- 25/38 . . by moving parts, e.g. scrapers, contacting stationary filter elements {sprayers}
 - 25/383 . . . {Brushes}
 - 25/386 . . . {Nozzles}
- 27/00 Cartridge filters of the throw-away type**
- 27/005 . . {Making filter elements not provided for elsewhere}
- 27/02 . . with cartridges made from a mass of loose {granular or fibrous} material
- 27/04 . . with cartridges made of a piece of unitary material, e.g. filter paper
 - 27/06 . . with corrugated, folded or wound material
 - 27/07 . . . having a coaxial stream through the filtering element
 - 27/08 . . Construction of the casing
 - 27/10 . . Safety devices, e.g. by-passes
 - 27/101 . . {Filter condition indicators}
 - 27/103 . . {Bypass or safety valves}
 - 27/105 . . {Bidirectional working filters}
 - 27/106 . . {Anti-leakage or anti-return valves}
- 27/108 . . {Flow control valves; Damping or calibrated passages}
- 27/14 . . having more than one filtering element
 - 27/142 . . . {connected in parallel}
 - 27/144 . . . {arranged concentrically or coaxially}
 - 27/146 . . . {connected in series}
 - 27/148 . . . {arranged concentrically or coaxially}
- 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**
- 29/0093 . . {Making filtering elements not provided for elsewhere}
- 29/0095 . . {Flat filtering elements ([B01D 25/12](#), [B01D 25/26](#) take precedence)}
- 29/0097 . . {Curved filtering elements, e.g. concave filtering elements}
 - 29/01 . . with flat filtering elements ([B01D 29/39](#) takes precedence)
- NOTE**
{If the construction of the filtering element itself is of minor importance the document is classified in the subgroups [B01D 29/01](#) and [B01D 29/014](#) - [B01D 29/018](#); otherwise in the subgroups [B01D 29/03](#) - [B01D 29/073](#)}
- 29/012 . . {Making filtering elements (making bag, cage, hose, tube, sleeve or like filtering elements [B01D 29/111](#))}
- 29/014 . . {with curved filtering elements (construction [B01D 29/035](#), [B01D 29/071](#))}
- 29/016 . . {with corrugated, folded or wound filtering elements}
 - 29/018 . . {ring shaped}
 - 29/03 . . self-supporting
 - 29/031 . . . {with corrugated, folded filtering elements}
 - 2029/033 . . . {bar screens}
 - 29/035 . . . {with curved filtering elements}
 - 29/036 . . . {ring shaped}
 - 29/038 {with corrugated, folded filtering elements}
 - 29/05 . . supported
 - 29/055 . . . {ring shaped}
 - 29/07 . . . with corrugated, folded or wound filtering sheets
 - 29/071 {with curved filtering elements ([B01D 29/072](#), [B01D 29/073](#) take precedence)}
 - 29/072 {ring shaped}
 - 29/073 {with wound filtering sheets}
 - 29/075 . . located in a closed housing and comprising scrapers or agitators on the cake side of the filtering elements, e.g. Nutsche- or Rosenmund-type filters for performing multiple step operations such as chemical reactions, filtering and cake treatment
- NOTE**
If the subject matter classified in this group also contains relevant information covered by other subgroups of group [B01D 29/00](#), it is also classified in the other appropriate subgroups of group [B01D 29/00](#).
- 29/085 . . Funnel filters; Holders therefor

- 29/09 . . with filtering bands, e.g. movable between filtering operations
- 29/093 . . {combined with means to fasten the opposite edges of the filtering band together, e.g. Zipper}
- 29/096 . . {Construction of filtering bands or supporting belts, e.g. devices for centering, mounting or sealing the filtering bands or the supporting belts}
- 29/11 . . with bag, cage, hose, tube, sleeve or like filtering elements
- NOTE**
- If the construction of the filtering element itself is of minor importance the document is classified in the subgroups [B01D 29/11](#), [B01D 29/114](#) and [B01D 29/117](#), otherwise in the subgroups [B01D 29/13](#) - [B01D 29/356](#)
- 29/111 . . {Making filtering elements}
- 29/112 . . {Ring shaped filters wherein both opposite axial sides are opened and the axial length is shorter than the diameter, e.g. as used in hydraulic transmission systems}
- 29/114 . . {arranged for inward flow filtration ([B01D 29/15](#), [B01D 29/33](#) take precedence)}
- 29/115 . . . {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}
- 29/117 . . {arranged for outward flow filtration ([B01D 29/23](#), [B01D 29/35](#) take precedence)}
- 29/118 . . . {open-ended}
- 29/13 . . Supported filter elements
- 29/15 . . . arranged for inward flow filtration
- 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}
- 29/19 on solid frames with surface grooves or the like
- 29/21 with corrugated, folded or wound sheets
- 29/213 {having a concertina shape}
- 29/216 {with wound sheets}
- 29/23 . . . arranged for outward flow filtration
- 29/232 {with corrugated, folded or wound sheets}
- 29/235 {having a concertina shape}
- 29/237 {with wound sheets}
- 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}
- 29/27 Filter bags
- 29/31 . . Self-supporting filtering elements
- 29/33 . . . arranged for inward flow filtration
- 29/333 {with corrugated, folded filtering elements}
- 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}
- 29/35 . . . arranged for outward flow filtration
- 29/353 {with corrugated, folded filtering elements}
- 29/356 {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}
- 29/39 . . with hollow discs side by side on, or around, one or more tubes, e.g. of the leaf type
- 29/395 . . {mounted axially on the tube}
- 29/41 . . mounted transversely on the tube
- 29/413 . . . {divided in sectors}
- 29/416 . . . {Filtering tables}
- 29/43 . . mounted otherwise than transversely on the tube {mounted otherwise than axially on the tube}
- 29/44 . . Edge filtering elements, i.e. using contiguous impervious surfaces
- 29/445 . . {Bar screens}
- 29/46 . . of flat, stacked bodies
- 29/48 . . of spirally or helically wound bodies
- 29/50 . . with multiple filtering elements, characterised by their mutual disposition ([B01D 29/39](#) takes precedence)
- 29/52 . . in parallel connection
- 29/54 . . . arranged concentrically or coaxially
- 29/56 . . in series connection
- 29/58 . . . arranged concentrically or coaxially
- 29/60 . . integrally combined with devices for controlling the filtration
- 29/601 . . {by clearness or turbidity measuring}
- 29/603 . . {by flow measuring}
- 29/605 . . {by level measuring}
- 29/606 . . {by pressure measuring}
- 29/608 . . {by temperature measuring}
- 29/62 . . Regenerating the filter material in the filter (devices for taking out of action one or more units of multi-unit filters, e.g. for regeneration, [B01D 35/12](#))
- 29/64 . . by scrapers, brushes, {nozzles}, or the like, acting on the cake side of the filtering element
- 29/6407 . . . {brushes}
- 29/6415 {with a rotary movement with respect to the filtering element}
- 29/6423 {with a translational movement with respect to the filtering element}
- 29/643 {with a combination of movements with respect to the filtering elements}
- 29/6438 . . . {nozzles}
- 29/6446 {with a rotary movement with respect to the filtering element}
- 29/6453 {with a translational movement with respect to the filtering element}
- 29/6461 {with a combination of movements with respect to the filtering elements}
- 29/6469 . . . {scrapers}
- 29/6476 {with a rotary movement with respect to the filtering element}
- 29/6484 {with a translatory movement with respect to the filtering element}
- 29/6492 {with a combination of movements with respect to the filtering elements}
- 29/66 . . by flushing, e.g. counter-current air-bumps
- 29/661 . . . {by using gas-bumps}
- 29/663 . . . {by using membranes}
- 29/665 . . . {by using pistons}
- 29/666 . . . {by a stirrer placed on the filtrate side of the filtering element}

- 29/668 . . . {with valves, e.g. rotating valves for coaxially placed filtering elements}
- NOTE**
the subgroup covers only counter-current flushing
- 29/68 . . . with backwash arms, shoes or nozzles
- 29/682 {with a rotary movement with respect to the filtering element}
- 29/684 {with a translatory movement with respect to the filtering element}
- 29/686 {with a combination of movements with respect to the filtering elements}
- 29/688 {with backwash arms or shoes acting on the cake side}
- 29/70 . . by forces created by movement of the filter element
- 29/705 . . . {by compression of compressible filter medium, e.g. foam}
- 29/72 . . . involving vibrations
- 29/74 . . . involving centrifugal force
- 29/76 . Handling the filter cake in the filter for purposes other than for regenerating ([B01D 29/94](#) takes precedence)
- 29/78 . . for washing
- 29/80 . . for drying
- 29/82 . . . by compression
- 29/822 {using membranes}
- 29/824 {using pistons}
- 29/826 {using rollers}
- 29/828 {using screws ([B01D 29/6476](#) takes precedence)}
- 29/84 . . . by gases or by heating
- 29/843 {by direct contact with a fluid}
- 29/846 {by indirect heat-exchange}
- 29/86 . . Retarding cake deposition on the filter during the filtration period, e.g. using stirrers ([B01D 29/908](#) takes precedence)}
- 29/865 . . . {by vibration of the liquid}
- 29/88 . having feed or discharge devices
- 29/885 . . {with internal recirculation through the filtering element ([B01D 37/02](#) takes precedence)}
- 29/90 . . for feeding
- 29/902 . . . {containing fixed liquid displacement elements or cores}
- 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)}
- 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)}
- 29/908 . . . {provoking a tangential stream}
- 29/92 . . for discharging filtrate
- 29/925 . . . {containing liquid displacement elements or cores}
- 29/94 . . for discharging the filter cake, e.g. chutes
- 29/945 . . . {for continuously discharging concentrated liquid}
- 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)
- 29/965 . . {Device for changing the inclination of the filtering element}
- 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](#))**
- 33/01 . with translationally moving filtering elements, e.g. pistons ([B01D 33/04](#) - [B01D 33/327](#) take precedence)
- 33/0108 . . {with bag, cage, hose, tube, sleeve or the like filtering elements}
- 33/0116 . . . {arranged for inward flow filtration}
- 33/0125 {open ended}
- 33/0133 . . . {arranged for outward flow filtration}
- 33/0141 {open ended}
- 33/015 . . {with flat filtering elements}
- 33/0158 . . . {self-supporting}
- 33/0166 {Bar screens}
- 33/0175 {with curved filtering elements}
- 33/0183 . . . {supported}
- 33/0191 {with corrugated, folded or wound filtering sheets}
- 33/03 . . with vibrating filter elements
- 33/0307 . . . {with bag, cage, hose, tube, sleeve or the like filtering elements}
- 33/0315 {arranged for inward flow filtration}
- 33/0323 {open ended}
- 33/033 {arranged for outward flow filtration}
- 33/0338 {open ended}
- 33/0346 . . . {with flat filtering elements}
- 33/0353 {self-supporting}
- 33/0361 {Bar screens}
- 33/0369 {with curved filtering elements}
- 33/0376 {supported}
- 33/0384 {with corrugated, folded or wound filtering sheets}
- 33/0392 {with curved filtering elements}
- 33/04 . . with filtering bands or the like supported on cylinders which are impervious for filtering
- 33/042 . . {whereby the filtration and squeezing-out take place between at least two filtering bands}
- 33/044 . . with filtering bands or the like supported on cylinders which are pervious for filtering
- 33/048 . . with endless filtering bands
- 33/052 . . . combined with a compression device ([B01D 33/64](#) takes precedence)
- 33/056 . Construction of filtering bands or supporting belts, e.g. devices for centering, mounting or sealing the filtering bands or the supporting belts
- 33/0565 . . {combined with means to fasten the opposite edges of the filtering band together, e.g. Zipper}
- 33/06 . with rotary cylindrical filtering surfaces, e.g. hollow drums ([B01D 33/044](#) takes precedence {; rotating drums for paper-making [D21B](#)})
- 33/067 . . Construction of the filtering drums, e.g. mounting or sealing arrangements
- 33/073 . . arranged for inward flow filtration

- 33/09 . . . with surface cells independently connected to pressure distributors
- 33/11 . . arranged for outward flow filtration
- 33/13 . . . with surface cells independently connected to pressure distributors
- 33/15 . with rotary plane filtering surfaces
- 33/155 . . {the filtering surface being parallel to the rotation axis}
- 33/17 . . with rotary filtering tables (tables divided into separately tiltable buckets, trays or like sections [B01D 33/327](#))
- 33/19 . . . the table surface being divided in successively tilted sectors or cells, e.g. for discharging the filter cake
- 33/21 . . with hollow filtering discs transversely mounted on a hollow rotary shaft
- 33/215 . . . {the filtering discs being fixed inwardly on a rotating construction}
- 33/23 . . . Construction of discs or component sectors thereof
- 33/25 . . with hollow frames axially mounted on a hollow rotary shaft
- 33/27 . with rotary filtering surfaces, which are neither cylindrical nor planar, e.g. helical surfaces
- 33/275 . . {using contiguous impervious surfaces}
- 33/29 . the movement of the filter elements being a combination of movements ([B01D 33/19](#) takes precedence)
- 33/31 . . Planetary movement
- 33/327 . . Tipping buckets, trays or like sections
- 33/333 . with individual filtering elements moving along a closed path (tipping buckets, trays or like sections [B01D 33/327](#))
- 33/35 . with multiple filtering elements characterised by their mutual disposition ([B01D 33/042](#) , [B01D 33/21](#) take precedence)
- 33/37 . . in parallel connection
- 33/39 . . . concentrically or coaxially
- 33/41 . . in series connection
- 33/42 . . . concentrically or coaxially
- 33/44 . Regenerating the filter material in the filter (devices for taking out of action one or more units of multi-unit filters, e.g. for regeneration, [B01D 35/12](#))
- 33/46 . . by scrapers, brushes {nozzles} or the like acting on the cake-side of the filtering element ({[B01D 33/503](#) takes precedence})
- 33/461 . . . {brushes}
- 33/463 . . . {nozzles}
- 33/465 . . . {take-off rollers}
- 33/466 . . . {scrapers}
- 33/468 . . . {wires, strands, strings or the like}
- 33/48 . . by flushing, e.g. counter-current air-bumps
- NOTE**
the subgroup covers only counter-current flushing
- 33/50 . . . with backwash arms, shoes or nozzles
- 33/503 {the backwash arms, shoes acting on the cake side}
- 33/506 {with a stirrer placed on the filtrate side}
- 33/52 . . by forces created by movement of the filter element
- 33/54 . . . involving vibrations
- 33/56 . . . involving centrifugal force
- 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}
- 33/60 . . for washing
- 33/62 . . for drying
- 33/64 . . . by compression
- 33/642 {by pressure belts}
- 33/644 {by pressure plates, membranes}
- 33/646 {by pressure rollers}
- 33/648 {by screws}
- 33/66 . . . by gases or by heating
- 33/663 {by direct contact with a fluid}
- 33/666 {by indirect heat-exchange}
- 33/68 . . Retarding cake deposition on the filter during the filtration period, e.g. using stirrers
- 33/70 . having feed or discharge devices ([B01D 33/82](#) takes precedence)
- 33/705 . . {with internal recirculation through the filter}
- 33/72 . . for feeding
- 33/722 . . . {containing fixed liquid displacement elements or cores}
- 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)}
- 33/727 . . . {provoking a tangential stream}
- 33/74 . . for discharging filtrate
- 33/742 . . . {containing fixed liquid displacement elements or cores}
- 33/745 . . . {Construction of suction casings, pans, or the like}
- 33/747 {moving during the filtration period}
- 33/76 . . for discharging the filter cake, e.g. chutes
- 33/763 . . . {for continuously discharging concentrated liquid}
- 33/766 . . . {Devices for breaking the filter cake, e.g. cutting}
- 33/80 . Accessories
- 33/801 . . {Driving means, shaft packing systems or the like}
- 33/802 . . {Device for changing the inclination of the filtering element}
- 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}
- 33/804 . . {integrally combined with devices for controlling the filtration}
- 33/805 . . . {by clearness or turbidity measuring}
- 33/806 . . . {by flow measuring}
- 33/807 . . . {by level measuring}
- 33/808 . . . {by pressure measuring}
- 33/809 . . . {by temperature measuring}
- 33/82 . . Means for pressure distribution
- 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**

- 35/005 . {Filters specially adapted for use in internal-combustion engine lubrication or fuel systems}
- 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](#)})
- 35/023 . . {Filler pipe filters}
- 35/027 . . rigidly mounted in or on tanks or reservoirs ([B01D 35/04](#) takes precedence)
- 35/0273 . . . {Filtering elements with a horizontal or inclined rotation or symmetry axis submerged in tanks or reservoirs}
- 35/0276 . . . {Filtering elements with a vertical rotation or symmetry axis mounted on tanks or reservoirs}
- 35/04 . . Plug, tap, or cock filters {filtering elements mounted in or on a faucet}
- 35/043 . . . {Reversible faucet filters}
- 35/046 . . . {the filtering element being mounted in the faucet plug}
- 35/05 . Floating filters
- 35/06 . Filters making use of electricity or magnetism (ultrafiltration, microfiltration [B01D 61/14](#); electro dialysis, electro-osmosis [B01D 61/42](#); devices comprising filters and magnetic separators [B03C 1/30](#))
- 35/10 . Brush filters {; Rotary brush filters}
- 35/12 . Devices for taking out of action one or more units of multi- unit filters, e.g. for regeneration
- 35/14 . Safety devices specially adapted for filtration (preventing or minimising fires or explosions [A62C](#)); Devices for indicating clogging (incorporated in a throw-away filter [B01D 27/10](#))
- 35/143 . . Filter condition indicators
- 35/1435 . . . {with alarm means}
- 35/147 . . Bypass or safety valves
- 35/1475 . . . {Pressure relief valves or pressure control valves}
- 35/15 . . Bidirectional working filters
- 35/153 . . Anti-leakage or anti-return valves
- 35/157 . . Flow control valves: Damping or calibrated passages
- 35/1573 . . . {Flow control valves}
- 35/1576 . . . {Calibrated passages}
- 35/16 . Cleaning-out devices {, e.g. for removing the cake from the filter casing or for evacuating the last remnants of liquid}
- 35/18 . Heating or cooling the filters
- 35/185 . . {comprising a vaporizing unit}
- 35/20 . Vibrating the filters (regenerating filter material by vibrations in filters with stationary filtering elements [B01D 29/72](#); discharging the filter cake by vibrations in filters with moving filtering elements [B01D 33/54](#), [B01D 33/76](#))
- 35/22 . Directing the mixture to be filtered on to the filters in a manner to clean the filters {([B01D 29/904](#) takes precedence)}
- 35/24 . Providing loose granular material to scratch the filters clean
- 35/26 . Filters with built-in pumps {filters provided with a pump mounted in or on the casing (aquarium pumps or filters [A01K 63/04](#))}
- 35/28 . Strainers not provided for elsewhere
- 35/30 . Filter housing constructions
- 35/301 . . {Constructions of two or more housings ([B01D 35/12](#) takes precedence)}
- 35/303 . . . {the housings being modular, e.g. standardised}
- 35/305 . . {with features related to crash tests or crash safety measures}
- 35/306 . . {Filter mounting adapter}
- 35/308 . . {Made of at least two different materials, e.g. metal and plastic}
- 35/31 . . including arrangements for environmental protection, e.g. pressure resisting features
- 35/32 . . . against radiation
- 35/34 . . open-topped ([B01D 35/31](#) takes precedence)
- 36/00 Filter circuits or combinations of filters with other separating devices**
- 36/001 . {Filters in combination with devices for the removal of gas, air purge systems}
- 36/003 . {Filters in combination with devices for the removal of liquids ([B01D 35/185](#) takes precedence)}
- 36/005 . . {Liquid level sensing means, e.g. for water in gasoil-filters}
- 36/006 . . {Purge means}
- 36/008 . . {Means to filter or treat the separated liquid}
- 36/02 . Combinations of filters of different kinds ([B01D 29/50](#), [B01D 33/35](#) take precedence)
- 36/04 . Combinations of filters with settling tanks
- 36/045 . . {Combination of filters with centrifugal separation devices}
- 37/00 Processes of filtration (processes specially adapted for filtering gases [B01D 46/00](#))**
- 37/02 . Precoating the filter medium; Addition of filter aids to the liquid being filtered {(devices for feeding reagents [C02F 1/685](#) and sub-groups; filter aids)}
- 37/025 . . {additives incorporated in the filter}
- 37/03 . using flocculating agents
- 37/04 . Controlling the filtration
- NOTES**
1. If the construction of the filtering element is of minor importance, the documents are classified in this group only
 2. Filters integrally combined with devices for controlling the filtration are also classified in the relevant groups for these aspects, e.g. [B01D 24/48](#), [B01D 29/60](#), [B01D 33/804](#)
- 37/041 . . {by clearness or turbidity measuring}
- 37/043 . . {by flow measuring}
- 37/045 . . {by level measuring}
- 37/046 . . {by pressure measuring}
- 37/048 . . {by temperature measuring}
- 39/00 Filtering material for liquid or gaseous fluids**
- 39/02 . Loose filtering material, e.g. loose fibres
- 39/04 . . Organic material, e.g. cellulose, cotton
- 39/06 . . Inorganic material, e.g. asbestos fibres, glass beads or fibres

