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
1. 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.
2. 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.
3. For apparatus used in drying or evaporation, class F26 takes precedence over this subclass.
4. Group B01D 59/00 takes precedence over the other groups of this subclass and over other subclasses in class B01.

WARNINGS
1. 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 29/075 covered by B01D 29/01, B01D 29/64
   - B01D 29/37 covered by B01D 29/336, B01D 29/356
   - B01D 33/052 covered by B01D 33/042, B01D 33/048
   - B01D 35/01 covered by B01D 36/001
   - B01D 61/26 covered by A61M 1/1656
   - B01D 61/34 covered by A61M 1/16
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 C00F 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 C00F 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 602)***
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

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 Azotropic distillation

3/38 Steam distillation

3/40 Extractive distillation

3/42 Regulation; Control

3/4205 (Reflux ratio control splitter)

5/00 Condensation of vapours; Recovering volatile solvents by condensation (B01D 8/00 takes precedence; condensers F28B)

5/003 (by using heat-exchange surfaces for indirect contact between gases or vapours and the cooling medium)

5/006 [Coils or serpentines]

5/009 [Horizontal tubes]

5/012 [Vertical tubes]

5/015 [Plates]

5/018 (Dome shaped (B01D 5/0066 takes precedence))

5/021 [Vortex]

5/024 (Rotating vessels or vessels containing movable parts)

5/027 (by direct contact between vapours or gases and the cooling medium)

5/03 (within column(s))

5/033 [Other features]

5/036 [Multiple-effect condensation; Fractional condensation]

5/039 [Recuperation of heat, e.g. use of heat pump(s), compression]

5/042 [Thermo-electric condensing; using Peltier-effect]

5/045 [Vacuum condensation]

5/048 [Barometric condensation]

5/051 [Regulation processes; Control systems, e.g. valves]

5/054 [General arrangements, e.g. flow sheets]

5/057 (in combination with other processes)

5/06 (with evaporation or distillation)

5/063 [Reflux condensation]

5/066 [Dome shaped condensation]

5/069 [with degasification or deaeration]

5/072 [with filtration]

5/075 [with heat exchanging (B01D 5/0039 takes precedence)]

5/078 [characterised by auxiliary systems or arrangements]

5/081 [Feeding the steam or the vapours]

5/084 [Feeding or collecting the cooling medium (B01D 5/0087 takes precedence)]

5/087 [Recirculating of the cooling medium]

5/09 [Collecting, removing and/or treatment of the condensate]
Solvent extraction

11/00

2011/002
- Counter-current extraction
2011/005
- Co-current extraction
2011/007
- Extraction using a solvent in the gas phase

NOTE

Combinations of characteristics of individual groups, e.g. B01D 11/0226 and B01D 11/028 are expressed as B01D 11/0226 + B01D 11/028

11/023
- of solids

11/026

9/009
- (Removing and treatment of non condensable gases)
9/006
- (Cleaning (cleaning in general B08B))

7/00
Sublimation (B01D 8/00 takes precedence; freeze-drying F26)

7/02
- Crystallisation directly from the vapour phase (into single crystals C30B 23/00)

8/00
Cold traps; Cold baffles (pumps for evacuating or condensing or freezing F04B 37/08)

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)

9/0004
- (cooling by heat exchange (by evaporation of components of the mixture to be separated B01D 9/0013; refrigeration machines F25B))

9/0009
- (by direct heat exchange with added cooling fluid)
9/0013
- (by indirect heat exchange)
9/0018
- (Evaporation of components of the mixture to be separated)
9/0022
- (by reducing pressure)
9/0027
- (by means of conveying fluid, e.g. spray-crystallisation (spray-drying F26B))
9/0031
- (by heating (B01D 9/0022, B01D 9/0027 take precedence))

9/0036
- Crystallisation on to a bed of product crystals; Seeding
9/004
- (Fractional crystallisation; Fractionating or rectifying columns)
9/0045
- (Washing of crystals, e.g. in wash columns)
9/005
- (Selection of auxiliary, e.g. for control of crystallisation nuclei, of crystal growth, of adherence to walls; Arrangements for introduction thereof)
9/0054
- (Use of anti-solvent)
9/0059
- (General arrangements of crystallisation plant, e.g. flow sheets)
9/0063
- (Control or regulation (control per se G05))
9/0068
- (Prevention of crystallisation)
9/0072
- (Crystallisation in microfluidic devices)
9/0077
- (Screening for crystallisation conditions or for crystal forms)
9/0081
- (Use of vibrations, e.g. ultrasound)

2009/0086
- (Processes or apparatus therefor)
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, thio ureum or metal salts)

2009/0095
- (with the aid of other complex forming substances than ureum, thio ureum or metal salts)

9/02
from solutions (not used)
9/04
concentrating solutions by removing frozen solvent therefrom

11/00
Solvent extraction

2011/002
- (Counter-current extraction)
2011/005
- (Co-current extraction)
2011/007
- (Extraction using a solvent in the gas phase)
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 20/28; 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 11/36, optically active organic compounds C07B 37/00 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 pl]
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 . . . [Packaging or coating]
15/22 . . . relating to the construction of the column
15/24 . . . relating to the treatment of the fractions to be distributed
15/242 . . . [Intermediate storage of effluents]
15/245 . . . [Adding materials to the effluents]
15/247 . . . [Fraction collectors]
15/26 . . . characterised by the separation mechanism
15/265 . . . [Adsorption chromatography]
15/30 . . . 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
15/345 . . . [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 . . . [Jon-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]
B01D

15/3823 . . . . . (of other types, e.g. avidin, streptavidin, biotin)
15/3828 . . . . . (Ligand exchange chromatography, e.g. complexion, chelation or metal interaction chromatography)
15/3833 . . . . . [Chiral chromatography]
2015/3838 . . . . . (Ligand exchange chromatography, e.g. complexion 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]
17/002 . . . Separation of non-miscible liquids
17/0020 . . . . . [by ab- or adsorption]
17/00205 . . . . . [by gas bubbles or moving solids]
17/00208 . . . . . [by sedimentation]
17/00211 . . . . . [with baffles]
17/00214 . . . . . [with removal of one of the phases]
17/00217 . . . . . [by centrifugal force]
17/004 . . . Breaking emulsions
17/0041 . . . . . [with moving devices]
17/0042 . . . . . [by changing the temperature]
17/0044 . . . . . [by changing the pressure]
17/0045 . . . . . [with coalescers]
17/0047 . . . . . [with separation aids]
17/0048 . . . . . [by changing the state of aggregation]

17/006 . . . Separation of liquids from each other by electricity
17/008 . . . [Thickening liquid suspensions by filtration]
17/0085 . . . . . (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 19/004 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 19/004 + the corresponding B01D 19/004 subgroup(s), (e.g. hydrocarbons containing silica are classified in B01D 19/004 + B01D 19/0049). If the main substance is a mixture containing more than one specific compound, then the attributed classification is a combination of the corresponding B01D 19/004 subgroup of the specific compounds, (e.g. benzene sulfonate...
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 strainners 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 (floation 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 21/2005 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 or sediment; Controlling the liquid level; {Control of process parameters}

Filtration: Filtering material, regeneration thereof
23/00. [Gravity filters (with moving filtering elements B01D 33/0035)]
23/005. . . [making filtering elements, not provided for elsewhere (see also B01D 25/001, B01D 27/005, B01D 29/0093)]
23/02. . . [with fixed filter bodies]
23/04. . . [with filter bags filtering from the inside]
23/06. . . [with rigid tubular bodies]
23/08. . . [with saucer-shaped filtering elements]
23/10. . . [with loose filter material]
23/12. . . [with filtering material supported on louvred sides]
23/14. . . [carbon filters]
23/16. . . [Sand or gravel filters (filterbed-basin filters, small bed filters, e.g. in closed housing B01D 23/10)]
23/18. . . [Bottoms of filter beds]
23/20. . . [Feed or discharge devices (nozzles B05B)]
23/205. . . [Special adaptation of spray heads thereof]
23/24. . . [Regeneration of the filter material in the filter]
23/26. . . [Integrally combined with devices for controlling the filtration (shutting-off elements, changing over from one element to another B01D 35/12, B01D 35/14; control of filtration processes B01D 37/04)]
23/28. . . [Filter funnels; Holders therefor (funnels in general B67C; funnels for laboratory use B01L; coffee or tea strainers or apparatus A47J 31/00 - A47J 31/06)]
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) see also B01D 25/001, B01D 27/005, B01D 29/012, B01D 29/111, B01D 33/0093)]
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]
Filtration; Filtering material, regeneration thereof

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]
Filtration; Filtering material, regeneration thereof

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); see also B01D 24/001, B01D 27/005, B01D 29/012, B01D 29/111, B01D 33/0093]

25/002 [Clamping devices (B01D 25/12 and subgroups take precedence)]

25/003 [integral] 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

25/04 [with screens or sheets, e.g. cloths, paper (B01D 25/12 takes precedence)]

25/056 [with loose, granular of fibrous filtering material]

25/068 [with rigid self-supporting filtering elements]

25/10 [in which the suspended particles form the filtering medium]

25/12 Filter presses, i.e. of the plate and frame type {filter presses in which the liquid is removed by pressing-out solid matter B30B]}

25/121 [with bandshaped filtering elements intermittently entrained between the press plates, the lateral sides of the elements being clamped between two successive plates or between a plate and a successive frame during the filtration period, e.g. zigzag endless filter belts]

25/122 [Construction of the plates]

25/124 [Pressing-out operation after filtration, e.g. of the cake (presses in general B30)]

25/125 [Opening and/or closing and/or pressure applying devices or means]

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 belts (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]

25/14 [Clamping means clamping of filter cloth or similar securing means]

25/16 [Edge filtering elements, i.e. using contiguous impervious surfaces]

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

25/18 [of flat, stacked bodies]

25/19 Clamping means for closing the filter press, e.g. hydraulic jacks

25/20 [of spirally or helically wound bodies]

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); see also B01D 24/001, B01D 25/001, B01D 29/012, B01D 29/111, B01D 33/0093]

27/002 with cartridges made from a mass of loose {granular or fibrous} material

27/004 with cartridges made of a piece of unitary material, e.g. filter paper

27/006 with corrugated, folded or wound material

27/007 having a coaxial stream through the filtering element

27/008 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]

27/108 having more than one filtering element

27/142 [connected in parallel]

27/144 [arranged concentrically or coaxially]

27/146 [connected in series]
Filtration; Filtering material, regeneration thereof

B01D

27/148 . . . [arranged concentrically or coaxially]

29/00 Other filters with filtering elements stationary during filtration, e.g. pressure or suction filters, or filtering elements therefor (B01D 24/00, B01D 25/00 and B01D 27/00 take precedence)

29/0002 . . . [Aspects of other filters with filtering elements stationary during filtration, or of filtering elements thereof]

29/0004 . . . [Filters with flat filtering elements]

29/0006 . . . [Making filtering elements]

29/0009 . . . [with curved filtering elements]

29/0011 . . . [ring shaped]

29/0013 . . . [Filters in which the filtering elements are moved between filtering operations; Means specially adapted for removing the filtering elements, or introducing new ones; Transport systems specially adapted for the filtering elements]

29/0015 . . . [Filtering bands]

29/0018 . . . [Filters with screens or sheets, e.g. cloth, paper]

29/002 . . . [with rigid, self-supporting filtering elements, e.g. of ceramic material]

29/0022 . . . [Filters with corrugated, folded, or wound sheets]

29/0025 . . . [allowing a coaxial stream through the filtering element (for cartridge filters B01D 27/07)]

29/0027 . . . [Filters with loose, granular, or fibrous filtering material]

29/0029 . . . [Bag, cage, hose, tube, sleeve, or like filters]

29/0031 . . . [Pressing-out operation after filtration, e.g. by means of membranes (filter presses per se B01D 25/12)]

29/0034 . . . [Filters having flexible filtering material]

29/0036 . . . [which is supported]

29/0038 . . . . . . [on solid frames with surface grooves and the like]

29/004 . . . . . . . [to take up a concertina shape during filtration]

29/0043 . . . . . . . [having rigid self-supporting filtering material (B01D 29/0068 takes precedence)]

29/0045 . . . . . . . [Edge filtering elements]

29/0047 . . . . . . . [with multiple filtering units]

29/005 . . . . . . . [connected in parallel (B01D 29/0056 takes precedence)]

29/0052 . . . . . . . [connected in series (B01D 29/0059 takes precedence)]

29/0054 . . . . . . . [arranged concentrically or coaxially]

29/0056 . . . . . . . [connected in parallel]

29/0059 . . . . . . . [connected in series]

29/0061 . . . . . . . [which are vibrated]

29/0063 . . . . . . . [which are open-ended]

29/0065 . . . . . . . [Filter candles]

29/0068 . . . . . . . [Filters with hollow discs side-by-side on or around one or more tubes (with elements moving during filtration B01D 33/0048, B01D 33/0051)]

29/007 . . . . . . . [having filtrate discharge tubes fixed non-perpendicularly to the filtering surfaces]

29/0072 . . . . . . . [Filters integrally combined with devices for controlling the filtration (for shutting-off elements or changing over from one element to another B01D 35/12, B01D 35/14; controlling filtration processes B01D 37/04)]