- 46/0035 . . {by wetting, e.g. using surfaces covered with oil}
- 46/0036 . . {by adsorption or absorption}
- 46/0038 . . {with means for influencing the odor, e.g. deodorizing substances}
- 46/0039 . {with flow guiding by feed or discharge devices}
- 46/0041 . . {for feeding}
- 46/0042 . . . {Use of the inlet flow in order to clean the filter surface}
- 46/0043 . . . {containing fixed gas displacement elements or cores}
- 46/0045 . . . {by using vanes}
- 46/0046 . . . {provoking a tangential stream ([B01D 46/0045 takes precedence](#))}
- 46/0047 . . {for discharging the filtered gas}
- 46/0049 . . . {containing fixed gas displacement elements or cores}
- 46/005 . . {Crossflow filtration, i.e. having an inlet and two outlets}
- 46/0052 . {with filtering elements moving during filtering operation ([B01D 46/22](#), [B01D 46/32 take precedence](#))}
- 46/0053 . . {with vibrating filtering elements}
- 46/0054 . . {with translational movement}
- 46/0056 . . {with rotational movement}
- 46/0084 . {provided with safety means}
- 46/0086 . . {Filter condition indicators}
- 46/0087 . . {Bypass or safety valves}
- 46/0089 . . {Anti-return means}
- 46/009 . . {Identification of filter type or position thereof, e.g. by transponders or bar codes}
- 46/0091 . . {Including arrangements for environmental or personal protection}
- 46/0093 . . . {against fire or explosion}
- 46/0094 . . . {against radiation}
- 46/0095 . . {Means acting upon failure of the filtering system, e.g. in case of damage of the filter elements; Failsafes}
- 46/0097 . . {Special means for preventing bypass around the filter, i.e. in addition to usual seals}
- 46/0098 . . {Protecting coverages on the filter which is removed before the filter is used, protection of filter, packaging}
- 46/02 . Particle separators, e.g. dust precipitators, having hollow filters made of flexible material
- 46/023 . . {Pockets filters, i.e. multiple bag filters mounted on a common frame}
- 46/026 . . {Means for maintaining a space between filters, e.g. avoiding contact between adjacent filters}
- 46/04 . . Cleaning filters
- 46/06 . . with means keeping the working surfaces flat
- 46/08 . . . the working surfaces forming a star shape
- 46/10 . Particle separators, e.g. dust precipitators, using filter plates, sheets or pads having plane surfaces
- 46/103 . . {Curved filtering elements}
- 46/106 . . {Ring-shaped filtering elements}
- 46/12 . . in multiple arrangements
- 46/121 . . . V-type arrangements
- 46/14 . . arranged in a star shape
- 46/16 . . arranged on non-filtering conveyors {or supports}
- 46/18 . Particle separators, e.g. dust precipitators, using filtering belts
- 46/185 . . {Construction of filtering belts or supporting belts including devices for centering, mounting or sealing thereof}
- 46/20 . . the belts combined with drums
- 46/22 . . the belts travelling during filtering
- 46/24 . Particle separators, e.g. dust precipitators, using rigid hollow filter bodies
- 46/2403 . . {characterised by the physical shape or structure of the filtering element}
- 46/2407 . . . {Filter candles}
- 46/2411 . . . {Filter cartridges}
- 46/2414 {End caps including additional functions or special forms}
- 46/2418 . . . {Honeycomb filters ([used for filtering exhaust gases of an internal combustion engine F01N 3/022; ceramic honeycomb structures per se C04B 38/0006](#))}
- 46/2422 {Mounting of the body within a housing}
- 46/2425 {characterized by parameters related to the physical properties of the honeycomb structure material}
- 46/2429 {of the honeycomb walls or cells}
- 46/244 {of the plugs}
- 46/2444 {of the outer peripheral sealing}
- 46/2448 {of the adhesive layers, i.e. joints between segments}
- 46/24491 {Porosity}
- 46/24492 {Pore diameter}
- 46/24493 {Modulus of rupture}
- 46/24494 {Thermal expansion coefficient, heat capacity or thermal conductivity}
- 46/24495 {Young's modulus}
- 46/2451 {characterized by the geometrical structure, shape, pattern or configuration or parameters related to the geometry of the structure}
- 46/2455 {of the whole honeycomb or segments}
- 46/2459 {of the plugs}
- 46/2462 {the outer peripheral sealing}
- 46/2466 {of the adhesive layers, i.e. joints between segments}
- 46/247 {of the cells}
- 46/2474 {of the walls along the length of the honeycomb}
- 46/2476 {Monolithic structures}
- 46/2478 {Structures comprising honeycomb segments}
- 46/248 {Structures comprising laminated bodies or discs}
- 46/2482 {Thickness, height, width, length or diameter}
- 46/2484 {Cell density, area or aspect ratio}
- 46/2486 {characterised by the shapes or configurations}
- 46/2488 {Triangular}
- 46/249 {Quadrangular e.g. square or diamond}
- 46/2492 {Hexagonal}
- 46/2494 {Octagonal}
- 46/2496 {Circular}
- 46/2498 {The honeycomb filter being defined by mathematical relationships}
- 46/26 . . rotatable
- 46/28 . Particle separators, e.g. dust precipitators, using filter brushes

- 46/30 . Particle separators, e.g. dust precipitators, using loose filtering material
- 46/32 . . the material moving during filtering
- 46/34 . . . not horizontally, e.g. using shoots
- 46/36 . . . as a substantially horizontal layer, e.g. on rotary tables, drums, conveyor belts
- 46/38 . . . as fluidised bed
- 46/40 . Particle separators, e.g. dust precipitators, using edge filters, i.e. using contiguous impervious surfaces
- 46/403 . . {of helically or spirally wound bodies}
- 46/406 . . {of stacked bodies}
- 46/42 . Auxiliary equipment or operation thereof
- 46/4209 . . {Prevention of static charge, e.g. by grounding}
- 46/4218 . . {Influencing the heat transfer which act passively, e.g. isolations, heat sinks, cooling ribs}
- 46/4227 . . {Manipulating filters or filter elements, e.g. handles or extracting tools}
- 46/4236 . . {Reducing noise or vibration emissions}
- 46/4245 . . {Means for power supply or devices using electrical power in filters or filter elements}
- 46/4254 . . {Allowing or improving visual supervision, e.g. lamps, transparent parts, windows}
- 46/4263 . . {Means for active heating or cooling}
- 46/4272 . . {Special valve constructions adapted to filters or filter elements}
- 46/4281 . . {Venturi's or systems showing a venturi effect}
- 46/429 . . {Means for wireless communication}
- 46/44 . . controlling filtration
- 46/442 . . . {by measuring the concentration of particles}
- 46/444 . . . {by flow measuring}
- 46/446 . . . {by pressure measuring}
- 46/448 . . . {by temperature measuring}
- 46/46 . . . automatic
- 46/48 . . Removing dust other than cleaning filters {, e.g. by using collecting trays}
- 46/50 . . Means for discharging electrostatic potential
- 46/52 . Particle separators, e.g. dust precipitators, using filters embodying folded {corrugated or wound sheet} material
- 46/521 . . {using folded, pleated material}
- 46/522 . . . {with specific folds, e.g. having different lengths}
- 46/523 . . . {with means for maintaining spacing between the pleats or folds}
- 46/525 . . . {which comprises flutes}
- 46/526 {in stacked arrangement}
- 46/527 {in wound arrangement}
- 46/528 . . {using wound sheets (B01D 46/527 takes precedence)}
- 46/54 . Particle separators, e.g. dust precipitators, using ultra-fine filter sheets or diaphragms
- 46/543 . . {using membranes}
- 46/546 . . {using nano- or microfibres}
- 46/56 . with multiple filtering elements, characterised by their mutual disposition (B01D 46/12 takes precedence)
- 46/58 . . connected in parallel
- 46/60 . . . arranged concentrically or coaxially
- 46/62 . . connected in series
- 46/64 . . . arranged concentrically or coaxially
- 46/645 . . . {Protecting screens at filter inlet or outlet}
- 46/66 . Regeneration of the filtering material or filter elements inside the filter (B01D 46/04, B01D 46/48 take precedence)
- 46/68 . . by means acting on the cake side involving movement with regard to the filter elements
- NOTE**
- Groups B01D 46/68 - B01D 46/78 are only for dry processes.
- 46/681 . . . by scrapers, brushes or the like
- 46/682 . . . by nozzles
- 46/69 . . by means acting on the cake side without movement with respect to the filter elements, e.g. fixed nozzles
- 46/70 . . by acting counter-currently on the filtering surface, e.g. by flushing on the non-cake side of the filter
- 46/71 . . . with pressurised gas, e.g. pulsed air
- 46/715 {Using pressurized gas at supersonic velocities}
- 46/72 . . . with backwash arms, shoes or nozzles
- 46/74 . . by forces created by movement of the filter element
- 46/76 . . . involving vibrations
- 46/762 involving sonic or ultrasonic waves
- 46/78 . . . involving centrifugal forces
- 46/785 . . {by electrical means, e.g. for the generation of electrostatic forces in order to reject particles}
- 46/79 . . by liquid process
- 46/80 . . Chemical processes for the removal of the retained particles, e.g. by burning
- 46/82 . . . with catalysts
- 46/84 . . . by heating only
- 46/86 . . Cleaning the filter surface by interrupting suction so that the filter cake falls by gravity
- 46/88 . Replacing filter elements
- 46/90 . Devices for taking out of action one or more units of multi-unit filters, e.g. for regeneration or maintenance
- 47/00 Separating dispersed particles from gases, air or vapours by liquid as separating agent (B01D 45/10 takes precedence; fractionating columns or parts thereof B01D 3/16)**
- 47/02 . by passing the gas or air or vapour over or through a liquid bath
- 47/021 . . {by bubbling the gas through a liquid bath}
- 47/022 . . {by using a liquid curtain (B01D 47/06 takes precedence)}
- 47/024 . . {by impinging the gas to be cleaned essentially in a perpendicular direction onto the liquid surface}
- 47/025 . . {by contacting gas and liquid with a static flow mixer (B01D 47/14 takes precedence)}
- 47/027 . . {by directing the gas to be cleaned essentially tangential to the liquid surface}
- 47/028 . . {by directing the gas through a wetted wire mesh or a perforated plate (B01D 47/14 takes precedence)}
- 47/04 . by passing the gas or air or vapour through foam
- 47/05 . by condensation of the separating agent
- 47/06 . Spray cleaning
- 47/063 . . {with two or more jets impinging against each other}
- 47/066 . . {with nozzles using mechanical vibrations}

- 47/08 . . with rotary nozzles
- 47/085 . . . {with nozzles which are partly immersed in the washing fluid}
- 47/10 . Venturi scrubbers
- 47/12 . Washers with plural different washing sections (B01D 47/14 takes precedence)
- 47/14 . Packed scrubbers (packing elements B01J 19/30, B01J 19/32)
- 47/16 . Apparatus having rotary means, other than rotatable nozzles, for atomising the cleaning liquid
- 47/18 . . with horizontally-arranged shafts

49/00 Separating dispersed particles from gases, air or vapours by other methods

- 49/003 . {by sedimentation}
- 49/006 . {by sonic or ultrasonic techniques}
- 49/02 . by thermal repulsion

50/00 Combinations of methods or devices for separating particles from gases or vapours

NOTE

Group B01D 50/10 takes precedence over groups B01D 50/20 - B01D 50/60.

- 50/10 . Combinations of devices covered by groups B01D 45/00, B01D 46/00 and B01D 47/00
- 50/20 . Combinations of devices covered by groups B01D 45/00 and B01D 46/00
- 50/40 . Combinations of devices covered by groups B01D 45/00 and B01D 47/00
- 50/60 . Combinations of devices covered by groups B01D 46/00 and B01D 47/00

51/00 Auxiliary pretreatment of gases or vapours to be cleaned (preventing dust fires A62C; pretreatment specially adapted for magnetic or electrostatic separation B03C)

- 51/02 . Amassing the particles, e.g. by flocculation ({amassing by electric fields B03C 3/0175})
- 51/04 . . by seeding, e.g. by adding particles
- 51/06 . . by varying the pressure of the gas or vapour
- 51/08 . . . by sound or ultrasonics
- 51/10 . Conditioning the gas to be cleaned

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)

NOTE

Group B01D 53/34 takes precedence over groups B01D 53/02 - B01D 53/32

- 53/002 . {by condensation}
- 53/005 . {by heat treatment}
- 53/007 . {by irradiation}

- 53/02 . by adsorption, e.g. preparative gas chromatography ({solid sorbent compositions B01J 20/00, preparation of inorganic compounds or elements C01})

NOTE

In group B01D 53/02 and subgroups it is desirable to add indexing codes relating to adsorbents, components to be removed, main components in the product gas stream or type of gas or vapour treatment chosen from groups B01D 2253/00, B01D 2256/00, B01D 2257/00 or B01D 2259/00

- 53/025 . . {with wetted adsorbents; Chromatography (analytical chromatography G01N 30/00 - G01N 30/96; for liquids B01D 15/08)}
- 53/04 . . with stationary adsorbents ({B01D 53/025 takes precedence})

NOTE

{In groups B01D 53/0462 and B01D 53/047 - B01D 53/0476 it is desirable to add indexing codes chosen from B01D 2259/40007 - B01D 2259/40081 relating to controlling and processing aspects of pressure or temperature swing adsorption}

- 53/0407 . . . {Constructional details of adsorbing systems}
- 53/0415 {Beds in cartridges}
- 53/0423 {Beds in columns}
- 53/0431 {Beds with radial gas flow}
- 53/0438 {Cooling or heating systems}
- 53/0446 {Means for feeding or distributing gases}
- 53/0454 . . . {Controlling adsorption (controlling temperature swing adsorption B01D 53/0462, controlling pressure swing adsorption B01D 53/047)}
- 53/0462 . . . {Temperature swing adsorption}
- 53/047 . . . Pressure swing adsorption
- 53/0473 {Rapid pressure swing adsorption}
- 53/0476 {Vacuum pressure swing adsorption}
- 53/053 with storage or buffer vessel
- 53/06 . . with moving adsorbents, e.g. rotating beds ({B01D 53/025 takes precedence})
- 53/08 . . . according to the "moving bed" method
- 53/10 . . . with dispersed adsorbents
- 53/12 according to the "fluidised technique"
- 53/14 . . by absorption
- 53/1406 . . {Multiple stage absorption}
- 53/1412 . . {Controlling the absorption process}
- 53/1418 . . {Recovery of products}
- 53/1425 . . {Regeneration of liquid adsorbents}
- 53/1431 . . {Pretreatment by other processes}
- 53/1437 . . . {Pretreatment by adsorption}
- 53/1443 . . . {Pretreatment by diffusion}
- 53/145 . . . {Pretreatment by separation of solid or liquid material}
- 53/1456 . . {Removing acid components}
- 53/1462 . . . {Removing mixtures of hydrogen sulfide and carbon dioxide}
- 53/1468 . . . {Removing hydrogen sulfide}
- 53/1475 . . . {Removing carbon dioxide}
- 53/1481 . . . {Removing sulfur dioxide or sulfur trioxide}

- 53/1487 . . {Removing organic compounds}
- 53/1493 . . {Selection of liquid materials for use as absorbents}
- NOTE**
- In [B01D 53/1493](#) it is desirable to add indexing codes for compositional aspects of absorbents. The codes are chosen from [B01D 2252/00](#) - [B01D 2252/61](#)
- 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](#))
- 53/185 . . . {Liquid distributors}
- 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](#))
- 2053/221 . . {Devices}
- 2053/222 . . . {with plates}
- 2053/223 . . . {with hollow tubes}
- 2053/224 {with hollow fibres}
- 53/225 . . {Multiple stage diffusion}
- 53/226 . . . {in serial connexion}
- 53/227 . . . {in parallel connexion}
- 53/228 . . {characterised by specific membranes}
- 53/229 . . {Integrated processes (Diffusion and at least one other process, e.g. adsorption, absorption)}
- 53/24 . . by centrifugal force (centrifuges [B04B](#); cyclones [B04C](#))
- 53/26 . . Drying gases or vapours
- 53/261 . . {by adsorption}
- 53/263 . . {by absorption}
- 53/265 . . {by refrigeration (condensation)}
- 53/266 . . {by filtration}
- 53/268 . . {by diffusion}
- 53/28 . . Selection of materials for use as drying agents
- 53/30 . . Controlling by gas-analysis apparatus (regulating non electrical variables in general [G05D](#))
- 53/32 . . by electrical effects other than those provided for in group [B01D 61/00](#)
- 53/323 . . {by electrostatic effects or by high-voltage electric fields}
- 53/326 . . {in electrochemical cells}
- 53/34 . . Chemical or biological purification of waste gases
- 53/343 . . {Heat recovery}
- 53/346 . . {Controlling the process}
- 53/38 . . Removing components of undefined structure
- 53/40 . . . Acidic components ([B01D 53/44](#) takes precedence)
- 53/42 . . . Basic components ([B01D 53/44](#) takes precedence)
- 53/44 . . . Organic components
- 53/46 . . Removing components of defined structure
- 53/48 . . . Sulfur compounds
- 53/485 {containing only one sulfur compound other than sulfur oxides or hydrogen sulfide}
- 53/50 Sulfur oxides ([B01D 53/60](#) takes precedence)
- 53/501 {by treating the gases with a solution or a suspension of an alkali or earth-alkali or ammonium compound}
- 53/502 {characterised by a specific solution or suspension}
- 53/504 {characterised by a specific device}
- 53/505 {in a spray drying process}
- 53/507 {by treating the gases with other liquids}
- 53/508 {by treating the gases with solids}
- 53/52 Hydrogen sulfide
- 53/523 {Mixtures of hydrogen sulfide and sulfur oxides}
- 53/526 {Mixtures of hydrogen sulfide and carbon dioxide}
- 53/54 . . . Nitrogen compounds
- 53/56 Nitrogen oxides ([B01D 53/60](#) takes precedence)
- 53/565 {by treating the gases with solids}
- 53/58 Ammonia
- 53/60 . . . Simultaneously removing sulfur oxides and nitrogen oxides
- 53/62 . . . Carbon oxides
- 53/64 . . . Heavy metals or compounds thereof, e.g. mercury
- 53/66 . . . Ozone
- 53/68 . . . Halogens or halogen compounds
- 53/685 {by treating the gases with solids}
- 53/70 Organic halogen compounds
- 53/72 . . . Organic compounds not provided for in groups [B01D 53/48](#) - [B01D 53/70](#), e.g. hydrocarbons
- 53/73 . . After-treatment of removed components
- 53/74 . . General processes for purification of waste gases; Apparatus or devices specially adapted therefor ([B01D 53/92](#) takes precedence)
- 53/75 . . . Multi-step processes
- 53/76 . . . Gas phase processes, e.g. by using aerosols
- 53/77 . . . Liquid phase processes
- 53/78 with gas-liquid contact
- 53/79 Injecting reactants
- 53/80 . . . Semi-solid phase processes, i.e. by using slurries
- 53/81 . . . Solid phase processes
- 53/82 with stationary reactants
- 53/83 with moving reactants
- 53/84 . . . Biological processes
- 53/85 with gas-solid contact
- 53/86 . . . Catalytic processes
- 53/8603 {Removing sulfur compounds}
- 53/8606 {only one sulfur compound other than sulfur oxides or hydrogen sulfide}
- 53/8609 {Sulfur oxides}
- 53/8612 {Hydrogen sulfide}
- 53/8615 {Mixtures of hydrogen sulfide and sulfur oxides}
- 53/8618 {Mixtures of hydrogen sulfide and carbon dioxides}
- 53/8621 {Removing nitrogen compounds}
- 53/8625 {Nitrogen oxides}
- 53/8628 {Processes characterised by a specific catalyst}
- 53/8631 {Processes characterised by a specific device}
- 53/8634 {Ammonia}
- 53/8637 {Simultaneously removing sulfur oxides and nitrogen oxides}

- 53/864 {Removing carbon monoxide or hydrocarbons}
- 53/8643 {Removing mixtures of carbon monoxide or hydrocarbons and nitrogen oxides}
- 53/8646 {Simultaneous elimination of the components ([B01D 53/8656](#) takes precedence)}
- 53/865 {characterised by a specific catalyst}
- 53/8653 {characterised by a specific device}
- 53/8656 {Successive elimination of the components}
- 53/8659 {Removing halogens or halogen compounds}
- 53/8662 {Organic halogen compounds}
- 53/8665 {Removing heavy metals or compounds thereof, e.g. mercury}
- 53/8668 {Removing organic compounds not provided for in [B01D 53/8603](#) - [B01D 53/8665](#)}
- 53/8671 {Removing components of defined structure not provided for in [B01D 53/8603](#) - [B01D 53/8668](#)}
- 53/8675 {Ozone}
- 53/8678 {Removing components of undefined structure}
- 53/8681 {Acidic components ([B01D 53/8687](#) takes precedence)}
- 53/8684 {Basic components ([B01D 53/8687](#) takes precedence)}
- 53/8687 {Organic components}
- 53/869 {Multiple step processes}
- 53/8693 {After-treatment of removed components}
- 53/8696 {Controlling the catalytic process}
- 53/88 Handling or mounting catalysts
- 53/885 {Devices in general for catalytic purification of waste gases}
- 53/90 Injecting reactants
- 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](#))
- 53/922 {Mixtures of carbon monoxide or hydrocarbons and nitrogen oxides}
- 53/925 {Simultaneous elimination of carbon monoxide or hydrocarbons and nitrogen oxides}
- 53/927 {Successive elimination of carbon monoxide or hydrocarbons and nitrogen oxides}
- 53/94 by catalytic processes
- 53/9404 {Removing only nitrogen compounds}
- 53/9409 {Nitrogen oxides}
- 53/9413 {Processes characterised by a specific catalyst}
- 53/9418 {for removing nitrogen oxides by selective catalytic reduction [SCR] using a reducing agent in a lean exhaust gas}
- 53/9422 {for removing nitrogen oxides by NO_x storage or reduction by cyclic switching between lean and rich exhaust gases (LNT, NSC, NSR)}
- 53/9427 {for removing nitrous oxide}
- 53/9431 {Processes characterised by a specific device}
- 53/9436 {Ammonia}
- 53/944 {Simultaneously removing carbon monoxide, hydrocarbons or carbon making use of oxidation catalysts ([three-way-catalysts \[TWC\]](#) [B01D 53/9445](#))}
- 53/9445 {Simultaneously removing carbon monoxide, hydrocarbons or nitrogen oxides making use of three-way catalysts [TWC] or four-way-catalysts [FWC]}
- 53/945 {characterised by a specific catalyst}
- 53/9454 {characterised by a specific device}
- 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](#))}
- 53/9463 {with catalysts positioned on one brick}
- 53/9468 {in different layers}
- 53/9472 {in different zones}
- 53/9477 {with catalysts positioned on separate bricks, e.g. exhaust systems}
- 53/9481 {Catalyst preceded by an adsorption device without catalytic function for temporary storage of contaminants, e.g. during cold start}
- 53/9486 {for storing hydrocarbons}
- 53/949 {for storing sulfur oxides}
- 53/9495 {Controlling the catalytic process}
- 53/96 Regeneration, reactivation or recycling of reactants
- 53/965 {including an electrochemical process step}
- 57/00** **Separation, other than separation of solids, not fully covered by a single other group or subclass, e.g. [B03C](#)**
- 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](#))
- 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](#))**
- 59/02 . . . Separation by phase transition
- 59/04 . . . by distillation
- 59/06 . . . by fractional melting; by zone melting
- 59/08 . . . by fractional crystallisation, by precipitation, by zone freezing
- 59/10 . . . Separation by diffusion
- 59/12 . . . by diffusion through barriers
- 59/14 Construction of the barrier
- 59/16 . . . by thermal diffusion
- 59/18 . . . by separation jets
- 59/20 . . . Separation by centrifuging
- 59/22 . . . Separation by extracting
- 59/24 . . . by solvent extraction
- 59/26 . . . by sorption, i.e. absorption, adsorption, persorption
- 59/28 . . . Separation by chemical exchange
- 59/30 . . . by ion exchange

- 59/32 . . by exchange between fluids
- 59/33 . . . involving dual temperature exchange
- 59/34 . Separation by photochemical methods
- 59/36 . Separation by biological methods
- 59/38 . Separation by electrochemical methods (in general [B01J](#))
- 59/40 . . by electrolysis
- 59/42 . . by electromigration; by electrophoresis
- 59/44 . Separation by mass spectrography (particle spectrometers or separator tubes [H01J 49/00](#))
- 59/46 . . using only electrostatic fields
- 59/48 . . using electrostatic and magnetic fields
- 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](#)

Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis, or ultrafiltration; Apparatus specially adapted therefor; Semi-permeable membranes or their production

NOTE

In IPC groups [B01D 61/00](#) - [B01D 71/00](#), the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.