29/0075 . . . . . . . [Regeneration of the filtering material in the filter (for two separate filter elements placed in different units B01D 35/12)]

29/0077 . . . . . . . [by scrapers, brushes, nozzles or the like placed on the cake-side of the filters (B01D 29/0084 takes precedence)]

29/0079 . . . . . . . [Counter-current flushing, e.g. by air bumps]

29/0081 . . . . . . . [with backwash shoes; with nozzles]

29/0084 . . . . . . . [by moving the filter element (B01D 29/0088 takes precedence)]

29/0086 . . . . . . . [by vibration]

29/0088 . . . . . . . [by centrifugal force]

29/009 . . . . . . . [Filters having feed or discharge devices]

29/0093 . . . . . . . [Making filtering elements (not provided for elsewhere) (see also B01D 23/005, B01D 25/001, B01D 27/005)]

29/0095 . . . . . . . [Flat filtering elements (B01D 25/12, B01D 25/0068 B01D 29/0015, B01D 29/0068 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 29/11)]]

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]

2029/075 . . . . . . [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]

29/085 . . . . . . . Funnel filters; Holders therefor

29/09 . . . . . . . [with filtering bands, e.g. movable between filtering operations (B01D 25/121 takes precedence)]

29/093 . . . . . . . [combined with means to fasten the opposite edges of the filtering band together, e.g. Zipper]
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 element]

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 element]

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 element]

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
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 B01B 33/000

[33/003: [Aspects of filters with filtering elements which move during the filtering operation]

33/0006 . . [with rotating filtering surfaces (rotating brush filters B01D 35/10)]

33/0009 . . [with cylindrical filtering surfaces, e.g. hollow drums, rotating drum filters for paper making D21B]

33/0012 . . [Drums provided with cells each independently connected with pressure distributor]

33/0016 . . [Drums with a single compartment]

33/0019 . . [arranged for outward flow filtration]

33/0022 . . [combined with filtering bands or the like]

33/0025 . . [with endless filtering bands]

33/0029 . . [with multiple filtering bands with or without one or more non filtering bands]

33/0032 . . [with loose, granular, or fibrous filtering material]

33/0035 . . [Gravity filters]

33/0038 . . [with external feed]

33/0041 . . [with plane surfaces]

33/0045 . . [with rotary tables]

33/0048 . . [with hollow discs transversely mounted on a hollow shaft]

33/0051 . . [with hollow frames axially mounted on a hollow shaft]

33/0054 . . [with loose, granular, or fibrous filtering material]

33/0058 . . [with filtering surfaces travelling along conveyors (tipping bucket type B01D 35/08; brush filters B01D 35/10)]

33/0061 . . [Accessories and components]

33/0064 . . [Devices for handling the filter cake, e.g. washing, discharging]

33/0067 . . [with scrapers, brushes, nozzles or the like placed on the cake-side of the filter (B01D 33/0074 takes precedence)]

33/007 . . [counter-current flushing]

33/0074 . . [with backwash shoes, with nozzles]

33/0077 . . [by moving the filter element]

33/008 . . [by vibration]

33/0083 . . [by centrifugal force]

33/0087 . . [Feed or discharge devices for liquids]

33/009 . . [Pressure distribution systems (pressure distribution systems for filters with tipping buckets or trays B01D 35/08)]

33/0093 . . [Making filter elements (not provided for elsewhere); see also B01D 24/001, B01D 25/001, B01D 27/005, B01D 29/012, B01D 29/111]

33/0096 . . [moving rectilinearly (filters B01D 35/10)]

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]
Filtration; Filtering material, regeneration thereof

33/0141 . . . . [open ended]
33/0145 . . . [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 . . . [opened]
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

2033/052 . . . . [combined with a compression device]
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 D21[B])
33/067 . Construction of the filtering drums, e.g. mounting or sealing arrangements

2033/07 . . . [arranged for inward flow filtration]
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 33/322)
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]

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Filtration; Filtering material, regeneration thereof

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 takes 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 . . . . [integratedly 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 Other filtering devices; Auxiliary devices for filtration; Filter housing constructions
35/005 . . . . . [Filters specially adapted for use in internal-combustion engine lubrication or fuel systems, not of special interest for B01D 23/00 - B01D 33/00 (internal-combustion engine lubricating systems F02M; lubrication in general F16N)]
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 53/00, F04D 29/70])
35/023 . . . . . [Filter 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; electrodialysis, electro-osmosis B01D 61/42; devices comprising filters and magnetic separators B03C 1/30)
35/08 . . . [Filters with tipping buckets or trays]
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 33/12 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
Filtration; Filtering material, regeneration thereof

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
39/08 . . . Filter cloth, i.e. woven, knitted or interlaced material (metallic B01D 39/10)
39/083 . . . [of organic material]
39/086 . . . [of inorganic material]
39/10 . . . Filter screens essentially made of metal
39/12 . . . of wire gauze; of knitted wire; of expanded metal
39/14 . . . Other self-supporting filtering material (; Other filtering material (non-woven fabrics in general D04H 3/00))
39/16 . . . of organic material, e.g. synthetic fibres
39/1607 . . . [the material being fibrous (B01D 39/18 takes precedence)]
39/1615 . . . [of natural origin]
39/1623 . . . [of synthetic origin]
39/163 . . . [sintered or bonded]
39/1638 . . . [the material being particulate]
39/1646 . . . [of natural origin, e.g. cork or peat]
39/1653 . . . [of synthetic origin]
39/1661 . . . [sintered or bonded]
39/1669 . . . [Cellular material]
39/1676 . . . [of synthetic origin]

39/1684 . . . [Wound filtering material]
39/1692 . . . [Other shaped material, e.g. perforated or porous sheets]
39/18 . . . the material being cellulose or derivatives thereof ((cork or peat B01D 39/1646) ; making filter paper D21F 11/14)
39/20 . . . of inorganic material, e.g. asbestos paper, metallic filtering material of non-woven wires (porous ceramic material C04B 38/00) ; sintering metals C22C 1/04; [making porous sintered metal bodies B22F 3/10, honeycomb filters B01D 46/2418, materials used for filtering exhaust gases of an internal combustion engine F01N 3/022, ceramic honeycomb structures C04B 38/0006)]
39/2003 . . . [Glass or glassy material]
39/2006 . . . [the material being particulate ]
39/201 . . . [sintered or bonded by inorganic agents]
39/2013 . . . [otherwise bonded, e.g. by resins]
39/2017 . . . [the material being filamentary or fibrous]
39/202 . . . [sintered or bonded by inorganic agents]
39/2024 . . . [otherwise bonded, e.g. by resins]
39/2027 . . . [Metallic material]
39/2031 . . . [the material being particulate ]
39/2034 . . . [sintered or bonded by inorganic agents]
39/2037 . . . [otherwise bonded]
39/2041 . . . [the material being filamentary or fibrous]
39/2044 . . . [sintered or bonded by inorganic agents]
39/2048 . . . [otherwise bonded]
39/2051 . . . [Metallic foam]
39/2055 . . . [Carbonaceous material (solid sorbent compositions comprising free carbon B01J 20/20)]
39/2058 . . . [the material being particulate ]
39/2062 . . . [Bonded, e.g. activated carbon blocks]
39/2065 . . . [the material being fibrous]
39/2068 . . . [Other inorganic materials, e.g. ceramics]
39/2072 . . . [the material being particulate or granular]
39/2075 . . . [sintered or bonded by inorganic agents]
39/2079 . . . [otherwise bonded, e.g. by resins]
39/2082 . . . [the material being filamentary or fibrous]
39/2086 . . . [sintered or bonded by inorganic agents]
39/2089 . . . [otherwise bonded, e.g. by resins]
39/2093 . . . [Ceramic foam]
39/2096 . . . [Wound materials]

41/00 Regeneration of the filtering material or filter elements outside the filter for liquid or gaseous fluids
41/02 . . . of loose filtering material
41/04 . . . of rigid self-supporting filtering material

43/00 Separating particles from liquids, or liquids from solids, otherwise than by sedimentation or filtration (flotation processes B03D 1A00; drying solid materials or objects F26B)
Separating dispersed particles from gases or vapours

45/00   Separating dispersed particles from gases or vapours by gravity, inertia, or centrifugal forces

45/02   .   by utilising gravity
45/04   .   by utilising inertia (B01D 45/12 takes precedence)
45/06   .   by reversal of direction of flow
45/08   .   by impingement against baffle separators
45/10   .   which are wetted
45/12   .   by centrifugal forces (centrifuges B04B; cyclones B04C)
45/14   .   generated by rotating vanes, discs, drums or brushes
45/16   .   generated by the winding course of the gas stream (the centrifugal forces being generated solely or partly by mechanical means, e.g. fixed swirl vanes)
45/18   .   Cleaning-out devices

46/00   Filters [i.e. particle separators] or filtering processes specially modified for separating dispersed particles from gases or vapours (filtering elements B01D 23/00; B01D 35/00; filtering material B01D 39/00; their regenerations outside the filters B01D 41/00)

46/0001   .   [Making filtering elements]
46/0002   .   [Casing; Housing; Frame constructions]
46/0004   .   [Details of removable closures, lids, caps or filter heads]
46/0005   .   [Mounting of filtering elements within casings, housings or frames (B01D 46/2422 takes precedence)]
46/0006   .   [Filter elements or cartridges installed in a drawer-like manner]
46/0008   .   [Two or more filter elements not fluidly connected positioned in the same housing]
46/0009   .   [Tray-like arrangements of filters in a vessel]
46/001   .   [Means for connecting filter housings to supports]
46/0012   .   [In-line filters]
46/0013   .   [Modules]
46/0015   .   [Throw-away type filters]
46/0016   .   [Folded frame or housing constructions]
46/0017   .   [Filter elements installed in a branch of a pipe, e.g. with an y-shaped tubular housing]
46/0019   .   [with multiple filtering elements, characterised by their mutual disposition]
46/002   .   [connected in parallel]
46/0021   .   [arranged concentrically or coaxially]
46/0023   .   [connected in series]
46/0024   .   [arranged concentrically or coaxially]
46/0026   .   [Protecting screens at filter inlet or outlet]
46/0027   .   [with additional separating or treating functions]
46/0028   .   [provided with antibacterial or antifungal means]
46/003   .   [including coalescing means for the separation of liquid]

46/0031   .   [with collecting, draining means]
46/0032   .   [using electrostatic forces to remove particles, e.g. electret filters]
46/0034   .   [using magnetic forces to remove particles]
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]
46/0057   .   [Regenerating the filter material in the filter (B01D 46/04, B01D 46/48 take precedence)]
46/0058   .   [Devices for taking out of action one or more units of multi-unit filters]
46/006   .   [Chemical processes for the removal of the retained particles, e.g. by burning of processes]
46/0061   .   [making use of catalysts]
46/0063   .   [by heating only]
46/0064   .   [by means of acting on the cake side and moving with respect to the filtering elements]
46/0065   .   [by scrapers, brushes, nozzles or the like]
46/0067   .   [by acting counter-currently on the filtering surface (e.g. flushing)]
46/0068   .   [with pressurised gas, e.g. pulsed air]
46/0069   .   [Using pressurized gas at supersonic velocities]
46/0071   .   [with backwash arms, shoes or nozzles]
46/0072   .   [by forces created by movement of the filter element]
46/0073   .   [involving centrifugal forces]
46/0075   .   [involving vibrations or shaking]
46/0076   .   [involving sonic or ultrasonic waves]
46/0078   .   [by electrical means, e.g. for the generation of electrostatic forces in order to reject particles]
46/0079   .   [by other means not moving with respect to the filtering elements, e.g. fixed nozzles on the cake side]
46/008   .   [Replacing filter elements]
46/0082   .   [Washing the filter inside the filter housing]
46/0083   .   [Cleaning the filter surface by interrupting suction so that the filter cake falls by gravity]
46/0084   .   [provided with safety means]
46/0086   .   [Filter condition indicators]
46/0087   .   [Bypass or safety valves]
46/0089   .   [Anti-return means]
Separating dispersed particles from gases or vapours