{The last place priority rule in groups [B01D 61/00](#) - [B01D 69/00](#) is not applied in the CPC.}

- 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](#))**

NOTES

1. {When classifying in this group, the indexing codes of the following groups must be added if applicable:
 - [B01D 2311/00](#) for details related to process operations and control;
 - [B01D 2313/00](#) for details related to membrane modules or apparatus;
 - [B01D 2315/00](#) for details related to the membrane module operation;
 - [B01D 2317/00](#) for details related to the module arrangement within a plant or an apparatus;
 - [B01D 2319/00](#) for details related to the membrane assembly within one housing.}
2. {Multistep processes comprising two or more membrane-separation steps of different kinds must be classified in [B01D 61/58](#) in combination with the subgroup for the specific steps. The symbols relating to the specific steps are added as "additional information."}
3. {Multistep processes comprising two or more membrane-separation steps of the same kind must be classified in the subgroup covering the specific multistep membrane separation, e.g. [B01D 61/029](#) for processes comprising two or more reverse osmosis steps, [B01D 61/3621](#) for processes comprising two or more pervaporation steps.}

- 61/002 . {Forward osmosis or direct osmosis}

WARNING

Group [B01D 61/002](#) is impacted by reclassification into groups [B01D 61/0021](#), [B01D 61/0022](#), [B01D 61/0023](#) and [B01D 61/0024](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 61/0021 . . {comprising multiple forward osmosis steps}

WARNING

Group [B01D 61/0021](#) is incomplete pending reclassification of documents from group [B01D 61/002](#).

Groups [B01D 61/002](#) and [B01D 61/0021](#) should be considered in order to perform a complete search.

- 61/0022 . . {Apparatus therefor}

WARNING

Group [B01D 61/0022](#) is incomplete pending reclassification of documents from group [B01D 61/002](#).

Groups [B01D 61/002](#) and [B01D 61/0022](#) should be considered in order to perform a complete search.

- 61/0023 . . {Accessories; Auxiliary operations}

WARNING

Group [B01D 61/0023](#) is incomplete pending reclassification of documents from group [B01D 61/002](#).

Groups [B01D 61/002](#) and [B01D 61/0023](#) should be considered in order to perform a complete search.

- 61/0024 . . {Controlling or regulating}

WARNING

Group [B01D 61/0024](#) is incomplete pending reclassification of documents from group [B01D 61/002](#).

Groups [B01D 61/002](#) and [B01D 61/0024](#) should be considered in order to perform a complete search.

- 61/005 . . {Osmotic agents; Draw solutions}

- 61/007 . {Separation by stereostructure, steric separation}
- 61/02 . Reverse osmosis; Hyperfiltration {; Nanofiltration}
- 61/025 . . {Reverse osmosis; Hyperfiltration}
- 61/026 . . . {comprising multiple reverse osmosis steps}

WARNING

Group [B01D 61/026](#) is impacted by reclassification into groups [B01D 61/0271](#) and [B01D 61/029](#).

Groups [B01D 61/026](#), [B01D 61/0271](#) and [B01D 61/029](#) should be considered in order to perform a complete search.

- 61/027 . . {Nanofiltration}

61/0271 . . . {comprising multiple nanofiltration steps}

WARNING

Group [B01D 61/0271](#) is incomplete pending reclassification of documents from group [B01D 61/026](#).

Groups [B01D 61/026](#) and [B01D 61/0271](#) should be considered in order to perform a complete search.

61/029 . . {Multistep processes comprising different kinds of membrane processes selected from reverse osmosis, hyperfiltration or nanofiltration}

WARNING

Group [B01D 61/029](#) is incomplete pending reclassification of documents from group [B01D 61/026](#).

Groups [B01D 61/026](#) and [B01D 61/029](#) should be considered in order to perform a complete search.

61/04 . . Feed pretreatment

NOTE

{When classifying in this group, the type of pretreatment must be specified with the indexing codes of groups [B01D 2311/04](#) and [B01D 2311/10](#) - [B01D 2311/2696](#).}

61/06 . . Energy recovery

61/08 . . Apparatus therefor

WARNING

Group [B01D 61/08](#) is impacted by reclassification into group [B01D 61/081](#).

Groups [B01D 61/08](#) and [B01D 61/081](#) should be considered in order to perform a complete search.

61/081 . . . {used at home, e.g. kitchen}

WARNING

Group [B01D 61/081](#) is incomplete pending reclassification of documents from group [B01D 61/08](#).

Groups [B01D 61/08](#) and [B01D 61/081](#) should be considered in order to perform a complete search.

61/10 . . Accessories; Auxiliary operations

61/12 . . Controlling or regulating

61/14 . . Ultrafiltration; Microfiltration

61/145 . . {Ultrafiltration}

61/146 . . . {comprising multiple ultrafiltration steps}

WARNING

Group [B01D 61/146](#) is impacted by reclassification into groups [B01D 61/1471](#) and [B01D 61/149](#).

Groups [B01D 61/146](#), [B01D 61/1471](#) and [B01D 61/149](#) should be considered in order to perform a complete search.

61/147 . . {Microfiltration}

61/1471 . . . {comprising multiple microfiltration steps}

WARNING

Group [B01D 61/1471](#) is incomplete pending reclassification of documents from group [B01D 61/146](#).

Groups [B01D 61/146](#) and [B01D 61/1471](#) should be considered in order to perform a complete search.

61/149 . . {Multistep processes comprising different kinds of membrane processes selected from ultrafiltration or microfiltration}

WARNING

Group [B01D 61/149](#) is incomplete pending reclassification of documents from group [B01D 61/146](#).

Groups [B01D 61/146](#) and [B01D 61/149](#) should be considered in order to perform a complete search.

61/16 . . Feed pretreatment

NOTE

{In group [B01D 61/16](#) the type of pretreatment must be specified with the indexing codes [B01D 2311/04](#) and [B01D 2311/10](#) - [B01D 2311/2696](#).}

61/18 . . Apparatus therefor

61/20 . . Accessories; Auxiliary operations

61/22 . . Controlling or regulating

61/24 . . Dialysis {; Membrane extraction}

WARNING

Group [B01D 61/24](#) is impacted by reclassification into groups [B01D 61/244](#) and [B01D 61/2461](#).

Groups [B01D 61/24](#), [B01D 61/244](#) and [B01D 61/2461](#) should be considered in order to perform a complete search.

61/243 . . {Dialysis}

WARNING

Group [B01D 61/243](#) is impacted by reclassification into group [B01D 61/244](#).

Groups [B01D 61/243](#) and [B01D 61/244](#) should be considered in order to perform a complete search.

61/244 . . . {comprising multiple dialysis steps}

WARNING

Group [B01D 61/244](#) is incomplete pending reclassification of documents from groups [B01D 61/24](#) and [B01D 61/243](#).

Groups [B01D 61/24](#), [B01D 61/243](#) and [B01D 61/244](#) should be considered in order to perform a complete search.

- | | |
|--|---|
| <p>61/246 . . {Membrane extraction}</p> <p>WARNING</p> <p>Group B01D 61/246 is impacted by reclassification into group B01D 61/2461.
Groups B01D 61/246 and B01D 61/2461 should be considered in order to perform a complete search.</p> <p>61/2461 . . . {comprising multiple membrane extraction steps}</p> <p>WARNING</p> <p>Group B01D 61/2461 is incomplete pending reclassification of documents from groups B01D 61/24 and B01D 61/246.
Groups B01D 61/24, B01D 61/246 and B01D 61/2461 should be considered in order to perform a complete search.</p> <p>61/28 . . Apparatus therefor</p> <p>61/30 . . Accessories; Auxiliary operation</p> <p>61/32 . . Controlling or regulating</p> <p>61/36 . . Pervaporation; Membrane distillation; Liquid permeation</p> <p>WARNING</p> <p>Group B01D 61/36 is impacted by reclassification into groups B01D 61/363, B01D 61/3631, B01D 61/365 and B01D 61/3651.
All groups listed in this Warning should be considered in order to perform a complete search.</p> <p>61/362 . . {Pervaporation}</p> <p>WARNING</p> <p>Group B01D 61/362 is impacted by reclassification into group B01D 61/3621.
Groups B01D 61/362 and B01D 61/3621 should be considered in order to perform a complete search.</p> <p>61/3621 . . . {comprising multiple pervaporation steps}</p> <p>WARNING</p> <p>Group B01D 61/3621 is incomplete pending reclassification of documents from group B01D 61/362.
Groups B01D 61/362 and B01D 61/3621 should be considered in order to perform a complete search.</p> <p>61/363 . . {Vapour permeation}</p> <p>WARNING</p> <p>Groups B01D 61/363 and B01D 61/3631 are incomplete pending reclassification of documents from group B01D 61/36.
Groups B01D 61/36, B01D 61/363 and B01D 61/3631 should be considered in order to perform a complete search.</p> <p>61/3631 . . . {comprising multiple vapour permeation steps}</p> | <p>61/364 . . {Membrane distillation}</p> <p>WARNING</p> <p>Group B01D 61/364 is impacted by reclassification into group B01D 61/3641.
Groups B01D 61/364 and B01D 61/3641 should be considered in order to perform a complete search.</p> <p>61/3641 . . . {comprising multiple membrane distillation steps}</p> <p>WARNING</p> <p>Group B01D 61/3641 is incomplete pending reclassification of documents from group B01D 61/364.
Groups B01D 61/364 and B01D 61/3641 should be considered in order to perform a complete search.</p> <p>61/365 . . {Osmotic distillation or osmotic evaporation}</p> <p>WARNING</p> <p>Groups B01D 61/365 and B01D 61/3651 are incomplete pending reclassification of documents from group B01D 61/36.
Groups B01D 61/36, B01D 61/365 and B01D 61/3651 should be considered in order to perform a complete search.</p> <p>61/3651 . . . {comprising multiple osmotic distillation or evaporation steps}</p> <p>61/366 . . {Apparatus therefor}</p> <p>61/368 . . {Accessories; Auxiliary operations}</p> <p>61/38 . . Liquid-membrane separation</p> <p>61/40 . . using emulsion-type membranes</p> <p>61/42 . . Electro dialysis; Electro-osmosis {}; Electro-ultrafiltration; Membrane capacitive deionization}</p> <p>WARNING</p> <p>Group B01D 61/42 is impacted by reclassification into groups B01D 61/423, B01D 61/4251, B01D 61/4271, B01D 61/428 and B01D 61/4281.
All groups listed in this Warning should be considered in order to perform a complete search.</p> <p>61/422 . . {Electrodialysis}</p> <p>WARNING</p> <p>Group B01D 61/422 is impacted by reclassification into group B01D 61/423.
Groups B01D 61/422 and B01D 61/423 should be considered in order to perform a complete search.</p> <p>61/423 . . . {comprising multiple electrodialysis steps}</p> <p>WARNING</p> <p>Group B01D 61/423 is incomplete pending reclassification of documents from groups B01D 61/42 and B01D 61/422.
Groups B01D 61/42, B01D 61/422 and B01D 61/423 should be considered in order to perform a complete search.</p> |
|--|---|

- 61/425 . . {Electro-ultrafiltration}
- WARNING**
- Group [B01D 61/425](#) is impacted by reclassification into group [B01D 61/4251](#).
- Groups [B01D 61/425](#) and [B01D 61/4251](#) should be considered in order to perform a complete search.
- 61/4251 . . . {comprising multiple electro-ultrafiltration steps}
- WARNING**
- Group [B01D 61/4251](#) is incomplete pending reclassification of documents from groups [B01D 61/42](#) and [B01D 61/425](#).
- Groups [B01D 61/42](#), [B01D 61/425](#) and [B01D 61/4251](#) should be considered in order to perform a complete search.
- 61/427 . . {Electro-osmosis}
- WARNING**
- Group [B01D 61/427](#) is impacted by reclassification into group [B01D 61/4271](#).
- Groups [B01D 61/427](#) and [B01D 61/4271](#) should be considered in order to perform a complete search.
- 61/4271 . . . {comprising multiple electro-osmosis steps}
- WARNING**
- Group [B01D 61/4271](#) is incomplete pending reclassification of documents from groups [B01D 61/42](#) and [B01D 61/427](#).
- Groups [B01D 61/42](#), [B01D 61/427](#) and [B01D 61/4271](#) should be considered in order to perform a complete search.
- 61/428 . . {Membrane capacitive deionization}
- WARNING**
- Groups [B01D 61/428](#) and [B01D 61/4281](#) are incomplete pending reclassification of documents from group [B01D 61/42](#).
- Groups [B01D 61/42](#), [B01D 61/428](#) and [B01D 61/4281](#) should be considered in order to perform a complete search.
- 61/4281 . . . {comprising multiple membrane capacitive deionization steps}
- 61/44 . . Ion-selective electrodialysis
- 61/445 . . . {with bipolar membranes; Water splitting}
- 61/46 . . . Apparatus therefor
- WARNING**
- Group [B01D 61/46](#) is impacted by reclassification into groups [B01D 61/461](#), [B01D 61/462](#), [B01D 61/463](#), [B01D 61/464](#), [B01D 61/465](#), [B01D 61/466](#), [B01D 61/467](#) and [B01D 61/468](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 61/461 {comprising only a single cell, only one anion or cation exchange membrane or one pair of anion and cation membranes}
- WARNING**
- Group [B01D 61/461](#) is incomplete pending reclassification of documents from group [B01D 61/46](#).
- Groups [B01D 61/46](#) and [B01D 61/461](#) should be considered in order to perform a complete search.
- 61/462 {comprising the membrane sequence AA, where A is an anion exchange membrane}
- WARNING**
- Group [B01D 61/462](#) is incomplete pending reclassification of documents from group [B01D 61/46](#).
- Groups [B01D 61/46](#) and [B01D 61/462](#) should be considered in order to perform a complete search.
- 61/463 {comprising the membrane sequence AC or CA, where C is a cation exchange membrane}
- WARNING**
- Group [B01D 61/463](#) is incomplete pending reclassification of documents from group [B01D 61/46](#).
- Groups [B01D 61/46](#) and [B01D 61/463](#) should be considered in order to perform a complete search.
- 61/464 {comprising the membrane sequence CC}
- WARNING**
- Group [B01D 61/464](#) is incomplete pending reclassification of documents from group [B01D 61/46](#).
- Groups [B01D 61/46](#) and [B01D 61/464](#) should be considered in order to perform a complete search.
- 61/465 {comprising the membrane sequence AB or BA, where B is a bipolar membrane}
- WARNING**
- Group [B01D 61/465](#) is incomplete pending reclassification of documents from group [B01D 61/46](#).
- Groups [B01D 61/46](#) and [B01D 61/465](#) should be considered in order to perform a complete search.
- 61/466 {comprising the membrane sequence BC or CB}
- WARNING**
- Group [B01D 61/466](#) is incomplete pending reclassification of documents from group [B01D 61/46](#).
- Groups [B01D 61/46](#) and [B01D 61/466](#) should be considered in order to perform a complete search.

<p>61/467 {comprising the membrane sequence BB}</p> <p>WARNING</p> <p>Group B01D 61/467 is incomplete pending reclassification of documents from group B01D 61/46.</p> <p>Groups B01D 61/46 and B01D 61/467 should be considered in order to perform a complete search.</p>	<p>63/02 . Hollow fibre modules</p> <p>WARNING</p> <p>Group B01D 63/02 is impacted by reclassification into groups B01D 63/031, B01D 63/032, B01D 63/033 and B01D 63/034.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>
<p>61/468 {comprising more than two electrodes}</p> <p>WARNING</p> <p>Group B01D 61/468 is incomplete pending reclassification of documents from group B01D 61/46.</p> <p>Groups B01D 61/46 and B01D 61/468 should be considered in order to perform a complete search.</p>	<p>63/021 . . {Manufacturing thereof}</p> <p>WARNING</p> <p>Group B01D 63/021 is impacted by reclassification into groups B01D 63/0231, B01D 63/0232 and B01D 63/0233.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>
<p>61/48 having one or more compartments filled with ion-exchange material {, e.g. electrodeionisation}</p> <p>61/485 {Specific features relating to the ion-exchange material}</p> <p>61/50 Stacks of the plate-and-frame type</p> <p>61/52 . . . Accessories; Auxiliary operation</p> <p>61/54 . . . Controlling or regulating</p> <p>61/56 . . Electro-osmotic dewatering</p> <p>61/58 . Multistep processes</p> <p>NOTE</p> <p>{In group B01D 61/58 the symbols relating to the specific process steps in B01D 61/00 - B01D 61/56 are given as additional information.}</p>	<p>63/022 . . . {Encapsulating hollow fibres}</p> <p>WARNING</p> <p>Group B01D 63/022 is impacted by reclassification into groups B01D 63/0221, B01D 63/0222, B01D 63/0223, B01D 63/0224 and B01D 63/0225.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p> <p>63/0221 {using a mould}</p> <p>WARNING</p> <p>Group B01D 63/0221 is incomplete pending reclassification of documents from group B01D 63/022.</p> <p>Groups B01D 63/022 and B01D 63/0221 should be considered in order to perform a complete search.</p>
<p>63/00 Apparatus in general for separation processes using semi-permeable membranes</p> <p>NOTES</p> <p>1. {When classifying in this group, the indexing codes of the following groups must be added if applicable:</p> <ul style="list-style-type: none"> • B01D 2313/00 for details related to membrane modules and apparatus; • B01D 2315/00 for details related to the membrane module operation; • B01D 2317/00 for details related to the module arrangement within a plant or an apparatus; • B01D 2319/00 for details related to the membrane assembly within one housing.} <p>2. {Attention is drawn to the Note following B01D 59/50, which indicates the last place rule is not applied in B01D 63/00.}</p>	<p>63/0222 {using centrifugal forces}</p> <p>WARNING</p> <p>Group B01D 63/0222 is incomplete pending reclassification of documents from group B01D 63/022.</p> <p>Groups B01D 63/022 and B01D 63/0222 should be considered in order to perform a complete search.</p> <p>63/0223 {by fixing the hollow fibres prior to encapsulation}</p> <p>WARNING</p> <p>Group B01D 63/0223 is incomplete pending reclassification of documents from group B01D 63/022.</p> <p>Groups B01D 63/022 and B01D 63/0223 should be considered in order to perform a complete search.</p>
<p>63/005 . {Microfluidic devices (Microfluidic devices comprising semi-permeable hollow fibre membranes B01D 63/028; Microfluidic devices comprising semi-permeable flat membranes B01D 63/088)}</p>	<p>63/0223 {by fixing the hollow fibres prior to encapsulation}</p> <p>WARNING</p> <p>Group B01D 63/0223 is incomplete pending reclassification of documents from group B01D 63/022.</p> <p>Groups B01D 63/022 and B01D 63/0223 should be considered in order to perform a complete search.</p>

<p>63/0224 {Opening the fibre ends after encapsulation}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/0224 is incomplete pending reclassification of documents from group B01D 63/022.</p> <p>Groups B01D 63/022 and B01D 63/0224 should be considered in order to perform a complete search.</p>	<p>63/0241 . . . {being U-shaped}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/0241 is incomplete pending reclassification of documents from group B01D 63/024.</p> <p>Groups B01D 63/024 and B01D 63/0241 should be considered in order to perform a complete search.</p>
<p>63/0225 {Multiple encapsulation layers}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/0225 is incomplete pending reclassification of documents from group B01D 63/022.</p> <p>Groups B01D 63/022 and B01D 63/0225 should be considered in order to perform a complete search.</p>	<p>63/025 . . {Bobbin units}</p> <p>63/026 . . {Wafer type modules or flat-surface type modules}</p> <p>63/027 . . {Twinned or braided type modules}</p> <p>63/028 . . {Microfluidic devices comprising semi-permeable hollow fibre membranes}</p> <p>63/031 . . {Two or more types of hollow fibres within one bundle or within one potting or tube-sheet}</p> <p style="text-align: center;">WARNING</p>
<p>63/023 {Encapsulating materials}</p> <p>63/0231 . . . {using supporting structures, e.g. filaments for weaving mats}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/0231 is incomplete pending reclassification of documents from group B01D 63/021.</p> <p>Groups B01D 63/021 and B01D 63/0231 should be considered in order to perform a complete search.</p>	<p>Group B01D 63/031 is incomplete pending reclassification of documents from group B01D 63/02.</p> <p>Groups B01D 63/02 and B01D 63/031 should be considered in order to perform a complete search.</p> <p>63/032 . . {More than two tube sheets for one bundle}</p> <p style="text-align: center;">WARNING</p>
<p>63/0232 . . . {using hollow fibers mats as precursor, e.g. wound or pleated mats}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/0232 is incomplete pending reclassification of documents from group B01D 63/021.</p> <p>Groups B01D 63/021 and B01D 63/0232 should be considered in order to perform a complete search.</p>	<p>Group B01D 63/032 is incomplete pending reclassification of documents from group B01D 63/02.</p> <p>Groups B01D 63/02 and B01D 63/032 should be considered in order to perform a complete search.</p> <p>63/033 . . {Specific distribution of fibres within one potting or tube-sheet}</p> <p style="text-align: center;">WARNING</p>
<p>63/0233 . . . {forming the bundle}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/0233 is incomplete pending reclassification of documents from group B01D 63/021.</p> <p>Groups B01D 63/021 and B01D 63/0233 should be considered in order to perform a complete search.</p>	<p>Group B01D 63/033 is incomplete pending reclassification of documents from group B01D 63/02.</p> <p>Groups B01D 63/02 and B01D 63/033 should be considered in order to perform a complete search.</p> <p>63/034 . . {Lumen open in more than two directions}</p> <p style="text-align: center;">WARNING</p>
<p>63/024 . . {with a single potted end}</p> <p style="text-align: center;">WARNING</p> <p>Group B01D 63/024 is impacted by reclassification into group B01D 63/0241.</p> <p>Groups B01D 63/024 and B01D 63/0241 should be considered in order to perform a complete search.</p>	<p>Group B01D 63/034 is incomplete pending reclassification of documents from group B01D 63/02.</p> <p>Groups B01D 63/02 and B01D 63/034 should be considered in order to perform a complete search.</p> <p>63/04 . . comprising multiple hollow fibre assemblies</p> <p>63/043 . . . {with separate tube sheets}</p> <p>63/046 . . . {in separate housings}</p>

- 63/06 . Tubular membrane modules
- 63/061 . . {Manufacturing thereof}
- 63/062 . . {with membranes on a surface of a support tube}
- 63/063 . . . {on the inner surface thereof}
- 63/065 . . . {on the outer surface thereof}
- 63/066 . . {with a porous block having membrane coated passages}
- 63/067 . . {with pleated membranes}
- 63/068 . . {with flexible membrane tubes}
- 63/069 . . {comprising a bundle of tubular membranes}

WARNING

Group [B01D 63/06](#) is impacted by reclassification into group [B01D 63/069](#).
Groups [B01D 63/06](#) and [B01D 63/069](#) should be considered in order to perform a complete search.

WARNING

Group [B01D 63/069](#) is incomplete pending reclassification of documents from group [B01D 63/06](#).
Groups [B01D 63/06](#) and [B01D 63/069](#) should be considered in order to perform a complete search.

- 63/08 . Flat membrane modules

WARNING

Group [B01D 63/08](#) is impacted by reclassification into group [B01D 63/089](#).
Groups [B01D 63/08](#) and [B01D 63/089](#) should be considered in order to perform a complete search.

- 63/081 . . {Manufacturing thereof}
- 63/082 . . {comprising a stack of flat membranes}

WARNING

Group [B01D 63/082](#) is impacted by reclassification into groups [B01D 63/0821](#) and [B01D 63/0822](#).
Groups [B01D 63/082](#), [B01D 63/0821](#) and [B01D 63/0822](#) should be considered in order to perform a complete search.

- 63/0821 . . . {Membrane plate arrangements for submerged operation}

WARNING

Group [B01D 63/0821](#) is incomplete pending reclassification of documents from group [B01D 63/082](#).
Groups [B01D 63/082](#) and [B01D 63/0821](#) should be considered in order to perform a complete search.