- Particle separators, e.g. dust precipitators, having hollow filters made of flexible material
- Particle separators, e.g. dust precipitators, using filtering belts
- Particle separators, e.g. dust precipitators, using filter plates, sheets, or pads having plane surfaces
- Particle separators, e.g. dust precipitators, using rigid hollow filter bodies
- Particle separators, e.g. dust precipitators, using filter cartridges
- Particle separators, e.g. dust precipitators, using end caps including additional functions or special forms
- Honeycomb filters (used for filtering exhaust gases of an internal combustion engine)
- Mounting of the body within a housing
- Characterized by parameters related to the physical properties of the honeycomb structure material, e.g. modulus of rupture, porosity
- (of the honeycomb walls or cells)
- (characterized by the geometrical structure, shape, pattern or configuration or parameters related to the geometry of the structure, e.g. thickness, cell density)
- (of the whole honeycomb or segments, e.g. elliptic body, octagonal segment, centre of gravity)
- (of the plugs, e.g. projections, gaps, length)
- (of the peripheral sealing, e.g. undulations, thickness)
- (of the adhesive layers, i.e. joints between segments, e.g. undulations, thickness)
- (of the cells, e.g. diamonds, hexagonal configuration, cell density)
- (of the walls along the length of the honeycomb, e.g. inclination from inlet to outlet, length, thickness)
- (Triangular shapes or configurations)
- (Quadrangular shapes or configurations, e.g. square, diamond)
- (Octagonal shapes or configurations)
- (Circular shapes or configurations)
- (Other shapes or configurations not covered by groups)
- (The honeycomb filter being defined by mathematical equations)
- Rotatable
- Particle separators, e.g. dust precipitators, using filter brushes
- Particle separators, e.g. dust precipitators, using loose filtering material
- the material moving during filtering
- not horizontally, e.g. using shoots
- as a substantially horizontal layer, e.g. on rotary tables, drums, conveyor belts
- as fluidised bed
- Particle separators, e.g. dust precipitators, using edge filters, i.e. using contiguous impervious surfaces
- (of helically or spirally wound bodies)
- (of stacked bodies)
- Auxiliary equipment or operation thereof
- (Prevention of static charge, e.g. by grounding)
- (Influencing the heat transfer which act passively, e.g. isolations, heat sinks, cooling ribs)
- (Manipulating filters or filter elements, e.g. handles or extracting tools)
- (Reducing noise or vibration emissions)
- (Means for power supply or devices using electrical power in filters or filter elements)
- (Allowing or improving visual supervision, e.g. lamps, transparent parts, windows)
- (Means for active heating or cooling)
- Special valve constructions adapted to filters or filter elements
- (Venturi's or systems showing a venturi effect)
- (Means for wireless communication)
- (Controlling filtration)
- (by measuring the concentration of particles)
- (by flow measuring)
- (by pressure measuring)
Separating dispersed particles from gases or vapours

50/00 Combinations of devices for separating particles from gases or vapours
50/002 • [Combinations of devices relating to groups B01D 45/00 and B01D 46/00]
50/004 • [Combinations of devices relating to groups B01D 45/00 and B01D 47/00]
50/006 • [Combinations of devices relating to groups B01D 46/00 and B01D 47/00]
50/008 • [Combinations of devices relating to groups B01D 45/00 and 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 E25K; 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]
53/009 • 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 15/00)]
53/027 • with stationary adsorbents ([B01D 53/025 takes precedence)
53/047 • [Constructional details of adsorbing systems]
53/0415 • [Beds in cartridges]
53/0423 • [Beds in columns]
Separating dispersed particles from gases or vapours

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 2259/40001 relating to controlling and processing aspects of pressure or temperature swing adsorption.

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.

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

NOTE
Liquid distributors (B01J 19/30).

NOTE
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).

NOTES
with hollow tubes.

NOTES
by centrifugal force (centrifuges B04B: cyclones B04C).

NOTES
Drying gases or vapours.

NOTES
by adsorption.

NOTES
by absorption.

NOTES
by refrigeration (condensation).

NOTES
by filtration.

NOTES
by diffusion.

NOTES
Selection of materials for use as drying agents.

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

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

NOTE
by electrostatic effects or by high-voltage electric fields.

NOTE
in electrochemical cells.

NOTE
Chemical or biological purification of waste gases.

NOTE
Heat recovery.

NOTE
Controlling the process.

NOTE
Removing components of undefined structure.

NOTE
Acidic components (B01D 53/44 takes precedence).

NOTE
Basic components (B01D 53/44 takes precedence).

NOTE
Organic components.

NOTE
Removing components of defined structure.

NOTE
Sulfur compounds.

NOTE
Sulfur compounds containing only one sulfur compound other than sulfur oxides or hydrogen sulfide.

NOTE
Sulfur oxides (B01D 53/60 takes precedence).

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

NOTE
characterised by a specific solution or suspension.

NOTE
characterised by a specific device.

NOTE
in a spray drying process.

NOTE
by treating the gases with other liquids.

NOTE
by treating the gases with solids.

NOTE
Hydrogen sulfide.

NOTE
Mixtures of hydrogen sulfide and sulfur oxides.

NOTE
Mixtures of hydrogen sulfide and carbon dioxide.

NOTE
Nitrogen compounds.

NOTE
Nitrogen oxides (B01D 53/60 takes precedence).

NOTE
by treating the gases with solids.

NOTE
Ammonia.

NOTE
Simultaneously removing sulfur oxides and nitrogen oxides.

NOTE
Carbon oxides.

NOTE
Heavy metals or compounds thereof, e.g. mercury.

NOTE
Ozone.
Separating dispersed particles from gases or vapours

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 . . . [Aft-er-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 NOx 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]
Separating dispersed particles from gases or vapours

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)
57/04 . by distillation
57/06 . by fractional melting; by zone melting
57/08 . by fractional crystallisation, by precipitation, by zone freezing
57/10 . Separation by diffusion
57/12 . by diffusion through barriers
57/14 . Construction of the barrier
57/16 . by thermal diffusion
57/18 . by separation jets
57/20 . Separation by centrifuging
57/22 . Separation by extracting
57/24 . by solvent extraction
57/26 . by sorption, i.e. adsorption, adsorption, persorption
57/28 . Separation by chemical exchange
57/30 . by ion exchange
57/32 . by exchange between fluids
57/33 . involving dual temperature exchange
57/34 . Separation by photochemical methods
57/36 . Separation by biological methods
57/38 . Separation by electrochemical methods (in general B01J)
57/40 . by electrolysis
57/42 . by electromigration; by electrophoresis
57/44 . Separation by mass spectrography (particle spectrometers or separator tubes H01J 49/00)
57/46 . using only electrostatic fields
57/48 . using electrostatic and magnetic fields
57/50 . 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 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 {(with respect to B01D 71/00, see also Note (1) following that group)}.

61/00 Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis, ultrafiltration; Apparatus, accessories or auxiliary operations specially adapted therefor

NOTE
In groups B01D 61/00 - B01D 61/58 it is desirable to add the indexing codes relating to process operations and control chosen from groups B01D 2311/00 - B01D 2311/2696.

details relating to membrane modules and apparatus indexing codes chosen from B01D 2313/00 - B01D 2313/90,

to details relating to the module arrangement within a plant or an apparatus indexing codes chosen from B01D 2315/00 - B01D 2315/16,

to details relating to the membrane operation indexing codes chosen from B01D 2317/00 - B01D 2317/08 and to details relating to the membrane assembly within one housing indexing codes chosen from B01D 2319/00 - B01D 2319/06

61/02 . [Forward osmosis, direct osmosis (actuators for pressure retarded osmosis F03G 7/005)]
61/05 . [Osmotic agents, draw solutions]
61/07 . [Separation by stereostructure, steric separation]
61/02 . Reverse osmosis; Hyperfiltration [: Nanofiltration]
61/022 . (comprising multiple reverse osmosis, hyperfiltration or nanofiltration steps)
61/025 . (Reverse osmosis; Hyperfiltration (B01D 61/022 takes precedence))
61/027 . (Nanofiltration (B01D 61/022 takes precedence))
61/04 . Feed pretreatment
61/06 . Energy recovery
61/08 . Apparatus therefor
61/10 . Accessories; Auxiliary operations
61/12 . Controlling or regulating
61/14 . Ultrafiltration; Microfiltration
61/142 . (comprising multiple ultrafiltration or microfiltration steps)
61/145 . (Ultrafiltration (B01D 61/142 takes precedence))
61/147 . (Microfiltration (B01D 61/142 takes precedence))
61/16 . Feed pretreatment
61/18 . Apparatus therefor
61/20 . Accessories; Auxiliary operations
61/22 . Controlling or regulating
61/24 . Dialysis ([: Membrane extraction (dialysate solution flow A61M 1/1656)]
61/243 . [Dialysis]
61/246 . [Membrane extraction]
61/28 . Apparatus therefor
Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis, or ultrafiltration; B01D

Apparatus...

63/00 Apparatus in general for separation processes using semi-permeable membranes

NOTE

In groups B01D 63/00 - B01D 63/16 it is desirable to add the indexing codes relating to membrane modules and apparatus chosen from groups B01D 2313/00 - B01D 2313/90, to details relating to the membrane module operation indexing codes chosen from B01D 2315/00 - B01D 2315/16, to details relating to the module arrangement within a plant or an apparatus indexing codes chosen from B01D 2317/00 - B01D 2317/08 and to details relating to the membrane assembly within one housing indexing codes are chosen from B01D 2319/00 - B01D 2319/06.

63/005 . . [Microfluidic devices comprising semi-permeable hollow fibre membranes]
63/026 . . [Wafer type modules or flat-surface type modules]
63/027 . . [Twinned or braided type modules]
63/028 . . [Microfluidic devices comprising semi-permeable hollow fibre membranes]
63/029 . . [Microfluidic devices comprising semi-permeable hollow fibre membranes]
63/030 . . [Comprising multiple hollow fibre assemblies]
63/031 . . [with separate tube sheets]
63/032 . . [in separate housings]
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]
63/064 . . [on the outer surface thereof]
63/065 . . [with a porous block having membrane coated passages]
63/066 . . [with pleated membranes]
63/067 . . [with flexible membrane tubes]
63/08 . . Flat membrane modules
63/081 . . [Manufacturing thereof]
63/082 . . [comprising a stack of flat membranes, e.g. plate-and-frame devices]
63/083 . . [at least one flow duct intersecting the membranes]
63/084 . . [specially adapted for two fluids in mass exchange flow]
63/085 . . [Single membrane modules]
63/086 . . [Microfluidic devices comprising semi-permeable flat membranes]
63/10 . . Spiral-wound membrane modules
63/100 . . [Details relating to membrane envelopes]
63/102 . . [Anti-Telescopic-Devices [ATD]]
63/12 . . [comprising multiple spiral-wound assemblies]
63/14 . . Pleat-type membrane modules
63/16 . . Rotary, reciprocated or vibrated modules
63/006 . . [Membrane storage]
63/008 . . [Membrane cleaning or sterilisation; Membrane regeneration]

NOTE

In group B01D 65/02 it is desirable to add the indexing codes relating to membrane cleaning, regeneration, sterilization and prevention of membrane fouling chosen from groups B01D 2321/00 - B01D 2321/24.

65/00 Accessories or auxiliary operations, in general, for separation processes or apparatus using semi-permeable membranes

65/003 . . [Membrane bonding or sealing]
65/005 . . [Membrane cleaning or sterilisation; Membrane regeneration]
Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis, or ultrafiltration;

65/04 . . . with movable bodies, e.g. foam balls

**WARNING**

Group **B01D 65/04** is no longer used for classification of new documents as from November 1st, 2007. Documents presently classified in this group are in the process of reclassification

65/06 . . . with special washing compositions

**WARNING**

Group **B01D 65/06** is no longer used for classification of new document as from November 1st, 2007. Documents presently classified in this group are in the process of reclassification

65/08 . . . Prevention of membrane fouling or of concentration polarisation

**NOTE**

In group **B01D 65/08** it is desirable to add the indexing codes relating to membrane cleaning, regeneration, sterilization and prevention of membrane fouling chosen from groups **B01D 2321/00 - B01D 2321/28**

65/10 . . . Testing of membranes or membrane apparatus; Detecting or repairing leaks

**NOTE**

The documents classified in the groups **B01D 67/00 - B01D 71/00** are also searchable in a keyword-based electronic off-line database called "MEMBRANE"

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]

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

**NOTE**

In group **B01D 67/00** it is desirable to add the indexing codes relating to membrane preparation chosen from groups **B01D 2323/00 - B01D 2323/42**

67/0002 . . . [Organic membrane formation]
67/0004 . . . [by agglomeration of particles, e.g. sintering]
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]
67/0011 . . . [Casting solutions therefor]
67/0013 . . . [Casting processes (hollow fibre membrane manufacturing methods **B01D 69/08**)]
67/0016 . . . [Coagulation]
67/0018 . . . [Thermally induced processes]
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]
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 masking and etching steps, e.g. CVD, PVD]
67/0039 . . . [Inorganic membrane formation]
67/0041 . . . [by agglomeration of particles in the dry state, e.g. sintering]
67/0044 . . . [by chemical reaction]
67/0046 . . . [by slurry techniques, e.g. die or slip-casting]
67/0048 . . . [by sol-gel transition]
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 . . . [Formation of membranes comprising organic and inorganic components]
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 (involving chemical reactions **B01D 67/0093**)]
67/009 . . . [with wave-energy, particle-radiation or plasma]
67/0093 . . . [Chemical modification]
67/0095 . . . [Drying]
67/0097 . . . [Storing or preservation]
Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis, or ultrafiltration; Apparatus...