- 63/0822 . . . {Plate-and-frame devices}

WARNING

Group [B01D 63/0822](#) is incomplete pending reclassification of documents from group [B01D 63/082](#).
Groups [B01D 63/082](#) and [B01D 63/0822](#) should be considered in order to perform a complete search.

- 63/084 . . . {at least one flow duct intersecting the membranes}
- 63/085 {specially adapted for two fluids in mass exchange flow}
- 63/087 . . {Single membrane modules}
- 63/088 . . {Microfluidic devices comprising semi-permeable flat membranes}
- 63/089 . . {Modules where the membrane is in the form of a bag, membrane cushion or pad}

WARNING

Group [B01D 63/089](#) is incomplete pending reclassification of documents from group [B01D 63/08](#).
Groups [B01D 63/08](#) and [B01D 63/089](#) should be considered in order to perform a complete search.

- 63/10 . Spiral-wound membrane modules

WARNING

Group [B01D 63/10](#) is impacted by reclassification into groups [B01D 63/101](#) and [B01D 63/107](#).
Groups [B01D 63/10](#), [B01D 63/101](#) and [B01D 63/107](#) should be considered in order to perform a complete search.

- 63/101 . . {Spiral winding}

WARNING

Group [B01D 63/101](#) is incomplete pending reclassification of documents from group [B01D 63/10](#).
Groups [B01D 63/10](#) and [B01D 63/101](#) should be considered in order to perform a complete search.

- 63/103 . . {Details relating to membrane envelopes}

WARNING

Group [B01D 63/103](#) is impacted by reclassification into group [B01D 63/1031](#).
Groups [B01D 63/103](#) and [B01D 63/1031](#) should be considered in order to perform a complete search.

- 63/1031 . . . {Glue line or sealing patterns}

WARNING

Group [B01D 63/1031](#) is incomplete pending reclassification of documents from group [B01D 63/103](#).
Groups [B01D 63/103](#) and [B01D 63/1031](#) should be considered in order to perform a complete search.

- 63/106 . . {Anti-Telescopic-Devices [ATD]}
 - 63/107 . . {Specific properties of the central tube or the permeate channel}
- WARNING**
- Group [B01D 63/107](#) is incomplete pending reclassification of documents from group [B01D 63/10](#).
- Groups [B01D 63/10](#) and [B01D 63/107](#) should be considered in order to perform a complete search.
- 63/12 . . comprising multiple spiral-wound assemblies
 - 63/14 . . Pleat-type membrane modules
 - 63/16 . . Rotary, reciprocated or vibrated modules
- 65/00 Accessories or auxiliary operations, in general, for separation processes or apparatus using semi-permeable membranes**
- NOTE**
- {Attention is drawn to the Note following [B01D 59/50](#), which indicates the last place rule is not applied in [B01D 65/00](#).}
- 65/003 . . {Membrane bonding or sealing}
 - 65/02 . . Membrane cleaning or sterilisation {; Membrane regeneration}
- NOTE**
- {When classifying in this group, the indexing codes of the following groups must be added if applicable:
[B01D 2321/00](#) for details relating to membrane cleaning, regeneration, sterilization or to the prevention of fouling.}
- 65/022 . . {Membrane sterilisation}
 - 65/025 . . {Removal of membrane elements before washing}
 - 65/027 . . {Cleaning of other parts of the apparatus than the membrane}
 - 65/04 . . with movable bodies, e.g. foam balls
 - 65/06 . . with special washing compositions
 - 65/08 . . Prevention of membrane fouling or of concentration polarisation
- NOTE**
- {When classifying in this group, the indexing codes of the following groups must be added if applicable:
[B01D 2321/00](#) for details relating to membrane cleaning, regeneration, sterilization or to the prevention of fouling.}
- 65/10 . . Testing of membranes or membrane apparatus; Detecting or repairing leaks
- WARNING**
- Group [B01D 65/10](#) is impacted by reclassification into group [B01D 65/109](#).
- Groups [B01D 65/10](#) and [B01D 65/109](#) should be considered in order to perform a complete search.
- 65/102 . . {Detection of leaks in membranes}

- 65/104 . . {Detection of leaks in membrane apparatus or modules}
- 65/106 . . {Repairing membrane apparatus or modules}
- 65/108 . . . {Repairing membranes}
- 65/109 . . {Testing of membrane fouling or clogging, e.g. amount or affinity}

WARNING

Group [B01D 65/109](#) is incomplete pending reclassification of documents from group [B01D 65/10](#).

Groups [B01D 65/10](#) and [B01D 65/109](#) should be considered in order to perform a complete search.

67/00 Processes specially adapted for manufacturing semi-permeable membranes for separation processes or apparatus

NOTES

1. {When classifying in this group, the indexing codes of the following groups must be added if applicable:
 - [B01D 2323/00](#) for details relating to membrane preparation.}
2. {Attention is drawn to the Note following [B01D 59/50](#), which indicates the last place rule is not applied in [B01D 67/00](#).}

- 67/0002 . . {Organic membrane manufacture}
- 67/0004 . . {by agglomeration of particles}

WARNING

Group [B01D 67/0004](#) is impacted by reclassification into groups [B01D 67/00041](#), [B01D 67/00042](#), [B01D 67/00043](#), [B01D 67/00044](#), [B01D 67/00045](#) and [B01D 67/00046](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 67/00041 . . . {by sintering}

WARNING

Group [B01D 67/00041](#) is incomplete pending reclassification of documents from group [B01D 67/0004](#).

Groups [B01D 67/0004](#) and [B01D 67/00041](#) should be considered in order to perform a complete search.

- 67/00042 . . . {by deposition of fibres, nanofibres or nanofibrils}

WARNING

Group [B01D 67/00042](#) is incomplete pending reclassification of documents from group [B01D 67/0004](#).

Groups [B01D 67/0004](#) and [B01D 67/00042](#) should be considered in order to perform a complete search.

67/00043 . . . {by agglomeration of nanoparticles}

WARNING

Group [B01D 67/00043](#) is incomplete pending reclassification of documents from group [B01D 67/0004](#).

Groups [B01D 67/0004](#) and [B01D 67/00043](#) should be considered in order to perform a complete search.

67/00044 . . . {by plasma spraying}

WARNING

Group [B01D 67/00044](#) is incomplete pending reclassification of documents from group [B01D 67/0004](#).

Groups [B01D 67/0004](#) and [B01D 67/00044](#) should be considered in order to perform a complete search.

67/00045 . . . {by additive layer techniques, e.g. selective laser sintering [SLS], selective laser melting [SLM] or 3D printing}

WARNING

Group [B01D 67/00045](#) is incomplete pending reclassification of documents from group [B01D 67/0004](#).

Groups [B01D 67/0004](#) and [B01D 67/00045](#) should be considered in order to perform a complete search.

67/00046 . . . {by deposition by filtration through a support or base layer}

WARNING

Group [B01D 67/00046](#) is incomplete pending reclassification of documents from group [B01D 67/0004](#).

Groups [B01D 67/0004](#) and [B01D 67/00046](#) should be considered in order to perform a complete search.

67/0006 . . {by chemical reactions (in-situ polymerisation, polycondensation, cross-linking or reaction for manufacturing composite membranes [B01D 69/125](#))}

67/0009 . . {by phase separation, sol-gel transition, evaporation or solvent quenching}

WARNING

Group [B01D 67/0009](#) is impacted by reclassification into group [B01D 67/00091](#).

Groups [B01D 67/0009](#) and [B01D 67/00091](#) should be considered in order to perform a complete search.

67/00091 . . . {by evaporation}

WARNING

Group [B01D 67/00091](#) is incomplete pending reclassification of documents from group [B01D 67/0009](#).

Groups [B01D 67/0009](#) and [B01D 67/00091](#) should be considered in order to perform a complete search.

67/0011 . . . {Casting solutions therefor}

WARNING

Group [B01D 67/0011](#) is impacted by reclassification into groups [B01D 67/00111](#) and [B01D 67/00113](#).

Groups [B01D 67/0011](#), [B01D 67/00111](#) and [B01D 67/00113](#) should be considered in order to perform a complete search.

67/00111 {Polymer pretreatment in the casting solutions}

WARNING

Group [B01D 67/00111](#) is incomplete pending reclassification of documents from group [B01D 67/0011](#).

Groups [B01D 67/0011](#) and [B01D 67/00111](#) should be considered in order to perform a complete search.

67/00113 {Pretreatment of the casting solutions, e.g. thermal treatment or ageing}

WARNING

Group [B01D 67/00113](#) is incomplete pending reclassification of documents from group [B01D 67/0011](#).

Groups [B01D 67/0011](#) and [B01D 67/00113](#) should be considered in order to perform a complete search.

67/0013 . . . {Casting processes}

WARNING

Group [B01D 67/0013](#) is impacted by reclassification into group [B01D 67/00135](#).

Groups [B01D 67/0013](#) and [B01D 67/00135](#) should be considered in order to perform a complete search.

67/00135 {Air gap characteristics}

WARNING

Group [B01D 67/00135](#) is incomplete pending reclassification of documents from group [B01D 67/0013](#).

Groups [B01D 67/0013](#) and [B01D 67/00135](#) should be considered in order to perform a complete search.

67/0016 . . . {Coagulation}

WARNING

Group [B01D 67/0016](#) is impacted by reclassification into group [B01D 67/00165](#).

Groups [B01D 67/0016](#) and [B01D 67/00165](#) should be considered in order to perform a complete search.

67/00165 {Composition of the coagulation baths}

WARNING

Group [B01D 67/00165](#) is incomplete pending reclassification of documents from group [B01D 67/0016](#).

Groups [B01D 67/0016](#) and [B01D 67/00165](#) should be considered in order to perform a complete search.

67/0018 {Thermally induced processes [TIPS]}

67/002 . . . {from melts}

67/0023 . . . {by inducing porosity into non porous precursor membranes}

67/0025 {by mechanical treatment, e.g. pore-stretching}

67/0027 {by stretching}

67/003 {by selective elimination of components, e.g. by leaching}

WARNING

Group [B01D 67/003](#) is impacted by reclassification into group [B01D 67/0031](#).

Groups [B01D 67/003](#) and [B01D 67/0031](#) should be considered in order to perform a complete search.

67/0031 {by elimination of at least one of the blocks of a block copolymer}

WARNING

Group [B01D 67/0031](#) is incomplete pending reclassification of documents from group [B01D 67/003](#).

Groups [B01D 67/003](#) and [B01D 67/0031](#) should be considered in order to perform a complete search.

67/0032 {by elimination of segments of the precursor, e.g. nucleation-track membranes, lithography or laser methods}

67/0034 {by micromachining techniques, e.g. using masking and etching steps, photolithography}

67/0037 . . . {by deposition from the gaseous phase, e.g. CVD, PVD}

67/0039 . . . {Inorganic membrane manufacture}

WARNING

Group [B01D 67/0039](#) is impacted by reclassification into group [B01D 67/0049](#).

Groups [B01D 67/0039](#) and [B01D 67/0049](#) should be considered in order to perform a complete search.

67/0041 . . . {by agglomeration of particles in the dry state}

WARNING

Group [B01D 67/0041](#) is impacted by reclassification into groups [B01D 67/00411](#), [B01D 67/00412](#), [B01D 67/00413](#), [B01D 67/00414](#), [B01D 67/00415](#) and [B01D 67/00416](#).

All groups listed in this Warning should be considered in order to perform a complete search.

67/00411 {by sintering}

WARNING

Group [B01D 67/00411](#) is incomplete pending reclassification of documents from group [B01D 67/0041](#).

Groups [B01D 67/0041](#) and [B01D 67/00411](#) should be considered in order to perform a complete search.

67/00412 {by deposition of fibres, nanofibres or nanofibrils}

WARNING

Group [B01D 67/00412](#) is incomplete pending reclassification of documents from group [B01D 67/0041](#).

Groups [B01D 67/0041](#) and [B01D 67/00412](#) should be considered in order to perform a complete search.

67/00413 {by agglomeration of nanoparticles}

WARNING

Group [B01D 67/00413](#) is incomplete pending reclassification of documents from group [B01D 67/0041](#).

Groups [B01D 67/0041](#) and [B01D 67/00413](#) should be considered in order to perform a complete search.

67/00414 {by plasma spraying}

WARNING

Group [B01D 67/00414](#) is incomplete pending reclassification of documents from group [B01D 67/0041](#).

Groups [B01D 67/0041](#) and [B01D 67/00414](#) should be considered in order to perform a complete search.

67/00415 {by additive layer techniques, e.g. selective laser sintering [SLS], selective laser melting [SLM] or 3D printing}

WARNING

Group [B01D 67/00415](#) is incomplete pending reclassification of documents from group [B01D 67/0041](#).

Groups [B01D 67/0041](#) and [B01D 67/00415](#) should be considered in order to perform a complete search.

67/00416 {by deposition by filtration through a support or base layer}

WARNING

Group [B01D 67/00416](#) is incomplete pending reclassification of documents from group [B01D 67/0041](#).

Groups [B01D 67/0041](#) and [B01D 67/00416](#) should be considered in order to perform a complete search.

67/0044 . . . {by chemical reaction}

67/0046 . . . {by slurry techniques, e.g. die or slip-casting}

67/0048 . . . {by sol-gel transition}

- 67/0049 . . {by evaporation}
- WARNING**
- Group [B01D 67/0049](#) is incomplete pending reclassification of documents from group [B01D 67/0039](#).
- Groups [B01D 67/0039](#) and [B01D 67/0049](#) should be considered in order to perform a complete search.

- 67/0051 . . {by controlled crystallisation, e.g. hydrothermal growth}
- 67/0053 . . {by inducing porosity into non porous precursor membranes}
- 67/0055 . . . {by mechanical treatment}
- 67/0058 . . . {by selective elimination of components, e.g. by leaching}
- 67/006 . . . {by elimination of segments of the precursor, e.g. nucleation-track membranes, lithography or laser methods}
- 67/0062 {by micromachining techniques, e.g. using masking and etching steps, photolithography}
- 67/0065 {by anodic oxidation}
- 67/0067 . . {by carbonisation or pyrolysis}
- 67/0069 . . {by deposition from the liquid phase, e.g. electrochemical deposition ([B01D 67/0046](#) takes precedence)}
- 67/0072 . . {by deposition from the gaseous phase, e.g. sputtering, CVD, PVD}
- 67/0074 . . {from melts}
- 67/0076 . . {Pretreatment of inorganic membrane material prior to membrane formation, e.g. coating of metal powder}
- 67/0079 . {Manufacture of membranes comprising organic and inorganic components}

WARNING

Group [B01D 67/0079](#) is impacted by reclassification into groups [B01D 67/00791](#) and [B01D 67/00793](#).

Groups [B01D 67/0079](#), [B01D 67/00791](#) and [B01D 67/00793](#) should be considered in order to perform a complete search.

- 67/00791 . . {Different components in separate layers}

WARNING

Group [B01D 67/00791](#) is incomplete pending reclassification of documents from group [B01D 67/0079](#).

Groups [B01D 67/0079](#) and [B01D 67/00791](#) should be considered in order to perform a complete search.

- 67/00793 . . {Dispersing a component, e.g. as particles or powder, in another component}

WARNING

Group [B01D 67/00793](#) is incomplete pending reclassification of documents from group [B01D 67/0079](#).

Groups [B01D 67/0079](#) and [B01D 67/00793](#) should be considered in order to perform a complete search.

- 67/0081 . {After-treatment of organic or inorganic membranes}
- 67/0083 . . {Thermal after-treatment}
- 67/0086 . . {Mechanical after-treatment}
- 67/0088 . . {Physical treatment with compounds, e.g. swelling, coating or impregnation}
- 67/009 . . {with wave-energy, particle-radiation or plasma}
- 67/0093 . . {Chemical modification}

WARNING

Group [B01D 67/0093](#) is impacted by reclassification into groups [B01D 67/00931](#) and [B01D 67/00933](#).

Groups [B01D 67/0093](#), [B01D 67/00931](#) and [B01D 67/00933](#) should be considered in order to perform a complete search.

- 67/00931 . . . {by introduction of specific groups after membrane formation, e.g. by grafting}

WARNING

Group [B01D 67/00931](#) is incomplete pending reclassification of documents from group [B01D 67/0093](#).

Groups [B01D 67/0093](#) and [B01D 67/00931](#) should be considered in order to perform a complete search.

- 67/00933 . . . {by addition of a layer chemically bonded to the membrane}

WARNING

Group [B01D 67/00933](#) is incomplete pending reclassification of documents from group [B01D 67/0093](#).

Groups [B01D 67/0093](#) and [B01D 67/00933](#) should be considered in order to perform a complete search.

- 67/0095 . . {Drying}
- 67/0097 . . {Storing or preservation}

69/00 Semi-permeable membranes for separation processes or apparatus characterised by their form, structure or properties; Manufacturing processes specially adapted therefor

NOTES

- In this group, the following term is used with the meaning indicated:
 - "properties" covers those of a mechanical, physical or chemical nature.
- { Manufacturing processes, if considered of interest, are also classified in group [B01D 67/00](#). }
- { Attention is drawn to the Note following [B01D 59/50](#), which indicates the last place rule is not applied in [B01D 69/00](#). }

- 69/02 . characterised by their properties

NOTE

{ When classifying in this group, the indexing codes of the following groups must be added if applicable:
[B01D 2325/00](#) for details relating to properties of membranes. }

- 69/04 . Tubular membranes
- 69/043 . . {characterised by the tube diameter}
- 69/046 . . {characterised by the cross-sectional shape of the tube}
- 69/06 . Flat membranes
- WARNING**
- Group [B01D 69/06](#) is impacted by reclassification into group [B01D 69/061](#).
- Groups [B01D 69/06](#) and [B01D 69/061](#) should be considered in order to perform a complete search.
- 69/061 . . {Membrane bags or membrane cushions}
- WARNING**
- Group [B01D 69/061](#) is incomplete pending reclassification of documents from group [B01D 69/06](#).
- Groups [B01D 69/06](#) and [B01D 69/061](#) should be considered in order to perform a complete search.
- 69/08 . Hollow fibre membranes (manufacture of hollow fibres [D01D 5/24](#), [D01F 1/08](#))
- 69/081 . . {characterised by the fibre diameter}
- 69/082 . . {characterised by the cross-sectional shape of the fibre}
- 69/084 . . {Undulated fibres}
- 69/085 . . {Details relating to the spinneret}
- 69/087 . . {Details relating to the spinning process}
- WARNING**
- Group [B01D 69/087](#) is impacted by reclassification into group [B01D 69/0871](#).
- Groups [B01D 69/087](#) and [B01D 69/0871](#) should be considered in order to perform a complete search.
- 69/0871 . . . {Fibre guidance after spinning through the manufacturing apparatus}
- WARNING**
- Group [B01D 69/0871](#) is incomplete pending reclassification of documents from group [B01D 69/087](#).
- Groups [B01D 69/087](#) and [B01D 69/0871](#) should be considered in order to perform a complete search.
- 69/088 . . . {Co-extrusion; Co-spinning}
- 69/10 . Supported membranes; Membrane supports
- WARNING**
- Group [B01D 69/10](#) is impacted by reclassification into groups [B01D 69/106](#), [B01D 69/107](#), [B01D 69/1071](#) and [B01D 69/108](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 69/105 . . {Support pretreatment}
- 69/106 . . {Membranes in the pores of a support, e.g. polymerized in the pores or voids}
- WARNING**
- Group [B01D 69/106](#) is incomplete pending reclassification of documents from group [B01D 69/10](#).
- Groups [B01D 69/10](#) and [B01D 69/106](#) should be considered in order to perform a complete search.
- 69/107 . . {Organic support material}
- WARNING**
- Groups [B01D 69/107](#) and [B01D 69/1071](#) are incomplete pending reclassification of documents from group [B01D 69/10](#).
- Groups [B01D 69/10](#), [B01D 69/107](#) and [B01D 69/1071](#) should be considered in order to perform a complete search.
- 69/1071 . . . {Woven, non-woven or net mesh}
- 69/108 . . {Inorganic support material}
- WARNING**
- Group [B01D 69/108](#) is incomplete pending reclassification of documents from group [B01D 69/10](#).
- Groups [B01D 69/10](#) and [B01D 69/108](#) should be considered in order to perform a complete search.
- 69/12 . Composite membranes; Ultra-thin membranes
- WARNING**
- Group [B01D 69/12](#) is impacted by reclassification into groups [B01D 69/1212](#), [B01D 69/1213](#), [B01D 69/1214](#), [B01D 69/1216](#) and [B01D 69/1218](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 69/1212 . . {Coextruded layers}
- WARNING**
- Group [B01D 69/1212](#) is incomplete pending reclassification of documents from group [B01D 69/12](#).
- Groups [B01D 69/12](#) and [B01D 69/1212](#) should be considered in order to perform a complete search.
- 69/1213 . . {Laminated layers}
- WARNING**
- Group [B01D 69/1213](#) is incomplete pending reclassification of documents from group [B01D 69/12](#).
- Groups [B01D 69/12](#) and [B01D 69/1213](#) should be considered in order to perform a complete search.

69/1214 . . {Chemically bonded layers, e.g. cross-linking}

WARNING

Group [B01D 69/1214](#) is incomplete pending reclassification of documents from group [B01D 69/12](#).

Groups [B01D 69/12](#) and [B01D 69/1214](#) should be considered in order to perform a complete search.

69/1216 . . {Three or more layers}

WARNING

Group [B01D 69/1216](#) is incomplete pending reclassification of documents from group [B01D 69/12](#).

Groups [B01D 69/12](#) and [B01D 69/1216](#) should be considered in order to perform a complete search.

69/1218 . . {Layers having the same chemical composition, but different properties, e.g. pore size, molecular weight or porosity}

WARNING

Group [B01D 69/1218](#) is incomplete pending reclassification of documents from group [B01D 69/12](#).

Groups [B01D 69/12](#) and [B01D 69/1218](#) should be considered in order to perform a complete search.

69/122 . . {Separate manufacturing of ultra-thin membranes}

69/125 . . {In situ manufacturing by polymerisation, polycondensation, cross-linking or chemical reaction}

WARNING

Group [B01D 69/125](#) is impacted by reclassification into group [B01D 69/1251](#).

Groups [B01D 69/125](#) and [B01D 69/1251](#) should be considered in order to perform a complete search.

69/1251 . . . {by interfacial polymerisation}

WARNING

Group [B01D 69/1251](#) is incomplete pending reclassification of documents from group [B01D 69/125](#).

Groups [B01D 69/125](#) and [B01D 69/1251](#) should be considered in order to perform a complete search.

69/127 . . . {using electrical discharge or plasma-polymerisation}

69/14 . . Dynamic membranes

69/141 . . {Heterogeneous membranes, e.g. containing dispersed material; Mixed matrix membranes}

WARNING

Group [B01D 69/141](#) is impacted by reclassification into groups [B01D 69/1411](#) and [B01D 69/14111](#).

Groups [B01D 69/141](#), [B01D 69/1411](#) and [B01D 69/14111](#) should be considered in order to perform a complete search.

69/1411 . . . {containing dispersed material in a continuous matrix}

WARNING

Groups [B01D 69/1411](#) and [B01D 69/14111](#) are incomplete pending reclassification of documents from group [B01D 69/141](#).

Groups [B01D 69/141](#), [B01D 69/1411](#) and [B01D 69/14111](#) should be considered in order to perform a complete search.