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

NOTES
1. In this group, the following term is used with the meaning indicated:
   • "properties" covers those of a mechanical, physical or chemical nature
2. Manufacturing processes, if considered of interest, are also classified in group B01D 67/00

69/02 . characterised by their properties

NOTE
In group B01D 69/02 it is desirable to add the indexing codes relating to properties of membranes chosen from groups B01D 2325/00 - B01D 2325/38

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
69/08 . Hollow fibre membranes (manufacture of hollow fibres B01D 5/24 B01F 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)
69/088 . (Co-extrusion; Co-spinning)
69/10 . Supported membranes; Membrane supports
69/105 . (Support pretreatment)
69/12 . Composite membranes; Ultra-thin membranes
69/122 . (Separate manufacturing of ultra-thin membranes)
69/125 . (In-situ manufacturing by polymerisation, polycondensation, cross-linking, and/or reaction)
69/127 . (using electrical discharge or plasma-polymerisation)
69/14 . Dynamic membranes
69/141 . (Heterogeneous membranes, e.g. containing dispersed material; Mixed matrix membranes)
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 highest proportion. This constituent is classified according to the last place rule, see Note before group B01D 61/00. 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
71/021 . . (Carbon)
71/022 . . . (Metals)
71/024 . . . . (Oxides)
71/025 . . . . . (Aluminium oxide)
71/027 . . . . . . (Silicium oxide)
71/028 . . . . . . . (Molecular sieves, e.g. zeolites, silicalite (B01D 71/021 takes precedence))
71/04 . . Glass
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-butyrate
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
71/28 . . Polymers of vinyl aromatic compounds
71/30 . . Polymethyleny halides
71/32 . . . containing fluorine atoms
71/34 . . . . Polyvinylidene fluoride
71/36 . . . . Polytetrafluoroethylene
71/38 . . . Polyalkenylalcohols; Polyalkenylenesters; Polyalkenylenaldehydes; Polyalkenyketones; Polyalkenylacetals; Polyalkenyketalts
71/40 . . . Polymers of unsaturated acids or derivatives thereof, e.g. salts, amides, imides, nitriles, anhydrides, esters
71/42 . . . Polymers of nitriles, e.g. polycrylonitride
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
71/46 . . . Epoxy resins
71/48 . . . Polyessters
71/50 . . . Polycarbonates
71/52 . . . Polyethers
71/54 . . . Polyureas; Polyurethanes
71/56 . . . Polyamides, e.g. polyester-amides
71/58 . . . Other polymers having nitrogen in the main chain, with or without oxygen or carbon only
71/60 . . . Polyamides
Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis, or ultrafiltration;  

Apparatus...

71/62 . . . Polycondensates having nitrogen-containing heterocyclic rings in the main chain  
71/64 . . . . Polyimides; Polyamide-imides; Polyester-imides; Polyamide acids or similar polyimide precursors  
71/66 . . . Polymers having sulfur in the main chain, with or without nitrogen, oxygen or carbon only  
71/68 . . . Polysulfones; Polyethersulfones  
71/70 . . . Polymers having silicon in the main chain, with or without sulfur, nitrogen, oxygen or carbon only  
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  
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  

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  
2201/0433 . . . 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  
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
B01D

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 (for removable closures, lids, caps or filter heads B01D 2201/304)
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 . . . Treated 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 (floating filters B01D 35/05)
2202/00 Details concerning evaporation, distillation or condensation
2202/10 . . . Use of a microdevice for separation (microreactors B01F 19/00)
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 (separation of well effluents E21B 43/34, flotation in general B03D 1/00)
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 (apparatus for dental treatment A61C 17/065)
2221/12 . . . Separation devices for treating rain or storm water (storm water treatment E03F)
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 (apparatus incorporating such gas filtering material see B01D 46/346)
2239/0258 . . . comprising nanoparticles
2239/0266 . . . comprising biodegradable or bio-soluble polymers
B01D

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 (apparatus incorporating gas filtering material B01D 46/0036)
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 (apparatus incorporating such gas filtering material B01D 46/0032)
2239/0442 . . Antimicrobial, antibacterial, antifungal additives (apparatus incorporating such gas filtering material B01D 46/0028)
2239/045 . . Deodorising additives
2239/0457 . . Specific fire retardant or heat resistant properties (apparatus incorporating such gas filtering material B01D 46/0093)
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-spin
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 (apparatus incorporating such gas filtering material B01D 2275/10)
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 (apparatus incorporating such gas filtering material B01D 2275/105)
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
2239/1283 . . Stability index
2239/1291 . . Other parameters
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 (recovering paint spray booth B05B 14/462)
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 (separating dispersed particles from gases by gravity, inertia or centrifugal forces B01D 45/00)
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 . . by gas flow reversal
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 (hydrogen halides B01D 2251/50)
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

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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
2252/608 . . . Antifoaming agents
2252/61 . . . Antifouling agents

2253/00 Adsorbents used in separation treatment of gases and vapours
2253/10 . . . Inorganic absorbents
2253/102 . . . Carbon
2253/104 . . . Alumina
2253/106 . . . Silica or silicates
2253/108 . . . Zeolites
2253/1085 . . . characterized by a silicon-aluminium ratio
2253/11 . . . Clays
2253/112 . . . Metals or metal compounds not provided for in B01D 2253/104 or B01D 2253/106
2253/1122 . . . Metals
2253/1124 . . . Metal oxides
2253/1126 . . . Metal hydrides
2253/1128 . . . Metal sulfides
2253/116 . . . Molecular sieves other than zeolites
2253/20 . . . Organic absorbents
2253/202 . . . Polymeric absorbents
2253/204 . . . Metal organic frameworks (MOF’s)
2253/206 . . . Ion exchange resins
2253/25 . . . Coated, impregnated or composite absorbents
2253/30 . . . Physical properties of absorbents
2253/302 . . . Dimensions
2253/304 . . . Linear dimensions, e.g. particle shape, diameter
2253/306 . . . Surface area, e.g. BET-specific surface
2253/308 . . . Pore size
2253/31 . . . Pore size distribution
2253/311 . . . Porosity, e.g. pore volume
2253/34 . . . Specific shapes
2253/342 . . . Monoliths
2253/3425 . . . Honeycomb shape

2255/00 Catalysts
2255/10 . . . Noble metals or compounds thereof
2255/102 . . . Platinum group metals
2255/1021 . . . Platinum
2255/1023 . . . Palladium
2255/1025 . . . Rhodium
2255/1026 . . . Ruthenium
2255/1028 . . . Iridium
2255/104 . . . Silver
2255/106 . . . Gold
2255/20 . . . Metals or compounds thereof (noble metals B01D 2255/10)
<table>
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<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
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<td>Catalysts not containing noble metals</td>
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<td>Non-metallic catalysts, additives or dopants</td>
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<td>Carbon</td>
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<td>Ligands for metal-organic catalysts</td>
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<td>Physical characteristics of catalysts</td>
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<td>Multilayered catalyst</td>
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<td>More than three zones</td>
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<td>Multiple catalysts</td>
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<td>2255/905</td>
<td>Catalysts having a gradually changing coating</td>
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<tr>
<td>2255/906</td>
<td>Catalyst dispersed in the gas</td>
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<tr>
<td>2255/908</td>
<td>O2-storage component incorporated in the catalyst</td>
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<tr>
<td>2255/909</td>
<td>H2-storage component incorporated in the catalyst</td>
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<tr>
<td>2255/91</td>
<td>NOx-storage component incorporated in the catalyst</td>
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<td>2255/911</td>
<td>NH3-storage component incorporated in the catalyst</td>
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<td>2255/912</td>
<td>HC-storage component incorporated in the catalyst</td>
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<td>Catalyst supported on particulate filters</td>
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<td>Wall flow filters</td>
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<td>Dimensions</td>
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**226/00** Main component in the product gas stream after treatment