69/14111 {with nanoscale dispersed material, e.g. nanoparticles}

69/142 . . . {with "carriers"}

69/144 {containing embedded or bound biomolecules}

69/145 . . . {containing embedded catalysts}

69/147 . . . {containing embedded adsorbents}

69/148 . . . {Organic/inorganic mixed matrix membranes}

71/00

Semi-permeable membranes for separation processes or apparatus characterised by the material; Manufacturing processes specially adapted therefor

NOTES

1. In this group, if the material is a composition it is classified according to the constituent present in the highest proportion; see Note before group [B01D 61/00](#). {This constituent is classified according to the last place rule.} If there is more than one constituent present in equal highest proportions, then each of these constituents is classified according to the last place rule.
2. Manufacturing processes, if considered of interest, are also classified in group [B01D 67/00](#).

71/02 . . Inorganic material

WARNING

Group [B01D 71/02](#) is impacted by reclassification into groups [B01D 71/0213](#), [B01D 71/0215](#) and [B01D 71/05](#).

All groups listed in this Warning should be considered in order to perform a complete search.

71/021 . . . {Carbon}

WARNING

Group [B01D 71/021](#) is impacted by reclassification into groups [B01D 71/0211](#) and [B01D 71/0212](#).

Groups [B01D 71/021](#), [B01D 71/0211](#) and [B01D 71/0212](#) should be considered in order to perform a complete search.

71/0211 . . . {Graphene or derivates thereof}

WARNING

Group [B01D 71/0211](#) is incomplete pending reclassification of documents from group [B01D 71/021](#).

Groups [B01D 71/021](#) and [B01D 71/0211](#) should be considered in order to perform a complete search.

71/0212 . . . {Carbon nanotubes}

WARNING

Group [B01D 71/0212](#) is incomplete pending reclassification of documents from group [B01D 71/021](#).

Groups [B01D 71/021](#) and [B01D 71/0212](#) should be considered in order to perform a complete search.

71/0213 . . {Silicon}

WARNING

Group [B01D 71/0213](#) is incomplete pending reclassification of documents from group [B01D 71/02](#).

Groups [B01D 71/02](#) and [B01D 71/0213](#) should be considered in order to perform a complete search.

71/0215 . . {Silicon carbide; Silicon nitride; Silicon oxycarbide}

WARNING

Group [B01D 71/0215](#) is incomplete pending reclassification of documents from group [B01D 71/02](#).

Groups [B01D 71/02](#) and [B01D 71/0215](#) should be considered in order to perform a complete search.

71/022 . . {Metals}

WARNING

Group [B01D 71/022](#) is impacted by reclassification into groups [B01D 71/0221](#), [B01D 71/0223](#), [B01D 71/02231](#), [B01D 71/02232](#) and [B01D 71/0227](#).

All groups listed in this Warning should be considered in order to perform a complete search.

71/0221 . . . {Group 4 or 5 metals}

WARNING

Group [B01D 71/0221](#) is incomplete pending reclassification of documents from group [B01D 71/022](#).

Groups [B01D 71/022](#) and [B01D 71/0221](#) should be considered in order to perform a complete search.

71/0223 . . . {Group 8, 9 or 10 metals}

WARNING

Groups [B01D 71/0223](#) - [B01D 71/02232](#) are incomplete pending reclassification of documents from group [B01D 71/022](#).

All groups listed in this Warning should be considered in order to perform a complete search.

71/02231 {Palladium}

71/02232 {Nickel}

71/0227 . . . {comprising an intermediate layer for avoiding intermetallic diffusion}

WARNING

Group [B01D 71/0227](#) is incomplete pending reclassification of documents from group [B01D 71/022](#).

Groups [B01D 71/022](#) and [B01D 71/0227](#) should be considered in order to perform a complete search.

71/024 . . {Oxides}

WARNING

Group [B01D 71/024](#) is impacted by reclassification into group [B01D 71/0271](#).

Groups [B01D 71/024](#) and [B01D 71/0271](#) should be considered in order to perform a complete search.

71/025 . . . {Aluminium oxide}

71/027 . . . {Silicium oxide}

71/0271 . . . {Perovskites}

WARNING

Group [B01D 71/0271](#) is incomplete pending reclassification of documents from group [B01D 71/024](#).

Groups [B01D 71/024](#) and [B01D 71/0271](#) should be considered in order to perform a complete search.

71/028 . . {Molecular sieves (carbon [B01D 71/021](#))}

WARNING

Group [B01D 71/028](#) is impacted by reclassification into group [B01D 71/0281](#).

Groups [B01D 71/028](#) and [B01D 71/0281](#) should be considered in order to perform a complete search.

71/0281 . . . {Zeolites}

WARNING

Group [B01D 71/0281](#) is incomplete pending reclassification of documents from group [B01D 71/028](#).

Groups [B01D 71/028](#) and [B01D 71/0281](#) should be considered in order to perform a complete search.

71/04 . . Glass

71/05 . . {Cermet materials}

WARNING

Group [B01D 71/05](#) is incomplete pending reclassification of documents from group [B01D 71/02](#).

Groups [B01D 71/02](#) and [B01D 71/05](#) should be considered in order to perform a complete search.

71/06 . Organic material

71/08 . . Polysaccharides

71/10 . . . Cellulose; Modified cellulose

71/12 . . . Cellulose derivatives

71/14 Esters of organic acids

71/16 Cellulose acetate

71/18 Mixed esters, e.g. cellulose acetate-butyrates

71/20 Esters of inorganic acids, e.g. cellulose nitrate

71/22 Cellulose ethers

71/24 . . Rubbers

NOTE

In this group the following term is used with the meaning indicated:

- "rubber" covers:
 - a. natural or conjugated diene rubber;
 - b. rubber in general (for specific rubber, see the group provided for such macromolecular compound)

71/26 . . Polyalkenes

WARNING

Group [B01D 71/26](#) is impacted by reclassification into groups [B01D 71/261](#) and [B01D 71/262](#).

Groups [B01D 71/26](#), [B01D 71/261](#) and [B01D 71/262](#) should be considered in order to perform a complete search.

71/261 . . . {Polyethylene}

WARNING

Group [B01D 71/261](#) is incomplete pending reclassification of documents from group [B01D 71/26](#).

Groups [B01D 71/26](#) and [B01D 71/261](#) should be considered in order to perform a complete search.

71/262 . . . {Polypropylene}

WARNING

Group [B01D 71/262](#) is incomplete pending reclassification of documents from group [B01D 71/26](#).

Groups [B01D 71/26](#) and [B01D 71/262](#) should be considered in order to perform a complete search.

71/28 . . Polymers of vinyl aromatic compounds

WARNING

Group [B01D 71/28](#) is impacted by reclassification into groups [B01D 71/281](#), [B01D 71/282](#) and [B01D 71/283](#).

All groups listed in this Warning should be considered in order to perform a complete search.

71/281 . . . {Polystyrene}

WARNING

Group [B01D 71/281](#) is incomplete pending reclassification of documents from group [B01D 71/28](#).

Groups [B01D 71/28](#) and [B01D 71/281](#) should be considered in order to perform a complete search.

71/282 . . . {Polyvinylphenol}

WARNING

Group [B01D 71/282](#) is incomplete pending reclassification of documents from group [B01D 71/28](#).

Groups [B01D 71/28](#) and [B01D 71/282](#) should be considered in order to perform a complete search.

71/283 . . . {Polyvinylpyridine}

WARNING

Group [B01D 71/283](#) is incomplete pending reclassification of documents from group [B01D 71/28](#).

Groups [B01D 71/28](#) and [B01D 71/283](#) should be considered in order to perform a complete search.

71/30 . . Polyalkenyl halides

WARNING

Group [B01D 71/30](#) is impacted by reclassification into group [B01D 71/301](#).

Groups [B01D 71/30](#) and [B01D 71/301](#) should be considered in order to perform a complete search.

71/301 . . . {Polyvinylchloride}
WARNING
Group [B01D 71/301](#) is incomplete pending reclassification of documents from group [B01D 71/30](#).
Groups [B01D 71/30](#) and [B01D 71/301](#) should be considered in order to perform a complete search.

71/32 . . . containing fluorine atoms
71/34 . . . Polyvinylidene fluoride
71/36 . . . Polytetrafluoroethene
71/38 . . Polyalkenylalcohols; Polyalkenylesters; Polyalkenylethers; Polyalkenylaldehydes; Polyalkenylketones; Polyalkenylacetals; Polyalkenylketals

WARNING
Group [B01D 71/38](#) is impacted by reclassification into groups [B01D 71/381](#), [B01D 71/382](#) and [B01D 71/383](#).
All groups listed in this Warning should be considered in order to perform a complete search.

71/381 . . . {Polyvinylalcohol}
WARNING
Group [B01D 71/381](#) is incomplete pending reclassification of documents from group [B01D 71/38](#).
Groups [B01D 71/38](#) and [B01D 71/381](#) should be considered in order to perform a complete search.

71/382 . . . {Polyvinylethers}
WARNING
Group [B01D 71/382](#) is incomplete pending reclassification of documents from group [B01D 71/38](#).
Groups [B01D 71/38](#) and [B01D 71/382](#) should be considered in order to perform a complete search.

71/383 . . . {Polyvinylacetates}
WARNING
Group [B01D 71/383](#) is incomplete pending reclassification of documents from group [B01D 71/38](#).
Groups [B01D 71/38](#) and [B01D 71/383](#) should be considered in order to perform a complete search.

71/40 . . Polymers of unsaturated acids or derivatives thereof, e.g. salts, amides, imides, nitriles, anhydrides, esters

WARNING
Group [B01D 71/40](#) is impacted by reclassification into groups [B01D 71/401](#), [B01D 71/4011](#), [B01D 71/402](#), [B01D 71/403](#) and [B01D 71/404](#).

All groups listed in this Warning should be considered in order to perform a complete search.

71/401 . . . {Polymers based on the polymerisation of acrylic acid, e.g. polyacrylate}

WARNING
Groups [B01D 71/401](#) and [B01D 71/4011](#) are incomplete pending reclassification of documents from group [B01D 71/40](#).
Groups [B01D 71/40](#), [B01D 71/401](#) and [B01D 71/4011](#) should be considered in order to perform a complete search.

71/4011 . . . {Polymethylmethacrylate}
71/402 . . . {Polymers based on the polymerisation of fumaric acid or derivatives thereof}

WARNING
Group [B01D 71/402](#) is incomplete pending reclassification of documents from group [B01D 71/40](#).
Groups [B01D 71/40](#) and [B01D 71/402](#) should be considered in order to perform a complete search.

71/403 . . . {Polymers based on the polymerisation of maleic acid or derivatives thereof}
WARNING
Group [B01D 71/403](#) is incomplete pending reclassification of documents from group [B01D 71/40](#).
Groups [B01D 71/40](#) and [B01D 71/403](#) should be considered in order to perform a complete search.

71/404 . . . {Polymers based on the polymerisation of crotonic acid}
WARNING
Group [B01D 71/404](#) is incomplete pending reclassification of documents from group [B01D 71/40](#).
Groups [B01D 71/40](#) and [B01D 71/404](#) should be considered in order to perform a complete search.

71/42 . . . Polymers of nitriles, e.g. polyacrylonitrile
WARNING
Group [B01D 71/42](#) is impacted by reclassification into group [B01D 71/421](#).
Groups [B01D 71/42](#) and [B01D 71/421](#) should be considered in order to perform a complete search.

<p>71/421 {Polyacrylonitrile}</p> <p>WARNING</p> <p>Group B01D 71/421 is incomplete pending reclassification of documents from group B01D 71/42.</p> <p>Groups B01D 71/42 and B01D 71/421 should be considered in order to perform a complete search.</p>	<p>71/521 {Aliphatic polyethers}</p> <p>WARNING</p> <p>Groups B01D 71/521 and B01D 71/5211 are incomplete pending reclassification of documents from group B01D 71/52.</p> <p>Groups B01D 71/52, B01D 71/521 and B01D 71/5211 should be considered in order to perform a complete search.</p>
<p>71/44 . . Polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of groups B01D 71/26-B01D 71/42</p> <p>WARNING</p> <p>Group B01D 71/44 is impacted by reclassification into group B01D 71/441.</p> <p>Groups B01D 71/44 and B01D 71/441 should be considered in order to perform a complete search.</p>	<p>71/5211 {Polyethylene glycol or polyethyleneoxide}</p> <p>71/522 {Aromatic polyethers}</p> <p>WARNING</p> <p>Groups B01D 71/522 - B01D 71/5223 are incomplete pending reclassification of documents from group B01D 71/52.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>
<p>71/441 . . . {Polyvinylpyrrolidone}</p> <p>WARNING</p> <p>Group B01D 71/441 is incomplete pending reclassification of documents from group B01D 71/44.</p> <p>Groups B01D 71/44 and B01D 71/441 should be considered in order to perform a complete search.</p>	<p>71/5221 {Polyaryletherketone}</p> <p>71/5222 {Polyetherketone, polyetheretherketone, or polyaryletherketone}</p> <p>71/5223 {Polyphenylene oxide, phenyl ether polymers or polyphenylethers}</p> <p>71/54 . . Polyureas; Polyurethanes</p> <p>71/56 . . Polyamides, e.g. polyester-amides</p> <p>71/58 . . Other polymers having nitrogen in the main chain, with or without oxygen or carbon only</p> <p>71/60 . . . Polyamines</p> <p>WARNING</p> <p>Group B01D 71/60 is impacted by reclassification into group B01D 71/601.</p> <p>Groups B01D 71/60 and B01D 71/601 should be considered in order to perform a complete search.</p>
<p>71/46 . . Epoxy resins</p> <p>71/48 . . Polyesters</p> <p>WARNING</p> <p>Group B01D 71/48 is impacted by reclassification into group B01D 71/481.</p> <p>Groups B01D 71/48 and B01D 71/481 should be considered in order to perform a complete search.</p>	<p>71/601 {Polyethylenimine}</p> <p>WARNING</p> <p>Group B01D 71/601 is incomplete pending reclassification of documents from group B01D 71/60.</p> <p>Groups B01D 71/60 and B01D 71/601 should be considered in order to perform a complete search.</p>
<p>71/481 . . . {Polyarylates}</p> <p>WARNING</p> <p>Group B01D 71/481 is incomplete pending reclassification of documents from group B01D 71/48.</p> <p>Groups B01D 71/48 and B01D 71/481 should be considered in order to perform a complete search.</p>	<p>71/62 . . . Polycondensates having nitrogen-containing heterocyclic rings in the main chain</p> <p>71/64 Polyimides; Polyamide-imides; Polyester-imides; Polyamide acids or similar polyimide precursors</p> <p>WARNING</p> <p>Group B01D 71/64 is impacted by reclassification into groups B01D 71/641, B01D 71/642 and B01D 71/643.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>
<p>71/50 . . Polycarbonates</p> <p>71/52 . . Polyethers</p> <p>WARNING</p> <p>Group B01D 71/52 is impacted by reclassification into groups B01D 71/521, B01D 71/5211, B01D 71/522, B01D 71/5221, B01D 71/5222 and B01D 71/5223.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	<p>WARNING</p> <p>Group B01D 71/64 is impacted by reclassification into groups B01D 71/641, B01D 71/642 and B01D 71/643.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>

- 71/641 {Polyamide-imides}
- WARNING**
- Group [B01D 71/641](#) is incomplete pending reclassification of documents from group [B01D 71/64](#).
- Groups [B01D 71/64](#) and [B01D 71/641](#) should be considered in order to perform a complete search.
- 71/642 {Polyester-imides}
- WARNING**
- Group [B01D 71/642](#) is incomplete pending reclassification of documents from group [B01D 71/64](#).
- Groups [B01D 71/64](#) and [B01D 71/642](#) should be considered in order to perform a complete search.
- 71/643 {Polyether-imides}
- WARNING**
- Group [B01D 71/643](#) is incomplete pending reclassification of documents from group [B01D 71/64](#).
- Groups [B01D 71/64](#) and [B01D 71/643](#) should be considered in order to perform a complete search.
- 71/66 . . Polymers having sulfur in the main chain, with or without nitrogen, oxygen or carbon only
- WARNING**
- Group [B01D 71/66](#) is impacted by reclassification into group [B01D 71/69](#).
- Groups [B01D 71/66](#) and [B01D 71/69](#) should be considered in order to perform a complete search.
- 71/68 . . . Polysulfones; Polyethersulfones
- 71/69 . . . {Polysulfonamides}
- WARNING**
- Group [B01D 71/69](#) is incomplete pending reclassification of documents from group [B01D 71/66](#).
- Groups [B01D 71/66](#) and [B01D 71/69](#) should be considered in order to perform a complete search.
- 71/70 . . Polymers having silicon in the main chain, with or without sulfur, nitrogen, oxygen or carbon only
- WARNING**
- Group [B01D 71/70](#) is impacted by reclassification into groups [B01D 71/701](#) and [B01D 71/702](#).
- Groups [B01D 71/70](#), [B01D 71/701](#) and [B01D 71/702](#) should be considered in order to perform a complete search.

- 71/701 . . . {Polydimethylsiloxane}
- WARNING**
- Group [B01D 71/701](#) is incomplete pending reclassification of documents from group [B01D 71/70](#).
- Groups [B01D 71/70](#) and [B01D 71/701](#) should be considered in order to perform a complete search.
- 71/702 . . . {Polysilsesquioxanes or combination of silica with bridging organosilane groups}
- WARNING**
- Group [B01D 71/702](#) is incomplete pending reclassification of documents from group [B01D 71/70](#).
- Groups [B01D 71/70](#) and [B01D 71/702](#) should be considered in order to perform a complete search.
- 71/72 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of the groups [B01D 71/46](#) - [B01D 71/70](#) {and [B01D 71/701](#) - [B01D 71/702](#)}
- 71/74 . . Natural macromolecular material or derivatives thereof ([B01D 71/08](#), [B01D 71/24](#) take precedence)
- 71/76 . . Macromolecular material not specifically provided for in a single one of groups [B01D 71/08](#) - [B01D 71/74](#) (rubbers in general [B01D 71/24](#))
- 71/78 . . . Graft polymers
- 71/80 . . . Block polymers
- 71/82 . . . characterised by the presence of specified groups, e.g. introduced by chemical after-treatment

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- 2101/00** Types of filters having loose filtering material
- 2101/005 . with a binder between the individual particles or fibres
- 2101/02 . Carbon filters
- 2101/04 . Sand or gravel filters
- 2201/00** Details relating to filtering apparatus
- 2201/02 . Filtering elements having a conical form
- 2201/04 . Supports for the filtering elements
- 2201/0407 . . Perforated supports on both sides of the filtering element
- 2201/0415 . . Details of supporting structures
- 2201/0423 . . . not in the inner side of the cylindrical filtering elements
- 2201/043 . . Filter tubes connected to plates
- 2201/0438 . . . mounted substantially vertically on plates at the lower side of the filter elements
- 2201/0446 . . . suspended from plates at the upper side of the filter elements
- 2201/0453 . . . positioned between at least two plates
- 2201/0461 . . Springs
- 2201/0469 . . Filter tubes connected to collector tubes
- 2201/0476 . . . mounted substantially vertically on collector tubes at the lower side of the filter elements

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- 2201/0484 . . . suspended from collector tubes at the upper side of the filter elements
- 2201/0492 . . . positioned between at least two collector tubes
- 2201/06 . Resilient foam as filtering element
- 2201/08 . Regeneration of the filter
- 2201/081 . . using nozzles or suction devices
- 2201/082 . . . Suction devices placed on the cake side of the filtering element
- 2201/083 . . . Suction devices placed on the filtrate side of the filtering element, e.g. with variable edge filters
- 2201/084 . . . Nozzles placed on the filtrate side of the filtering element
- 2201/085 . . using another chemical than the liquid to be filtered
- 2201/086 . . using fluid streams co-current to the filtration direction
- 2201/087 . . using gas bubbles, e.g. air
- 2201/088 . . Arrangements for killing microorganisms
- 2201/089 . . using rollers having projections to clear the filter apertures
- 2201/10 . Filtration under gravity in large open drainage basins
- 2201/12 . Pleated filters
- 2201/122 . . with pleats of different length
- 2201/125 . . with non-parallel pleats
- 2201/127 . . with means for keeping the spacing between the pleats
- 2201/14 . Particulate filter materials with a lower density than the liquid mixture to be filtered
- 2201/16 . Valves
- 2201/162 . . with snap, latch or clip connecting means
- 2201/165 . . Multi-way valves
- 2201/167 . . Single-way valves
- 2201/18 . Filters characterised by the openings or pores
- 2201/182 . . for depth filtration
- 2201/184 . . Special form, dimension of the openings, pores of the filtering elements
- 2201/186 . . . Pore openings which can be modified
- 2201/188 . . Multiple filtering elements having filtering areas of different size
- 2201/20 . Pressure-related systems for filters
- 2201/202 . . Systems for applying pressure to filters
- 2201/204 . . Systems for applying vacuum to filters
- 2201/206 . . . by the weight of the liquid in a tube, e.g. siphon, barometric leg
- 2201/208 . . . by venturi systems
- 2201/22 . Filtering bands with supporting discs
- 2201/24 . Tools used for the removal of filters
- 2201/26 . Transport systems for filtering devices
- 2201/265 . . mounted on vehicles
- 2201/28 . Position of the filtering element
- 2201/282 . . Filtering elements with a horizontal rotation or symmetry axis
- 2201/285 . . Filtering elements with a symmetry axis not parallel to the rotation axis
- 2201/287 . . Filtering elements with a vertical or inclined rotation or symmetry axis
- 2201/29 . Filter cartridge constructions
- 2201/291 . . End caps
- 2201/293 . . . Making of end caps
- 2201/295 . . . with projections extending in a radial outward direction, e.g. for use as a guide, spacing means
- 2201/296 . . . Other than having a circular shape
- 2201/298 . . . End caps common to at least two filtering elements
- 2201/30 . Filter housing constructions
- 2201/301 . . Details of removable closures, lids, caps, filter heads
- 2201/302 . . . having inlet or outlet ports
- 2201/303 not arranged concentrically
- 2201/304 . . . Seals or gaskets
- 2201/305 . . . Snap, latch or clip connecting means
- 2201/306 . . . Closures, lids, caps or filter heads forming one element with the filtering element
- 2201/307 . . Filtering elements contained in an insert body mounted in a filter housing (double casing), e.g. to avoid contamination when removing or replacing the filter element
- 2201/308 . . Use of foils, membranes or other means to protect the filter before its use or for protecting the environment, e.g. during removal of the filter
- 2201/309 . . Housings with transparent parts
- 2201/31 . Other construction details
- 2201/313 . . Means for protecting the filter from the incoming fluid, e.g. shields
- 2201/316 . . Standpipes
- 2201/32 . Flow characteristics of the filter
- 2201/325 . . Outward flow filtration
- 2201/34 . Seals or gaskets for filtering elements
- 2201/342 . . Axial sealings
- 2201/345 . . Pressurized seals or gaskets
- 2201/347 . . Radial sealings
- 2201/36 . Filtering elements containing a rotating housing construction
- 2201/38 . Preventing rewetting of the filter cake on the filter media
- 2201/40 . Special measures for connecting different parts of the filter
- 2201/4007 . . Use of cam or ramp systems
- 2201/4015 . . Bayonet connecting means
- 2201/4023 . . Means for connecting filter housings to supports
- 2201/403 . . allowing dilatation, e.g. by heat
- 2201/4038 . . for connecting at least two filtering elements together
- 2201/4046 . . Means for avoiding false mounting of different parts
- 2201/4053 . . . using keys
- 2201/4061 . . . between a cartridge and a filter head or manifold
- 2201/4069 . . Magnetic means
- 2201/4076 . . Anti-rotational means
- 2201/4084 . . Snap or Seeger ring connecting means
- 2201/4092 . . Threaded sections, e.g. screw
- 2201/44 . Special measures allowing the even or uniform distribution of fluid along the length of a conduit
- 2201/46 . Several filtrate discharge conduits each connected to one filter element or group of filter elements
- 2201/48 . Overflow systems
- 2201/50 . Means for dissipating electrostatic charges
- 2201/52 . Filter identification means
- 2201/54 . Computerised or programmable systems
- 2201/56 . Wireless systems for monitoring the filter
- 2201/58 . Power supply means for regenerating the filter
- 2201/583 . . using the kinetic energy of the fluid circulating in the filtering device

- 2201/586 . . using regenerative sources, e.g. wind, sun
- 2201/60 . Shape of non-cylindrical filtering elements
- 2201/602 . . Oval
- 2201/605 . . Square or rectangular
- 2201/607 . . Triangular
- 2201/62 . Honeycomb-like
- 2201/64 . Filters having floating elements
- 2202/00 Details concerning evaporation, distillation or condensation**
- 2202/10 . Use of a microdevice for separation
- 2202/20 . Use of an ionic liquid in the separation process
- 2215/00 Separating processes involving the treatment of liquids with adsorbents**
- 2215/02 . with moving adsorbents
- 2215/021 . . Physically moving or fluidising the adsorbent beads or particles or slurry, excluding the movement of the entire columns
- 2215/022 . . Physically moving the adsorbent as a whole, e.g. belts, discs or sheets
- 2215/023 . . Simulated moving beds
- 2215/024 . . . Provisions to deal with recirculated volumes, e.g. in order to regulate flow
- 2215/025 . . . Reekon with dead volumes between sections
- 2215/026 . . . Flushing the injection conduits
- 2215/027 . . . Used at supercritical conditions of temperature or pressure
- 2215/028 . . . Co-current flow
- 2215/029 . . Centrifuge-like arrangements
- 2221/00 Applications of separation devices**
- 2221/02 . Small separation devices for domestic application, e.g. for canteens, industrial kitchen, washing machines
- 2221/04 . Separation devices for treating liquids from earth drilling, mining
- 2221/06 . Separation devices for industrial food processing or agriculture
- 2221/08 . Mobile separation devices
- 2221/10 . Separation devices for use in medical, pharmaceutical or laboratory applications, e.g. separating amalgam from dental treatment residues
- 2221/12 . Separation devices for treating rain or storm water
- 2221/14 . Separation devices for workshops, car or semiconductor industry, e.g. for separating chips and other machining residues
- 2221/16 . Separation devices for cleaning ambient air, e.g. air along roads or air in cities
- 2239/00 Aspects relating to filtering material for liquid or gaseous fluids**
- 2239/02 . Types of fibres, filaments or particles, self-supporting or supported materials
- 2239/0208 . . Single-component fibres
- 2239/0216 . . Bicomponent or multicomponent fibres
- 2239/0225 . . . Side-by-side
- 2239/0233 . . . Island-in-sea
- 2239/0241 . . comprising electrically conductive fibres or particles
- 2239/025 . . comprising nanofibres
- 2239/0258 . . comprising nanoparticles
- 2239/0266 . . comprising biodegradable or bio-soluble polymers
- 2239/0275 . . comprising biologically produced plastics, e.g. bioplastics
- 2239/0283 . . comprising filter materials made from waste or recycled materials
- 2239/0291 . . comprising swelling polymers
- 2239/04 . Additives and treatments of the filtering material
- 2239/0407 . . comprising particulate additives, e.g. adsorbents
- 2239/0414 . . Surface modifiers, e.g. comprising ion exchange groups
- 2239/0421 . . . Rendering the filter material hydrophilic
- 2239/0428 . . . Rendering the filter material hydrophobic
- 2239/0435 . . Electret
- 2239/0442 . . Antimicrobial, antibacterial, antifungal additives
- 2239/045 . . Deodorising additives
- 2239/0457 . . Specific fire retardant or heat resistant properties
- 2239/0464 . . Impregnants
- 2239/0471 . . Surface coating material
- 2239/0478 . . . on a layer of the filter
- 2239/0485 . . . on particles
- 2239/0492 . . . on fibres
- 2239/06 . Filter cloth, e.g. knitted, woven non-woven; self-supported material
- 2239/0604 . . Arrangement of the fibres in the filtering material
- 2239/0609 . . . Knitted
- 2239/0613 . . . Woven
- 2239/0618 . . . Non-woven
- 2239/0622 . . . Melt-blown
- 2239/0627 . . . Spun-bonded
- 2239/0631 . . . Electro-spun
- 2239/0636 . . . Two or more types of fibres present in the filter material
- 2239/064 . . . The fibres being mixed
- 2239/0645 . . Arrangement of the particles in the filtering material
- 2239/065 . . More than one layer present in the filtering material
- 2239/0654 . . . Support layers
- 2239/0659 . . . The layers being joined by needling
- 2239/0663 . . . The layers being joined by hydro-entangling
- 2239/0668 . . . The layers being joined by heat or melt-bonding
- 2239/0672 . . . The layers being joined by welding
- 2239/0677 . . . by spot-welding
- 2239/0681 . . . The layers being joined by gluing
- 2239/0686 . . . by spot-gluing
- 2239/069 . . Special geometry of layers
- 2239/0695 . . . Wound layers
- 2239/08 . Special characteristics of binders
- 2239/083 . . Binders between layers of the filter
- 2239/086 . . Binders between particles or fibres
- 2239/10 . Filtering material manufacturing
- 2239/12 . Special parameters characterising the filtering material
- 2239/1208 . . Porosity
- 2239/1216 . . Pore size
- 2239/1225 . . Fibre length
- 2239/1233 . . Fibre diameter
- 2239/1241 . . Particle diameter
- 2239/125 . . Size distribution
- 2239/1258 . . Permeability
- 2239/1266 . . Solidity
- 2239/1275 . . Stiffness

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- 2239/1283 . . Stability index
- 2239/1291 . . Other parameters
- 2247/00 Details relating to the separation of dispersed particles from gases, air or vapours by liquid as separating agent**
- 2247/02 . Enhancing the particle separation by electrostatic or magnetic effects ([B01D 2247/102 takes precedence; electrostatic or magnetic separation B03C](#))
- 2247/04 . Regenerating the washing fluid
- 2247/06 . Separation units provided with means for cleaning and maintenance
- 2247/08 . Means for controlling the separation process
- 2247/10 . Means for removing the washing fluid dispersed in the gas or vapours
- 2247/101 . . using a cyclone
- 2247/102 . . using electrostatic or magnetic effects
- 2247/103 . . using fluids, e.g. as a fluid curtain or as large liquid droplets
- 2247/104 . . using an impeller
- 2247/105 . . by gas flow reversal
- 2247/106 . . using a structured demister, e.g. tortuous channels
- 2247/107 . . using an unstructured demister, e.g. a wire mesh demister
- 2247/108 . . using vortex inducers
- 2247/12 . Fan arrangements for providing forced draft
- 2247/14 . Fan arrangements for providing induced draft
- 2251/00 Reactants**
- 2251/10 . Oxidants
- 2251/102 . . Oxygen
- 2251/104 . . Ozone
- 2251/106 . . Peroxides
- 2251/1065 . . . Organic peroxides
- 2251/108 . . Halogens or halogen compounds
- 2251/11 . . Air
- 2251/20 . Reductants
- 2251/202 . . Hydrogen
- 2251/204 . . Carbon monoxide
- 2251/206 . . Ammonium compounds
- 2251/2062 . . . Ammonia
- 2251/2065 . . . Ammonium hydroxide
- 2251/2067 . . . Urea
- 2251/208 . . Hydrocarbons
- 2251/21 . . Organic compounds not provided for in groups [B01D 2251/206](#) or [B01D 2251/208](#)
- 2251/30 . Alkali metal compounds
- 2251/302 . . of lithium
- 2251/304 . . of sodium
- 2251/306 . . of potassium
- 2251/40 . Alkaline earth metal or magnesium compounds
- 2251/402 . . of magnesium
- 2251/404 . . of calcium
- 2251/406 . . of strontium
- 2251/408 . . of barium
- 2251/50 . Inorganic acids
- 2251/502 . . Hydrochloric acid
- 2251/504 . . Nitric acid
- 2251/506 . . Sulfuric acid
- 2251/508 . . Sulfur dioxide
- 2251/51 . . Hydrogen sulfide
- 2251/512 . . Phosphoric acid
- 2251/60 . Inorganic bases or salts
- 2251/602 . . Oxides
- 2251/604 . . Hydroxides
- 2251/606 . . Carbonates
- 2251/608 . . Sulfates
- 2251/61 . . Phosphates
- 2251/70 . Organic acids
- 2251/80 . Organic bases or salts
- 2251/90 . Chelants
- 2251/902 . . EDTA
- 2251/904 . . NTA
- 2251/95 . Specific microorganisms
- 2252/00 Absorbents, i.e. solvents and liquid materials for gas absorption**
- 2252/10 . Inorganic absorbents
- 2252/102 . . Ammonia
- 2252/103 . . Water
- 2252/1035 . . . Sea water
- 2252/20 . Organic absorbents
- 2252/202 . . Alcohols or their derivatives
- 2252/2021 . . . Methanol
- 2252/2023 . . . Glycols, diols or their derivatives
- 2252/2025 Ethers or esters of alkylene glycols, e.g. ethylene or propylene carbonate
- 2252/2026 Polyethylene glycol, ethers or esters thereof, e.g. Selexol
- 2252/2028 Polypropylene glycol, ethers or esters thereof
- 2252/204 . . Amines
- 2252/20405 . . . Monoamines
- 2252/2041 . . . Diamines
- 2252/20415 . . . Tri- or polyamines
- 2252/20421 . . . Primary amines
- 2252/20426 . . . Secondary amines
- 2252/20431 . . . Tertiary amines
- 2252/20436 . . . Cyclic amines
- 2252/20442 containing a piperidine-ring
- 2252/20447 containing a piperazine-ring
- 2252/20452 containing a morpholine-ring
- 2252/20457 containing a pyridine-ring
- 2252/20463 containing a pyrimidine-ring
- 2252/20468 containing a pyrrolidone-ring
- 2252/20473 containing an imidazole-ring
- 2252/20478 . . . Alkanolamines
- 2252/20484 with one hydroxyl group
- 2252/20489 with two or more hydroxyl groups
- 2252/20494 . . . Amino acids, their salts or derivatives
- 2252/205 . . Other organic compounds not covered by [B01D 2252/00](#) - [B01D 2252/20494](#)
- 2252/2053 . . . Other nitrogen compounds
- 2252/2056 . . . Sulfur compounds, e.g. Sulfolane, thiols
- 2252/30 . Ionic liquids and zwitter-ions
- 2252/40 . Absorbents explicitly excluding the presence of water
- 2252/50 . Combinations of absorbents
- 2252/502 . . having two or more functionalities in the same molecule other than alkanolamine
- 2252/504 . . Mixtures of two or more absorbents
- 2252/60 . Additives
- 2252/602 . . Activators, promoting agents, catalytic agents or enzymes
- 2252/604 . . Stabilisers or agents inhibiting degradation
- 2252/606 . . Anticorrosion agents

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2252/608	. . Antifoaming agents	2255/20715	. . . Zirconium
2252/61	. . Antifouling agents	2255/20723	. . . Vanadium
2253/00	Adsorbents used in separation treatment of gases and vapours	2255/2073	. . . Manganese
2253/10	. Inorganic adsorbents	2255/20738	. . . Iron
2253/102	. . Carbon	2255/20746	. . . Cobalt
2253/104	. . Alumina	2255/20753	. . . Nickel
2253/106	. . Silica or silicates	2255/20761	. . . Copper
2253/108	. . . Zeolites	2255/20769	. . . Molybdenum
2253/1085	. . . . characterized by a silicon-aluminium ratio	2255/20776	. . . Tungsten
2253/11	. . . Clays	2255/20784	. . . Chromium
2253/112	. . Metals or metal compounds not provided for in B01D 2253/104 or B01D 2253/106	2255/20792	. . . Zinc
2253/1122	. . . Metals	2255/209	. . Other metals
2253/1124	. . . Metal oxides	2255/2092	. . . Aluminium
2253/1126	. . . Metal hydrides	2255/2094	. . . Tin
2253/1128	. . . Metal sulfides	2255/2096	. . . Bismuth
2253/116	. . Molecular sieves other than zeolites	2255/2098	. . . Antimony
2253/20	. Organic adsorbents	2255/30	. Silica
2253/202	. . Polymeric adsorbents	2255/40	. Mixed oxides
2253/204	. . Metal organic frameworks (MOF's)	2255/402	. . Perovskites
2253/206	. . Ion exchange resins	2255/405	. . Spinel
2253/25	. Coated, impregnated or composite adsorbents	2255/407	. . Zr-Ce mixed oxides
2253/30	. Physical properties of adsorbents	2255/50	. Zeolites
2253/302	. . Dimensions	2255/502	. . Beta zeolites
2253/304	. . . Linear dimensions, e.g. particle shape, diameter	2255/504	. . ZSM 5 zeolites
2253/306	. . . Surface area, e.g. BET-specific surface	2255/65	. Catalysts not containing noble metals
2253/308	. . . Pore size	2255/70	. Non-metallic catalysts, additives or dopants
2253/31	. . . Pore size distribution	2255/702	. . Carbon
2253/311	. . . Porosity, e.g. pore volume	2255/705	. . Ligands for metal-organic catalysts
2253/34	. . Specific shapes	2255/707	. . Additives or dopants
2253/342	. . . Monoliths	2255/80	. Type of catalytic reaction
2253/3425	. . . . Honeycomb shape	2255/802	. . Photocatalytic
2255/00	Catalysts	2255/804	. . Enzymatic
2255/10	. Noble metals or compounds thereof	2255/806	. . Electrocatalytic
2255/102	. . Platinum group metals	2255/808	. . Hydrolytic
2255/1021	. . . Platinum	2255/90	. Physical characteristics of catalysts
2255/1023	. . . Palladium	2255/902	. . Multilayered catalyst
2255/1025	. . . Rhodium	2255/9022	. . . Two layers
2255/1026	. . . Ruthenium	2255/9025	. . . Three layers
2255/1028	. . . Iridium	2255/9027	. . . More than three layers
2255/104	. . Silver	2255/903	. . Multi-zoned catalysts
2255/106	. . Gold	2255/9032	. . . Two zones
2255/20	. Metals or compounds thereof	2255/9035	. . . Three zones
2255/202	. . Alkali metals	2255/9037	. . . More than three zones
2255/2022	. . . Potassium	2255/904	. . Multiple catalysts
2255/2025	. . . Lithium	2255/9045	. . . in parallel
2255/2027	. . . Sodium	2255/905	. . Catalysts having a gradually changing coating
2255/204	. . Alkaline earth metals	2255/906	. . Catalyst dispersed in the gas
2255/2042	. . . Barium	2255/908	. . O ₂ -storage component incorporated in the catalyst
2255/2045	. . . Calcium	2255/909	. . H ₂ -storage component incorporated in the catalyst
2255/2047	. . . Magnesium	2255/91	. . NO _x -storage component incorporated in the catalyst
2255/206	. . Rare earth metals	2255/911	. . NH ₃ -storage component incorporated in the catalyst
2255/2061	. . . Yttrium	2255/912	. . HC-storage component incorporated in the catalyst
2255/2063	. . . Lanthanum	2255/915	. . Catalyst supported on particulate filters
2255/2065	. . . Cerium	2255/9155	. . . Wall flow filters
2255/2066	. . . Praseodymium	2255/92	. . Dimensions
2255/2068	. . . Neodymium	2255/9202	. . . Linear dimensions
2255/207	. . Transition metals	2255/9205	. . . Porosity
2255/20707	. . . Titanium	2255/9207	. . . Specific surface

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2256/00	Main component in the product gas stream after treatment
2256/10	. Nitrogen
2256/12	. Oxygen
2256/14	. Ozone
2256/16	. Hydrogen
2256/18	. Noble gases
2256/20	. Carbon monoxide
2256/22	. Carbon dioxide
2256/24	. Hydrocarbons
2256/245	. . Methane
2256/26	. Halogens or halogen compounds
2257/00	Components to be removed
2257/10	. Single element gases other than halogens
2257/102	. . Nitrogen
2257/104	. . Oxygen
2257/106	. . Ozone
2257/108	. . Hydrogen
2257/11	. . Noble gases
2257/20	. Halogens or halogen compounds
2257/202	. . Single element halogens
2257/2022	. . . Bromine
2257/2025	. . . Chlorine
2257/2027	. . . Fluorine
2257/204	. . Inorganic halogen compounds
2257/2042	. . . Hydrobromic acid
2257/2045	. . . Hydrochloric acid
2257/2047	. . . Hydrofluoric acid
2257/206	. . Organic halogen compounds
2257/2062	. . . Bromine compounds
2257/2064	. . . Chlorine
2257/2066	. . . Fluorine
2257/2068	. . . Iodine
2257/30	. Sulfur compounds
2257/302	. . Sulfur oxides
2257/304	. . Hydrogen sulfide
2257/306	. . Organic sulfur compounds, e.g. mercaptans
2257/308	. . Carbonoxysulfide COS
2257/40	. Nitrogen compounds
2257/402	. . Dinitrogen oxide
2257/404	. . Nitrogen oxides other than dinitrogen oxide
2257/406	. . Ammonia
2257/408	. . Cyanides, e.g. hydrogen cyanide (HCH)
2257/50	. Carbon oxides
2257/502	. . Carbon monoxide
2257/504	. . Carbon dioxide
2257/55	. Compounds of silicon, phosphorus, germanium or arsenic
2257/553	. . Compounds comprising hydrogen, e.g. silanes
2257/556	. . Organic compounds
2257/60	. Heavy metals or heavy metal compounds
2257/602	. . Mercury or mercury compounds
2257/70	. Organic compounds not provided for in groups B01D 2257/00 - B01D 2257/602
2257/702	. . Hydrocarbons
2257/7022	. . . Aliphatic hydrocarbons
2257/7025	. . . . Methane
2257/7027	. . . Aromatic hydrocarbons
2257/704	. . Solvents not covered by groups B01D 2257/702 - B01D 2257/7027
2257/706	. . Organometallic compounds

2257/708	. . Volatile organic compounds V.O.C.'s
2257/80	. Water
2257/90	. Odorous compounds not provided for in groups B01D 2257/00 - B01D 2257/708
2257/91	. Bacteria; Microorganisms
2257/93	. Toxic compounds not provided for in groups B01D 2257/00 - B01D 2257/708
2258/00	Sources of waste gases
2258/01	. Engine exhaust gases
2258/012	. . Diesel engines and lean burn gasoline engines
2258/014	. . Stoichiometric gasoline engines
2258/016	. . Methanol engines
2258/018	. . Natural gas engines
2258/02	. Other waste gases
2258/0208	. . from fuel cells
2258/0216	. . from CVD treatment or semi-conductor manufacturing
2258/0225	. . from chemical or biological warfare
2258/0233	. . from cement factories
2258/0241	. . from glass manufacture plants
2258/025	. . from metallurgy plants
2258/0258	. . from painting equipments or paint drying installations
2258/0266	. . from animal farms
2258/0275	. . from food processing plants or kitchens
2258/0283	. . Flue gases
2258/0291	. . . from waste incineration plants
2258/05	. Biogas
2258/06	. Polluted air
2259/00	Type of treatment
2259/10	. Gas phase, e.g. by using aerosols
2259/12	. Methods and means for introducing reactants
2259/122	. . Gaseous reactants
2259/124	. . Liquid reactants
2259/126	. . Semi-solid reactants, e.g. slurries
2259/128	. . Solid reactants
2259/40	. Further details for adsorption processes and devices
2259/40001	. . Methods relating to additional, e.g. intermediate, treatment of process gas
2259/40003	. . Methods relating to valve switching
2259/40005	. . . using rotary valves
2259/40007	. . Controlling pressure or temperature swing adsorption
2259/40009	. . . using sensors or gas analysers
2259/40011	. . Methods relating to the process cycle in pressure or temperature swing adsorption
2259/40013	. . . Pressurization
2259/40015	. . . . with two sub-steps
2259/40016	. . . . with three sub-steps
2259/40018	. . . . with more than three sub-steps
2259/4002	. . . Production
2259/40022	. . . . with two sub-steps
2259/40024	. . . . with three sub-steps
2259/40026	. . . . with more than three sub-steps
2259/40028	. . . Depressurization
2259/4003	. . . . with two sub-steps
2259/40032	. . . . with three sub-steps
2259/40033	. . . . with more than three sub-steps
2259/40035	. . . Equalization
2259/40037 with two sub-steps
2259/40039 with three sub-steps

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- 2259/40041 with more than three sub-steps
- 2259/40043 . . . Purging
- 2259/40045 with two sub-steps
- 2259/40047 with three sub-steps
- 2259/40049 with more than three sub-steps
- 2259/4005 Nature of purge gas
- 2259/40052 Recycled product or process gas
- 2259/40054 treated before its reuse
- 2259/40056 Gases other than recycled product or process gas
- 2259/40058 . . . Number of sequence steps, including sub-steps, per cycle
- 2259/4006 Less than four
- 2259/40062 Four
- 2259/40064 Five
- 2259/40066 Six
- 2259/40067 Seven
- 2259/40069 Eight
- 2259/40071 Nine
- 2259/40073 Ten
- 2259/40075 More than ten
- 2259/40077 . . . Direction of flow
- 2259/40079 Co-current
- 2259/40081 Counter-current
- 2259/40083 . . Regeneration of adsorbents in processes other than pressure or temperature swing adsorption
- 2259/40084 . . . by exchanging used adsorbents with fresh adsorbents
- 2259/40086 . . . by using a purge gas ([B01D 2259/4009](#) takes precedence)
- 2259/40088 . . . by heating
- 2259/4009 using hot gas
- 2259/40092 using hot liquid
- 2259/40094 by applying microwaves
- 2259/40096 by using electrical resistance heating
- 2259/40098 with other heating means
- 2259/401 . . . using a single bed
- 2259/402 . . . using two beds
- 2259/403 . . . using three beds
- 2259/404 . . . using four beds
- 2259/406 . . . using more than four beds
- 2259/4061 . . . using five beds
- 2259/4062 . . . using six beds
- 2259/4063 . . . using seven beds
- 2259/4065 . . . using eight beds
- 2259/4066 . . . using nine beds
- 2259/4067 . . . using ten beds
- 2259/4068 . . . using more than ten beds
- 2259/41 . . . using plural beds of the same adsorbent in series
- 2259/414 . . . using different types of adsorbents
- 2259/4141 within a single bed
- 2259/4143 arranged as a mixture
- 2259/4145 arranged in series
- 2259/4146 Contiguous multilayered adsorbents
- 2259/4148 Multiple layers positioned apart from each other
- 2259/416 . . . involving cryogenic temperature treatment
- 2259/418 . . . deleted
- 2259/45 . . Gas separation or purification devices adapted for specific applications
- 2259/4508 . . . for cleaning air in buildings
- 2259/4516 . . . for fuel vapour recovery systems
- 2259/4525 . . . for storage and dispensing systems
- 2259/4533 . . . for medical purposes
- 2259/4541 . . . for portable use, e.g. gas masks
- 2259/455 . . . for transportable use
- 2259/4558 for being employed as mobile cleaners for ambient air, i.e. the earth's atmosphere
- 2259/4566 . . . for use in transportation means
- 2259/4575 in aeroplanes or space ships
- 2259/4583 . . . for removing chemical, biological and nuclear warfare agents
- 2259/4591 . . . Construction elements containing cleaning material, e.g. catalysts
- 2259/65 . . Employing advanced heat integration, e.g. Pinch technology
- 2259/652 . . . using side coolers
- 2259/655 . . . using heat storage materials
- 2259/657 using latent heat, e.g. with phase change materials
- 2259/80 . . Employing electric, magnetic, electromagnetic or wave energy, or particle radiation
- 2259/802 . . . Visible light
- 2259/804 . . . UV light
- 2259/806 . . . Microwaves
- 2259/808 . . . Laser
- 2259/81 . . . X-rays
- 2259/812 . . . Electrons
- 2259/814 . . . Magnetic fields
- 2259/816 . . . Sonic or ultrasonic vibration
- 2259/818 . . . Employing electrical discharges or the generation of a plasma
- 2265/00 Casings, housings or mounting for filters specially adapted for separating dispersed particles from gases or vapours**
- 2265/02 . . Non-permanent measures for connecting different parts of the filter
- 2265/021 . . . Anti-rotational means
- 2265/022 . . . Bayonet connecting means
- 2265/023 . . . making use of magnetic forces
- 2265/024 . . . Mounting aids
- 2265/025 making use of ramps or cams
- 2265/026 with means for avoiding false mounting
- 2265/027 . . . Quick closing means for, e.g. filter heads, caps, maintenance openings
- 2265/028 . . . Snap, latch or clip connecting means
- 2265/029 . . . Special screwing connections, threaded sections
- 2265/04 . . Permanent measures for connecting different parts of the filter, e.g. welding, glueing or moulding
- 2265/05 . . . Special adapters for the connection of filters or parts of filters
- 2265/06 . . Details of supporting structures for filtering material, e.g. cores
- 2267/00 Multiple filter elements specially adapted for separating dispersed particles from gases or vapours**
- 2267/30 . . . Same type of filters
- 2267/40 . . . Different types of filters
- 2267/60 . . . Vertical arrangement
- 2267/70 . . . Horizontal arrangement
- 2271/00 Sealings for filters specially adapted for separating dispersed particles from gases or vapours**
- 2271/02 . . Gaskets, sealings

- 2271/022 . . Axial sealings
- 2271/025 . . Making of sealings
- 2271/027 . . Radial sealings
- 2273/00 Operation of filters specially adapted for separating dispersed particles from gases or vapours**
- 2273/10 . Allowing a continuous bypass of at least part of the flow, e.g. of secondary air, vents
- 2273/12 . Influencing the filter cake during filtration using filter aids
- 2273/14 . Filters which are moved between two or more positions, e.g. by turning, pushing
- 2273/16 . Means for selecting a filter element of a group of filters for a special purpose other than cleaning a filter
- 2273/18 . Testing of filters, filter elements, sealings
- 2273/20 . High temperature filtration
- 2273/22 . Making use of microwaves, e.g. for measurements
- 2273/24 . Making use of acoustic waves, e.g. for measurements
- 2273/26 . Making use of optical waves, e.g. for measurements
- 2273/28 . Making use of vacuum or underpressure
- 2273/30 . Means for generating a circulation of a fluid in a filtration system, e.g. using a pump or a fan
- 2275/00 Filter media structures for filters specially adapted for separating dispersed particles from gases or vapours**
- 2275/10 . Multiple layers
- 2275/105 . . Wound layers
- 2275/20 . Shape of filtering material
- 2275/201 . . Conical shape
- 2275/202 . . Disc-shaped filter elements
- 2275/203 . . Shapes flexible in their geometry, e.g. bendable, adjustable to a certain size
- 2275/204 . . Special shapes of loose filter materials
- 2275/205 . . Rectangular shape
- 2275/206 . . Special forms, e.g. adapted to a certain housing
- 2275/207 . . Triangular shape
- 2275/208 . . Oval shape
- 2275/30 . Porosity of filtering material
- 2275/302 . . Means for changing the porosity of a filter element, e.g. adjustment of a slit width, compression of a foam material
- 2275/305 . . Porosity decreasing in flow direction
- 2275/307 . . Porosity increasing in flow direction
- 2275/40 . Porous blocks
- 2275/403 . . Flexible blocks
- 2275/406 . . Rigid blocks
- 2275/50 . Stabilised filter material, stabilised by, e.g. structuring, calendering
- 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**
- 2277/10 . Parallel
- 2277/20 . Inclined, i.e. forming an angle of between 0° and 90°
- 2277/30 . Transverse, i.e. forming an angle of 90°
- 2279/00 Filters adapted for separating dispersed particles from gases or vapours specially modified for specific uses**
- 2279/10 . for air bags, e.g. inflators therefor
- 2279/20 . for collecting heterogeneous particles separately
- 2279/30 . for treatment of exhaust gases from IC Engines
- 2279/35 . for venting arrangements
- 2279/40 . for cleaning of environmental air, e.g. by filters installed on vehicles or on streets
- 2279/45 . for electronic devices, e.g. computers, hard-discs, mobile phones
- 2279/50 . for air conditioning
- 2279/51 . . in clean rooms, e.g. production facilities for electronic devices, laboratories
- 2279/55 . for cleaning appliances, e.g. suction cleaners
- 2279/60 . for the intake of internal combustion engines or turbines
- 2279/65 . for the sterilisation of air
- 2311/00 Details relating to membrane separation process operations and control**
- NOTE**
- In this group, C-sets are used for classification. The detailed information about the C-Sets construction and the associated syntax rules are found in the definitions of [B01D](#).
- 2311/02 . Specific process operations before starting the membrane separation process
- 2311/04 . Specific process operations in the feed stream; Feed pretreatment
- 2311/06 . Specific process operations in the permeate stream
- 2311/08 . Specific process operations in the concentrate stream
- 2311/10 . Temperature control
- 2311/103 . . Heating
- WARNING**
- Group [B01D 2311/103](#) is impacted by reclassification into groups [B01D 2311/1031](#) and [B01D 2311/1032](#).
- Groups [B01D 2311/103](#), [B01D 2311/1031](#) and [B01D 2311/1032](#) should be considered in order to perform a complete search.
- 2311/1031 . . . Heat integration, heat recovery or reuse within an apparatus
- WARNING**
- Group [B01D 2311/1031](#) is incomplete pending reclassification of documents from group [B01D 2311/103](#).
- Groups [B01D 2311/103](#) and [B01D 2311/1031](#) should be considered in order to perform a complete search.
- 2311/1032 . . . Heating or reheating between serial separation steps
- WARNING**
- Group [B01D 2311/1032](#) is incomplete pending reclassification of documents from group [B01D 2311/103](#).
- Groups [B01D 2311/103](#) and [B01D 2311/1032](#) should be considered in order to perform a complete search.

2311/106 . . Cooling

WARNING

Group [B01D 2311/106](#) is impacted by reclassification into group [B01D 2311/1061](#).

Groups [B01D 2311/106](#) and [B01D 2311/1061](#) should be considered in order to perform a complete search.

2311/1061 . . . Cooling between serial separation steps

WARNING

Group [B01D 2311/1061](#) is incomplete pending reclassification of documents from group [B01D 2311/106](#).

Groups [B01D 2311/106](#) and [B01D 2311/1061](#) should be considered in order to perform a complete search.

2311/12 . Addition of chemical agents

2311/13 . Use of sweep gas

2311/14 . Pressure control

2311/16 . Flow or flux control

2311/165 . . Cross-flow velocity control

2311/18 . pH control

2311/20 . Power consumption

2311/22 . characterised by a specific duration or time

2311/24 . Quality control

2311/243 . . Electrical conductivity control

2311/246 . . Concentration control

2311/25 . Recirculation, recycling or bypass, e.g. recirculation of concentrate into the feed

WARNING

Group [B01D 2311/25](#) is impacted by reclassification into groups [B01D 2311/251](#), [B01D 2311/2512](#), [B01D 2311/2513](#), [B01D 2311/252](#), [B01D 2311/2521](#), [B01D 2311/2523](#), [B01D 2311/253](#), [B01D 2311/2531](#) and [B01D 2311/2532](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2311/251 . . Recirculation of permeate

WARNING

Groups [B01D 2311/251](#) - [B01D 2311/2513](#) are incomplete pending reclassification of documents from group [B01D 2311/25](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2311/2512 . . . to feed side

2311/2513 . . . to concentrate side

2311/252 . . Recirculation of concentrate

WARNING

Groups [B01D 2311/252](#) - [B01D 2311/2523](#) are incomplete pending reclassification of documents from group [B01D 2311/25](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2311/2521 . . . to permeate side

2311/2523 . . . to feed side

2311/253 . . Bypassing of feed

WARNING

Groups [B01D 2311/253](#) - [B01D 2311/2532](#) are incomplete pending reclassification of documents from group [B01D 2311/25](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2311/2531 . . . to permeate side

2311/2532 . . . to concentrate side

2311/26 . Further operations combined with membrane separation processes

WARNING

Group [B01D 2311/26](#) is impacted by reclassification into groups [B01D 2311/2643](#), [B01D 2311/2674](#), [B01D 2311/2697](#), [B01D 2311/2698](#) and [B01D 2311/2699](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2311/2603 . . Application of an electric field, different from the potential difference across the membrane

2311/2607 . . Application of a magnetic field

2311/2611 . . Irradiation

2311/2615 . . . Application of high-frequency electromagnetic fields or microwave irradiation

2311/2619 . . . UV-irradiation

2311/2623 . . Ion-Exchange

2311/2626 . . Absorption or adsorption

2311/263 . . Chemical reaction

2311/2634 . . . Oxidation

2311/2638 . . . Reduction

2311/2642 . . Aggregation, sedimentation, flocculation, precipitation or coagulation

2311/2643 . . Crystallisation

WARNING

Group [B01D 2311/2643](#) is incomplete pending reclassification of documents from group [B01D 2311/26](#).

Groups [B01D 2311/26](#) and [B01D 2311/2643](#) should be considered in order to perform a complete search.

2311/2646 . . Decantation

2311/2649 . . Filtration

2311/2653 . . Degassing

2311/2657 . . . Deaeration

2311/2661 . . Addition of gas

2311/2665 . . . Aeration other than for cleaning purposes

2311/2669 . . Distillation

2311/2673 . . Evaporation

2311/2674 . . Condensation

WARNING

Group [B01D 2311/2674](#) is incomplete pending reclassification of documents from group [B01D 2311/26](#).

Groups [B01D 2311/26](#) and [B01D 2311/2674](#) should be considered in order to perform a complete search.

2311/2676 . . Centrifugal separation

2311/268 . . Water softening

2311/2684 . . Electrochemical processes

2311/2688 . . Biological processes

2311/2692 . . Sterilization

2311/2696 . . Catalytic reactions

2311/2697 . . Chromatography

WARNING

Group [B01D 2311/2697](#) is incomplete pending reclassification of documents from group [B01D 2311/26](#).

Groups [B01D 2311/26](#) and [B01D 2311/2697](#) should be considered in order to perform a complete search.

2311/2698 . . Compression

WARNING

Group [B01D 2311/2698](#) is incomplete pending reclassification of documents from group [B01D 2311/26](#).

Groups [B01D 2311/26](#) and [B01D 2311/2698](#) should be considered in order to perform a complete search.

2311/2699 . . Drying

WARNING

Group [B01D 2311/2699](#) is incomplete pending reclassification of documents from group [B01D 2311/26](#).

Groups [B01D 2311/26](#) and [B01D 2311/2699](#) should be considered in order to perform a complete search.

2313/00 Details relating to membrane modules or apparatus

WARNING

Group [B01D 2313/00](#) is impacted by reclassification into groups [B01D 2313/60](#), [B01D 2313/62](#), [B01D 2313/64](#), [B01D 2313/66](#), [B01D 2313/68](#), [B01D 2313/70](#), [B01D 2313/701](#) and [B01D 2313/702](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2313/02 . . Specific tightening or locking mechanisms

2313/025 . . Specific membrane holders

2313/04 . . Specific sealing means

WARNING

Group [B01D 2313/04](#) is impacted by reclassification into groups [B01D 2313/041](#) and [B01D 2313/042](#).

Groups [B01D 2313/04](#), [B01D 2313/041](#) and [B01D 2313/042](#) should be considered in order to perform a complete search.

2313/041 . . Gaskets or O-rings

WARNING

Group [B01D 2313/041](#) is incomplete pending reclassification of documents from group [B01D 2313/04](#).

Groups [B01D 2313/04](#) and [B01D 2313/041](#) should be considered in order to perform a complete search.

2313/042 . . Adhesives or glues

WARNING

Group [B01D 2313/042](#) is incomplete pending reclassification of documents from group [B01D 2313/04](#).

Groups [B01D 2313/04](#) and [B01D 2313/042](#) should be considered in order to perform a complete search.

2313/06 . . External membrane module supporting or fixing means

2313/08 . . Flow guidance means within the module or the apparatus

2313/083 . . Bypass routes

2313/086 . . Meandering flow path over the membrane

2313/10 . . Specific supply elements

2313/105 . . Supply manifolds

2313/12 . . Specific discharge elements

2313/125 . . Discharge manifolds

2313/13 . . Specific connectors

WARNING

Group [B01D 2313/13](#) is impacted by reclassification into group [B01D 2313/131](#).

Groups [B01D 2313/13](#) and [B01D 2313/131](#) should be considered in order to perform a complete search.

2313/131 . . Quick connectors or quick-fit

WARNING

Group [B01D 2313/131](#) is incomplete pending reclassification of documents from group [B01D 2313/13](#).

Groups [B01D 2313/13](#) and [B01D 2313/131](#) should be considered in order to perform a complete search.

2313/14 . . Specific spacers

2313/143 . . on the feed side

2313/146 . . on the permeate side

2313/16 . . Specific vents

2313/18 . . Specific valves

2313/19 . . Specific flow restrictors

- 2313/20 . . . Specific housing

WARNING

Group [B01D 2313/20](#) is impacted by reclassification into groups [B01D 2313/201](#), [B01D 2313/2011](#), [B01D 2313/203](#), [B01D 2313/2031](#), [B01D 2313/205](#), [B01D 2313/206](#), [B01D 2313/2061](#), [B01D 2313/2062](#) and [B01D 2313/208](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2313/201 . . . Closed housing, vessels or containers

WARNING

Groups [B01D 2313/201](#) and [B01D 2313/2011](#) are incomplete pending reclassification of documents from group [B01D 2313/20](#).

Groups [B01D 2313/20](#), [B01D 2313/201](#) and [B01D 2313/2011](#) should be considered in order to perform a complete search.

- 2313/2011 . . . Pressure vessels

- 2313/203 . . . Open housings

WARNING

Groups [B01D 2313/203](#) and [B01D 2313/2031](#) are incomplete pending reclassification of documents from group [B01D 2313/20](#).

Groups [B01D 2313/20](#), [B01D 2313/203](#) and [B01D 2313/2031](#) should be considered in order to perform a complete search.

- 2313/2031 . . . Frame or cage-like structures

- 2313/205 . . . characterised by the shape

WARNING

Group [B01D 2313/205](#) is incomplete pending reclassification of documents from group [B01D 2313/20](#).

Groups [B01D 2313/20](#) and [B01D 2313/205](#) should be considered in order to perform a complete search.

- 2313/206 . . . characterised by the material

WARNING

Groups [B01D 2313/206](#) - [B01D 2313/2062](#) are incomplete pending reclassification of documents from group [B01D 2313/20](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2313/2061 . . . Organic, e.g. polymeric material

- 2313/2062 . . . Inorganic material

- 2313/208 . . . Resilient or flexible housing walls, e.g. bags or foils

WARNING

Group [B01D 2313/208](#) is incomplete pending reclassification of documents from group [B01D 2313/20](#).

Groups [B01D 2313/20](#) and [B01D 2313/208](#) should be considered in order to perform a complete search.

- 2313/21 . . . Specific headers, end caps

- 2313/22 . . . Cooling or heating elements

WARNING

Group [B01D 2313/22](#) is impacted by reclassification into group [B01D 2313/221](#).

Groups [B01D 2313/22](#) and [B01D 2313/221](#) should be considered in order to perform a complete search.

- 2313/221 . . . Heat exchangers

WARNING

Group [B01D 2313/221](#) is incomplete pending reclassification of documents from group [B01D 2313/22](#).

Groups [B01D 2313/22](#) and [B01D 2313/221](#) should be considered in order to perform a complete search.

- 2313/23 . . . Specific membrane protectors, e.g. sleeves or screens

- 2313/24 . . . Specific pressurizing or depressurizing means

- 2313/243 . . . Pumps

- 2313/246 . . . Energy recovery means

- 2313/26 . . . Specific gas distributors or gas intakes

- 2313/28 . . . Specific concentration chambers

- 2313/30 . . . Specific dilution or de-ionizing chambers

- 2313/32 . . . Intermediate chambers

- 2313/34 . . . Energy carriers

- 2313/345 . . . Electrodes

- 2313/36 . . . Energy sources

WARNING

Group [B01D 2313/36](#) is impacted by reclassification into group [B01D 2313/367](#).

Groups [B01D 2313/36](#) and [B01D 2313/367](#) should be considered in order to perform a complete search.

- 2313/365 . . . Electrical sources

- 2313/367 . . . Renewable energy sources, e.g. wind or solar sources

WARNING

Group [B01D 2313/367](#) is incomplete pending reclassification of documents from group [B01D 2313/36](#).

Groups [B01D 2313/36](#) and [B01D 2313/367](#) should be considered in order to perform a complete search.

- 2313/40 . . . Adsorbents within the flow path

- 2313/42 . . . Catalysts within the flow path

- 2313/44 . . . Cartridge types

B01D

- 2313/46 . Supply, recovery or discharge mechanisms of washing members

- 2313/48 . Mechanisms for switching between regular separation operations and washing

- 2313/50 . Specific extra tanks

WARNING

Group [B01D 2313/50](#) is impacted by reclassification into groups [B01D 2313/501](#) and [B01D 2313/502](#).

Groups [B01D 2313/50](#), [B01D 2313/501](#) and [B01D 2313/502](#) should be considered in order to perform a complete search.

- 2313/501 . . Permeate storage tanks

WARNING

Group [B01D 2313/501](#) is incomplete pending reclassification of documents from group [B01D 2313/50](#).

Groups [B01D 2313/50](#) and [B01D 2313/501](#) should be considered in order to perform a complete search.

- 2313/502 . . Concentrate storage tanks

WARNING

Group [B01D 2313/502](#) is incomplete pending reclassification of documents from group [B01D 2313/50](#).

Groups [B01D 2313/50](#) and [B01D 2313/502](#) should be considered in order to perform a complete search.

- 2313/54 . Modularity of membrane module elements

- 2313/56 . Specific mechanisms for loading the membrane in a module

WARNING

Group [B01D 2313/56](#) is impacted by reclassification into group [B01D 2313/57](#).

Groups [B01D 2313/56](#) and [B01D 2313/57](#) should be considered in order to perform a complete search.

- 2313/57 . Tools used for removal of membranes

WARNING

Group [B01D 2313/57](#) is incomplete pending reclassification of documents from group [B01D 2313/56](#).

Groups [B01D 2313/56](#) and [B01D 2313/57](#) should be considered in order to perform a complete search.

- 2313/58 . Parts of membrane modules specifically adapted for single use

- 2313/60 . Specific sensors or sensor arrangements

WARNING

Group [B01D 2313/60](#) is incomplete pending reclassification of documents from groups [B01D 2313/00](#) and [B01D 2313/90](#).

Groups [B01D 2313/00](#), [B01D 2313/90](#) and [B01D 2313/60](#) should be considered in order to perform a complete search.

- 2313/62 . Displays

WARNING

Group [B01D 2313/62](#) is incomplete pending reclassification of documents from groups [B01D 2313/00](#) and [B01D 2313/90](#).

Groups [B01D 2313/00](#), [B01D 2313/90](#) and [B01D 2313/62](#) should be considered in order to perform a complete search.

- 2313/64 . Bar codes; Data storage means; RFID

WARNING

Group [B01D 2313/64](#) is incomplete pending reclassification of documents from group [B01D 2313/00](#).

Groups [B01D 2313/00](#) and [B01D 2313/64](#) should be considered in order to perform a complete search.

- 2313/66 . Biodegradability of parts of the module

WARNING

Group [B01D 2313/66](#) is incomplete pending reclassification of documents from group [B01D 2313/00](#).

Groups [B01D 2313/00](#) and [B01D 2313/66](#) should be considered in order to perform a complete search.

- 2313/68 . Biocompatibility of parts of the module

WARNING

Group [B01D 2313/68](#) is incomplete pending reclassification of documents from group [B01D 2313/00](#).

Groups [B01D 2313/00](#) and [B01D 2313/68](#) should be considered in order to perform a complete search.

- 2313/70 . Control means using a programmable logic controller [PLC] or a computer

WARNING

Groups [B01D 2313/70](#) - [B01D 2313/702](#) are incomplete pending reclassification of documents from groups [B01D 2313/00](#) and [B01D 2313/90](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2313/701 . . comprising a software program or a logic diagram

- 2313/702 . . comprising telecommunication features, e.g. modems or antennas

- 2313/90 . Additional auxiliary systems integrated with the module or apparatus

WARNING

Group [B01D 2313/90](#) is impacted by reclassification into groups [B01D 2313/60](#), [B01D 2313/62](#), [B01D 2313/70](#), [B01D 2313/701](#), [B01D 2313/702](#), [B01D 2313/901](#), [B01D 2313/902](#) and [B01D 2313/903](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2313/901 . . Integrated prefilter

WARNING

Group [B01D 2313/901](#) is incomplete pending reclassification of documents from group [B01D 2313/90](#).

Groups [B01D 2313/90](#) and [B01D 2313/901](#) should be considered in order to perform a complete search.

- 2313/902 . . Integrated cleaning device

WARNING

Group [B01D 2313/902](#) is incomplete pending reclassification of documents from group [B01D 2313/90](#).

Groups [B01D 2313/90](#) and [B01D 2313/902](#) should be considered in order to perform a complete search.

- 2313/903 . . Integrated control or detection device

WARNING

Group [B01D 2313/903](#) is incomplete pending reclassification of documents from group [B01D 2313/90](#).

Groups [B01D 2313/90](#) and [B01D 2313/903](#) should be considered in order to perform a complete search.

- 2315/00 Details relating to the membrane module operation**

WARNING

Group [B01D 2315/00](#) is impacted by reclassification into groups [B01D 2315/17](#), [B01D 2315/22](#) and [B01D 2315/24](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2315/02 . Rotation or turning
 2315/04 . Reciprocation, oscillation or vibration
 2315/05 . Moving the membrane in one direction, e.g. displacement, translational movement
 2315/06 . Submerged-type; Immersion type
 2315/08 . Fully permeating type; Dead-end filtration
 2315/10 . Cross-flow filtration
 2315/12 . Feed-and-bleed systems
 2315/14 . Batch-systems
 2315/16 . Diafiltration

- 2315/17 . Depth filtration, asymmetric membranes arranged with wider pore size side towards feed

WARNING

Group [B01D 2315/17](#) is incomplete pending reclassification of documents from group [B01D 2315/00](#).

Groups [B01D 2315/00](#) and [B01D 2315/17](#) should be considered in order to perform a complete search.

- 2315/18 . Time sequence of one or more process steps carried out periodically within one apparatus

- 2315/20 . Operation control schemes defined by a periodically repeated sequence comprising filtration cycles combined with cleaning or gas supply, e.g. aeration

- 2315/22 . Membrane contactor

WARNING

Group [B01D 2315/22](#) is incomplete pending reclassification of documents from group [B01D 2315/00](#).

Groups [B01D 2315/00](#) and [B01D 2315/22](#) should be considered in order to perform a complete search.

- 2315/24 . Counter-current operation

WARNING

Group [B01D 2315/24](#) is incomplete pending reclassification of documents from group [B01D 2315/00](#).

Groups [B01D 2315/00](#) and [B01D 2315/24](#) should be considered in order to perform a complete search.

- 2317/00 Membrane module arrangements within a plant or an apparatus**

- 2317/02 . Elements in series
 2317/022 . . Reject series
 2317/025 . . Permeate series
 2317/027 . . Christmas tree arrangements
 2317/04 . Elements in parallel
 2317/06 . Use of membrane modules of the same kind
 2317/08 . Use of membrane modules of different kinds

- 2319/00 Membrane assemblies within one housing**

- 2319/02 . Elements in series
 2319/022 . . Reject series
 2319/025 . . Permeate series
 2319/027 . . Christmas tree arrangements
 2319/04 . Elements in parallel
 2319/06 . Use of membranes of different materials or properties within one module

- 2321/00 Details relating to membrane cleaning, regeneration, sterilization or to the prevention of fouling**

WARNING

Group [B01D 2321/00](#) is impacted by reclassification into groups [B01D 2321/281](#), [B01D 2321/282](#), [B01D 2321/35](#), [B01D 2321/42](#) and [B01D 2321/44](#).

All groups listed in this Warning should be considered in order to perform a complete search.

B01D

- 2321/02 . Forward flushing
- 2321/04 . Backflushing
- 2321/06 . Use of osmotic pressure, e.g. direct osmosis
- 2321/08 . Use of hot water or water vapor
- 2321/10 . Use of feed
- 2321/12 . Use of permeate
- 2321/14 . Use of concentrate
- 2321/16 . Use of chemical agents

WARNING

Group [B01D 2321/16](#) is impacted by reclassification into group [B01D 2321/167](#).

Groups [B01D 2321/16](#) and [B01D 2321/167](#) should be considered in order to perform a complete search.

- 2321/162 . . Use of acids
- 2321/164 . . Use of bases
- 2321/166 . . Use of enzymatic agents
- 2321/167 . . Use of scale inhibitors

WARNING

Group [B01D 2321/167](#) is incomplete pending reclassification of documents from group [B01D 2321/16](#).

Groups [B01D 2321/16](#) and [B01D 2321/167](#) should be considered in order to perform a complete search.

- 2321/168 . . Use of other chemical agents
- 2321/18 . Use of gases
- 2321/185 . . Aeration
- 2321/20 . By influencing the flow
- 2321/2008 . . statically
- 2321/2016 . . . Static mixers; Turbulence generators
- 2321/2025 . . . Tangential inlet
- 2321/2033 . . dynamically
- 2321/2041 . . . Mixers; Agitators
- 2321/205 . . . Integrated pumps
- 2321/2058 . . . by vibration of the membrane, e.g. with an actuator
- 2321/2066 . . Pulsated flow
- 2321/2075 . . . Ultrasonic treatment
- 2321/2083 . . By reversing the flow
- 2321/22 . Electrical effects
- 2321/223 . . Polarity reversal
- 2321/226 . . Interruption of electric currents
- 2321/24 . Magnetic effects
- 2321/26 . By suction
- 2321/28 . by soaking or impregnating
- 2321/281 . by applying a special coating to the membrane or to any module element

WARNING

Group [B01D 2321/281](#) is incomplete pending reclassification of documents from group [B01D 2321/00](#).

Groups [B01D 2321/00](#) and [B01D 2321/281](#) should be considered in order to perform a complete search.

- 2321/282 . by spray flush or jet flush

WARNING

Group [B01D 2321/282](#) is incomplete pending reclassification of documents from group [B01D 2321/00](#).

Groups [B01D 2321/00](#) and [B01D 2321/282](#) should be considered in order to perform a complete search.

- 2321/30 . Mechanical cleaning, e.g. with brushes or scrapers
- 2321/32 . By heating or pyrolysis
- 2321/34 . by radiation
- 2321/343 . . By UV radiation
- 2321/346 . . by gamma radiation
- 2321/35 . with acoustic waves

WARNING

Group [B01D 2321/35](#) is incomplete pending reclassification of documents from group [B01D 2321/00](#).

Groups [B01D 2321/00](#) and [B01D 2321/35](#) should be considered in order to perform a complete search.

- 2321/40 . Automatic control of cleaning processes
- 2321/42 . Chemical regeneration

WARNING

Group [B01D 2321/42](#) is incomplete pending reclassification of documents from group [B01D 2321/00](#).

Groups [B01D 2321/00](#) and [B01D 2321/42](#) should be considered in order to perform a complete search.

- 2321/44 . Specific cleaning apparatus

WARNING

Group [B01D 2321/44](#) is incomplete pending reclassification of documents from group [B01D 2321/00](#).

Groups [B01D 2321/00](#) and [B01D 2321/44](#) should be considered in order to perform a complete search.

2323/00 Details relating to membrane preparation**WARNING**

Group [B01D 2323/00](#) is impacted by reclassification into groups [B01D 2323/15](#), [B01D 2323/216](#), [B01D 2323/217](#), [B01D 2323/218](#), [B01D 2323/2181](#), [B01D 2323/21811](#), [B01D 2323/21813](#), [B01D 2323/21815](#), [B01D 2323/21817](#), [B01D 2323/21819](#), [B01D 2323/2182](#), [B01D 2323/21821](#), [B01D 2323/21822](#), [B01D 2323/21823](#), [B01D 2323/21824](#), [B01D 2323/21825](#), [B01D 2323/21826](#), [B01D 2323/21827](#), [B01D 2323/21828](#), [B01D 2323/21829](#), [B01D 2323/2183](#), [B01D 2323/21831](#), [B01D 2323/21832](#), [B01D 2323/21833](#), [B01D 2323/21834](#), [B01D 2323/21835](#), [B01D 2323/21836](#), [B01D 2323/21837](#), [B01D 2323/21838](#), [B01D 2323/21839](#), [B01D 2323/2185](#), [B01D 2323/2187](#), [B01D 2323/2189](#), [B01D 2323/219](#), [B01D 2323/226](#), [B01D 2323/52](#), [B01D 2323/54](#), [B01D 2323/56](#), [B01D 2323/58](#), [B01D 2323/60](#), [B01D 2323/62](#), [B01D 2323/64](#) and [B01D 2323/66](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2323/02 . Hydrophilization
- 2323/04 . Hydrophobization
- 2323/06 . Specific viscosities of materials involved
- 2323/08 . Specific temperatures applied

WARNING

Group [B01D 2323/08](#) is impacted by reclassification into groups [B01D 2323/081](#) and [B01D 2323/082](#).

Groups [B01D 2323/08](#), [B01D 2323/081](#) and [B01D 2323/082](#) should be considered in order to perform a complete search.

- 2323/081 . . Heating

WARNING

Group [B01D 2323/081](#) is incomplete pending reclassification of documents from group [B01D 2323/08](#).

Groups [B01D 2323/08](#) and [B01D 2323/081](#) should be considered in order to perform a complete search.

- 2323/082 . . Cooling

WARNING

Group [B01D 2323/082](#) is incomplete pending reclassification of documents from group [B01D 2323/08](#).

Groups [B01D 2323/08](#) and [B01D 2323/082](#) should be considered in order to perform a complete search.

- 2323/10 . Specific pressure applied
- 2323/12 . Specific ratios of components used
- 2323/14 . Ageing features

- 2323/15 . Use of additives

WARNING

Group [B01D 2323/15](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/15](#) should be considered in order to perform a complete search.

- 2323/16 . . Swelling agents
- 2323/18 . . Pore-control agents or pore formers
- 2323/20 . . Plasticizers
- 2323/21 . . Fillers
- 2323/216 . . Surfactants

WARNING

Group [B01D 2323/216](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/216](#) should be considered in order to perform a complete search.

- 2323/217 . . Emulgator or emulsion/foam forming agents

WARNING

Group [B01D 2323/217](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/217](#) should be considered in order to perform a complete search.

- 2323/218 . . Additive materials

WARNING

Group [B01D 2323/218](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/218](#) should be considered in order to perform a complete search.

- 2323/2181 . . . Inorganic additives

WARNING

Group [B01D 2323/2181](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/2181](#) should be considered in order to perform a complete search.

- 2323/21811 Metals

WARNING

Group [B01D 2323/21811](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21811](#) should be considered in order to perform a complete search.

2323/21813 Metal oxides

WARNING

Group [B01D 2323/21813](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21813](#) should be considered in order to perform a complete search.

2323/21815 Acids

WARNING

Group [B01D 2323/21815](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21815](#) should be considered in order to perform a complete search.

2323/21817 Salts

WARNING

Group [B01D 2323/21817](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21817](#) should be considered in order to perform a complete search.

2323/21819 Carbon, carbon nanotubes, graphene or derivatives thereof

WARNING

Group [B01D 2323/21819](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21819](#) should be considered in order to perform a complete search.

2323/2182 Organic additives

WARNING

Group [B01D 2323/2182](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/2182](#) should be considered in order to perform a complete search.

2323/21821 Alkanes

WARNING

Group [B01D 2323/21821](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21821](#) should be considered in order to perform a complete search.

2323/21822 Alkenes

WARNING

Group [B01D 2323/21822](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21822](#) should be considered in order to perform a complete search.

2323/21823 Alcohols or hydroxydes, e.g. ethanol, glycerol or phenol

WARNING

Group [B01D 2323/21823](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21823](#) should be considered in order to perform a complete search.

2323/21824 Aldehydes

WARNING

Group [B01D 2323/21824](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21824](#) should be considered in order to perform a complete search.

2323/21825 Ketones

WARNING

Group [B01D 2323/21825](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21825](#) should be considered in order to perform a complete search.

2323/21826 Acids, e.g. acetic acid

WARNING

Group [B01D 2323/21826](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21826](#) should be considered in order to perform a complete search.

2323/21827 Salts

WARNING

Group [B01D 2323/21827](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21827](#) should be considered in order to perform a complete search.

2323/21828 Ammonium Salts

WARNING

Group [B01D 2323/21828](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21828](#) should be considered in order to perform a complete search.

2323/21829 Acrylates

WARNING

Group [B01D 2323/21829](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21829](#) should be considered in order to perform a complete search.

2323/2183 Ethers

WARNING

Group [B01D 2323/2183](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/2183](#) should be considered in order to perform a complete search.

2323/21831 Cyclic ethers comprising heterocyclic O-Ring

WARNING

Group [B01D 2323/21831](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21831](#) should be considered in order to perform a complete search.

2323/21832 Cyclic ethers comprising aromatic heterocyclic O-Ring

WARNING

Group [B01D 2323/21832](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21832](#) should be considered in order to perform a complete search.

2323/21833 Esters

WARNING

Group [B01D 2323/21833](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21833](#) should be considered in order to perform a complete search.

2323/21834 Amines

WARNING

Group [B01D 2323/21834](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21834](#) should be considered in order to perform a complete search.

2323/21835 Cyclic amines comprising heterocyclic N-Ring, e.g. pyridine

WARNING

Group [B01D 2323/21835](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21835](#) should be considered in order to perform a complete search.

2323/21836 Cyclic amines comprising aromatic heterocyclic N-Ring

WARNING

Group [B01D 2323/21836](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21836](#) should be considered in order to perform a complete search.

2323/21837 Amides

WARNING

Group [B01D 2323/21837](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21837](#) should be considered in order to perform a complete search.

2323/21838 Imides

WARNING

Group [B01D 2323/21838](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21838](#) should be considered in order to perform a complete search.

2323/21839 Polymeric additives

WARNING

Group [B01D 2323/21839](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/21839](#) should be considered in order to perform a complete search.

- 2323/2185 Polyethylene glycol
- WARNING**
- Group [B01D 2323/2185](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/2185](#) should be considered in order to perform a complete search.
- 2323/2187 Polyvinylpyrrolidone
- WARNING**
- Group [B01D 2323/2187](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/2187](#) should be considered in order to perform a complete search.
- 2323/2189 . . . Metal-organic compounds or complexes
- WARNING**
- Group [B01D 2323/2189](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/2189](#) should be considered in order to perform a complete search.
- 2323/219 . Specific solvent system
- WARNING**
- Group [B01D 2323/219](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/219](#) should be considered in order to perform a complete search.
- 2323/22 . . Specific non-solvents or non-solvent system
- 2323/225 . . Use of supercritical fluids
- 2323/226 . . Use of ionic liquids
- WARNING**
- Group [B01D 2323/226](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/226](#) should be considered in order to perform a complete search.
- 2323/24 . Use of template or surface directing agents [SDA]
- 2323/26 . Spraying processes
- 2323/28 . Pore treatments
- 2323/283 . . Reducing the pores
- 2323/286 . . Closing of pores, e.g. for membrane sealing
- 2323/30 . Cross-linking
- 2323/32 . Use of chain transfer agents or inhibitors
- 2323/34 . Use of radiation
- 2323/345 . . UV-treatment
- 2323/35 . Use of magnetic or electrical fields
- 2323/36 . Introduction of specific chemical groups
- 2323/38 . Graft polymerization
- 2323/385 . . involving radiation
- 2323/39 . Electrospinning
- 2323/40 . in-situ membrane formation
- 2323/42 . Details of membrane preparation apparatus
- 2323/44 . Relaxation steps
- 2323/46 . Impregnation
- 2323/48 . Influencing the pH
- 2323/50 . Control of the membrane preparation process
- 2323/52 . Use of a mould
- WARNING**
- Group [B01D 2323/52](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/52](#) should be considered in order to perform a complete search.
- 2323/54 . Recycling of scrap material from production process or membrane fragments
- WARNING**
- Group [B01D 2323/54](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/54](#) should be considered in order to perform a complete search.
- 2323/56 . Use of ultrasound
- WARNING**
- Group [B01D 2323/56](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/56](#) should be considered in order to perform a complete search.
- 2323/58 . Fusion; Welding
- WARNING**
- Group [B01D 2323/58](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/58](#) should be considered in order to perform a complete search.
- 2323/60 . Co-casting; Co-extrusion
- WARNING**
- Group [B01D 2323/60](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/60](#) should be considered in order to perform a complete search.
- 2323/62 . Cutting the membrane
- WARNING**
- Group [B01D 2323/62](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).
- Groups [B01D 2323/00](#) and [B01D 2323/62](#) should be considered in order to perform a complete search.

- 2323/64 . Use of a temporary support

WARNING

Group [B01D 2323/64](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/64](#) should be considered in order to perform a complete search.

- 2323/66 . Avoiding penetration into pores of support of further porous layer with fluid or counter-pressure

WARNING

Group [B01D 2323/66](#) is incomplete pending reclassification of documents from group [B01D 2323/00](#).

Groups [B01D 2323/00](#) and [B01D 2323/66](#) should be considered in order to perform a complete search.

- 2325/00 **Details relating to properties of membranes**

WARNING

Group [B01D 2325/00](#) is impacted by reclassification into groups [B01D 2325/39](#), [B01D 2325/43](#), [B01D 2325/50](#), [B01D 2325/52](#), [B01D 2325/54](#), [B01D 2325/56](#) and [B01D 2325/58](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2325/02 . Details relating to pores or porosity of the membranes

WARNING

Group [B01D 2325/02](#) is impacted by reclassification into groups [B01D 2325/0281](#), [B01D 2325/0282](#), [B01D 2325/0283](#), [B01D 2325/02831](#), [B01D 2325/02832](#), [B01D 2325/02833](#) and [B01D 2325/02834](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2325/021 . . Pore shapes

WARNING

Group [B01D 2325/021](#) is impacted by reclassification into groups [B01D 2325/0212](#) and [B01D 2325/0214](#).

Groups [B01D 2325/021](#), [B01D 2325/0212](#) and [B01D 2325/0214](#) should be considered in order to perform a complete search.

- 2325/0212 . . . Symmetric or isoporous membranes

WARNING

Group [B01D 2325/0212](#) is incomplete pending reclassification of documents from group [B01D 2325/021](#).

Groups [B01D 2325/021](#) and [B01D 2325/0212](#) should be considered in order to perform a complete search.

- 2325/0214 . . . Tapered pores

WARNING

Group [B01D 2325/0214](#) is incomplete pending reclassification of documents from group [B01D 2325/021](#).

Groups [B01D 2325/021](#) and [B01D 2325/0214](#) should be considered in order to perform a complete search.

- 2325/022 . . Asymmetric membranes

WARNING

Group [B01D 2325/022](#) is impacted by reclassification into groups [B01D 2325/0231](#), [B01D 2325/0232](#) and [B01D 2325/0233](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2325/023 . . . Dense layer within the membrane

- 2325/0231 . . . Dense layers being placed on the outer side of the cross-section

WARNING

Group [B01D 2325/0231](#) is incomplete pending reclassification of documents from group [B01D 2325/022](#).

Groups [B01D 2325/022](#) and [B01D 2325/0231](#) should be considered in order to perform a complete search.

- 2325/0232 . . . Dense layer on both outer sides of the membrane

WARNING

Group [B01D 2325/0232](#) is incomplete pending reclassification of documents from group [B01D 2325/022](#).

Groups [B01D 2325/022](#) and [B01D 2325/0232](#) should be considered in order to perform a complete search.

- 2325/0233 . . . with clearly distinguishable layers

WARNING

Group [B01D 2325/0233](#) is incomplete pending reclassification of documents from group [B01D 2325/022](#).

Groups [B01D 2325/022](#) and [B01D 2325/0233](#) should be considered in order to perform a complete search.

- 2325/025 . . Finger pores

- 2325/026 . . Sponge structure

- 2325/027 . . Nonporous membranes

- 2325/028 . . Microfluidic pore structures

- 2325/0281 . . Fibril, or microfibril structures

WARNING

Group [B01D 2325/0281](#) is incomplete pending reclassification of documents from group [B01D 2325/02](#).

Groups [B01D 2325/02](#) and [B01D 2325/0281](#) should be considered in order to perform a complete search.

- 2325/0282 . . Dynamic pores-stimuli responsive membranes, e.g. thermoresponsive or pH-responsive

WARNING

Group [B01D 2325/0282](#) is incomplete pending reclassification of documents from group [B01D 2325/02](#).

Groups [B01D 2325/02](#) and [B01D 2325/0282](#) should be considered in order to perform a complete search.

- 2325/0283 . . Pore size

WARNING

Groups [B01D 2325/0283](#) - [B01D 2325/02834](#) are incomplete pending reclassification of documents from group [B01D 2325/02](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2325/02831 . . . less than 1 nm
 2325/02832 . . . 1-10 nm
 2325/02833 . . . more than 10 and up to 100 nm
 2325/02834 . . . more than 0.1 and up to 1 µm
 2325/04 . Characteristic thickness
 2325/06 . Surface irregularities
 2325/08 . Patterned membranes
 2325/10 . Catalysts being present on the surface of the membrane or in the pores
 2325/12 . Adsorbents being present on the surface of the membranes or in the pores
 2325/14 . Membrane materials having negatively charged functional groups
 2325/16 . Membrane materials having positively charged functional groups
 2325/18 . Membrane materials having mixed charged functional groups
 2325/20 . Specific permeability or cut-off range
 2325/22 . Thermal or heat-resistance properties
 2325/24 . Mechanical properties, e.g. strength
 2325/26 . Electrical properties
 2325/28 . Degradation or stability over time
 2325/30 . Chemical resistance
 2325/32 . Melting point or glass-transition temperatures
 2325/34 . Molecular weight or degree of polymerisation

WARNING

Group [B01D 2325/34](#) is impacted by reclassification into group [B01D 2325/341](#).

Groups [B01D 2325/34](#) and [B01D 2325/341](#) should be considered in order to perform a complete search.

- 2325/341 . . At least two polymers of same structure but different molecular weight

WARNING

Group [B01D 2325/341](#) is incomplete pending reclassification of documents from group [B01D 2325/34](#).

Groups [B01D 2325/34](#) and [B01D 2325/341](#) should be considered in order to perform a complete search.

- 2325/36 . Hydrophilic membranes
 2325/38 . Hydrophobic membranes
 2325/39 . Amphiphilic membranes

WARNING

Group [B01D 2325/39](#) is incomplete pending reclassification of documents from group [B01D 2325/00](#).

Groups [B01D 2325/00](#) and [B01D 2325/39](#) should be considered in order to perform a complete search.

- 2325/40 . Fibre reinforced membranes
 2325/42 . Ion-exchange membranes
 2325/43 . Specific optical properties

WARNING

Group [B01D 2325/43](#) is incomplete pending reclassification of documents from groups [B01D 2325/00](#) and [B01D 2325/44](#).

Groups [B01D 2325/00](#), [B01D 2325/44](#) and [B01D 2325/43](#) should be considered in order to perform a complete search.

- 2325/44 . . Specific light transmission

WARNING

Group [B01D 2325/44](#) is impacted by reclassification into group [B01D 2325/43](#).

Groups [B01D 2325/44](#) and [B01D 2325/43](#) should be considered in order to perform a complete search.

- 2325/46 . Magnetic properties
 2325/48 . Antimicrobial properties
 2325/50 . Membrane in gel form

WARNING

Group [B01D 2325/50](#) is incomplete pending reclassification of documents from group [B01D 2325/00](#).

Groups [B01D 2325/00](#) and [B01D 2325/50](#) should be considered in order to perform a complete search.

- 2325/52 . Crystallinity

WARNING

Group [B01D 2325/52](#) is incomplete pending reclassification of documents from group [B01D 2325/00](#).

Groups [B01D 2325/00](#) and [B01D 2325/52](#) should be considered in order to perform a complete search.

- 2325/54 . Interpenetration relationship between layers in supported or composite membranes

WARNING

Group [B01D 2325/54](#) is incomplete pending reclassification of documents from group [B01D 2325/00](#).

Groups [B01D 2325/00](#) and [B01D 2325/54](#) should be considered in order to perform a complete search.

B01D

- 2325/56 • Biodegradability of membrane

WARNING

Group [B01D 2325/56](#) is incomplete pending reclassification of documents from group [B01D 2325/00](#).

Groups [B01D 2325/00](#) and [B01D 2325/56](#) should be considered in order to perform a complete search.

- 2325/58 • Biocompatibility of membrane

WARNING

Group [B01D 2325/58](#) is incomplete pending reclassification of documents from group [B01D 2325/00](#).

Groups [B01D 2325/00](#) and [B01D 2325/58](#) should be considered in order to perform a complete search.