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<th>Description</th>
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<td>226/26</td>
<td>Halogens or halogen compounds</td>
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**227/00** Components to be removed

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<tr>
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<th>Description</th>
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<tr>
<td>227/10</td>
<td>Single element gases other than halogens</td>
</tr>
<tr>
<td>227/102</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>227/104</td>
<td>Oxygen</td>
</tr>
<tr>
<td>227/106</td>
<td>Ozone</td>
</tr>
<tr>
<td>227/108</td>
<td>Hydrogen</td>
</tr>
<tr>
<td>227/11</td>
<td>Noble gases</td>
</tr>
<tr>
<td>227/20</td>
<td>Halogens or halogen compounds</td>
</tr>
<tr>
<td>227/202</td>
<td>Single element halogens</td>
</tr>
<tr>
<td>227/204</td>
<td>Bromine</td>
</tr>
<tr>
<td>227/205</td>
<td>Chlorine</td>
</tr>
<tr>
<td>227/207</td>
<td>Fluorine</td>
</tr>
<tr>
<td>227/204</td>
<td>Inorganic halogen compounds</td>
</tr>
<tr>
<td>227/2042</td>
<td>Hydrobromic acid</td>
</tr>
<tr>
<td>227/2045</td>
<td>Hydrochloric acid</td>
</tr>
<tr>
<td>227/2047</td>
<td>Hydrofluoric acid</td>
</tr>
<tr>
<td>227/206</td>
<td>Organic halogen compounds</td>
</tr>
<tr>
<td>227/2062</td>
<td>Bromine compounds</td>
</tr>
<tr>
<td>227/2064</td>
<td>Chlorine</td>
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<tr>
<td>227/2066</td>
<td>Fluorine</td>
</tr>
<tr>
<td>227/2068</td>
<td>Iodine</td>
</tr>
<tr>
<td>227/30</td>
<td>Sulfur compounds</td>
</tr>
<tr>
<td>227/302</td>
<td>Sulfur oxides</td>
</tr>
<tr>
<td>227/304</td>
<td>Hydrogen sulfide</td>
</tr>
<tr>
<td>227/306</td>
<td>Organic sulfur compounds, e.g. mercaptans</td>
</tr>
<tr>
<td>227/308</td>
<td>Carbonoxysulfide COS</td>
</tr>
<tr>
<td>227/40</td>
<td>Nitrogen compounds</td>
</tr>
<tr>
<td>227/402</td>
<td>Dinitrogen oxide</td>
</tr>
<tr>
<td>227/404</td>
<td>Nitrogen oxides other than dinitrogen oxide</td>
</tr>
<tr>
<td>227/406</td>
<td>Ammonia</td>
</tr>
<tr>
<td>227/408</td>
<td>Cyanides, e.g. hydrogen cyanide (HCH)</td>
</tr>
<tr>
<td>227/50</td>
<td>Carbon oxides</td>
</tr>
</tbody>
</table>
B01D

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 2257/00 - 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 (for catalytic processes B01D 53/90)
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
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
... 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
2259/45 . . . 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 (portable devices B01D 2259/4541)
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 . . . Sealing of 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
B01D

2279/00 Filters specially adapted for separating dispersed particles from gases or vapours characterised by the position of the filter in relation to the gas stream
2279/10 Parallel
2279/20 Inclined, i.e. forming an angle of between 0° and 90°
2279/30 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 (air-conditioning systems comprising filters F24F 3/1603)
2279/51 in clean rooms, e.g. production facilities for electronic devices, laboratories
2279/55 for cleaning appliances, e.g. suction cleaners (suction cleaners comprising filters A47L 9/10)
2279/60 for the intake of internal combustion engines or turbines (intake systems for vehicles comprising filters F02M 35/024)
2279/65 for the sterilisation of air (disinfection, sterilisation or deodorization of air A61L 9/10)

2311/00 Details relating to membrane separation process operations and control

**NOTE**

In groups B01D 2311/02 - B01D 2311/08, the nature of specific operations carried out can be indexed by a combination of symbols chosen from B01D 2311/10 - B01D 2311/2696

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
2311/11 Specific supply elements
2311/13 Use of sweep gas
2311/14 Pressure control
2311/16 Flux 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, e.g. recirculation of concentrate into the feed
2311/26 Further operations combined with membrane separation processes
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
2311/2646 Decantation
2311/2649 Filtration
2311/2653 Degassing
2311/2657 Deseration
2311/2661 Addition of gas
2311/2665 Aeration other than for cleaning purposes
2311/2669 Distillation
2311/2673 Evaporation
2311/2676 Centrifugal separation
2311/268 Water softening
2311/2684 Electrochemical processes
2311/2688 Biological processes
2311/2692 Sterilization
2311/2696 Catalytic reactions

2313/00 Details relating to membrane modules or apparatus
2313/02 Specific tightening or locking mechanisms
2313/025 Specific membrane holders
2313/04 Specific sealing means
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
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
2313/21 Specific headers, end caps
Details relating to membrane preparation

2317/00 Membrane module arrangements within a plant or an apparatus (membrane assemblies within one housing B01D 2319/00)

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

Details relating to membrane cleaning, regeneration, sterilization or to the prevention of fouling

2319/00 Membrane assemblies within one housing (module or elements arrangements within a plant or an apparatus B01D 2317/00)

2319/02 . Elements in series
2319/022 . Reject series
2319/025 . Permeate series

2319/04 . Elements in parallel
2319/06 . Use of membranes of different materials or properties within one module

2319/07 . Christmas tree arrangements

Details relating to membrane module operation

2319/00 Details relating to the membrane module operation

2319/02 . Elements in parallel
2319/04 . Use of membranes of different materials or properties within one module

2319/07 . Christmas tree arrangements
. Spraying processes
. Pore treatments
. Reducing the pores
. Closing of pores, e.g. for membrane sealing
. Cross-linking
. Use of chain transfer agents or inhibitors
. Use of radiation
. UV-treatment
. Use of magnetic or electrical fields
. Introduction of specific chemical groups
. graft polymerization
. involving radiation
. Electrospinning
. in-situ membrane formation
. Details of membrane preparation apparatus
. Relaxation steps
. Impregnation
. Influencing the pH
. Control of the membrane preparation process

Details relating to properties of membranes
. Details relating to pores or porosity of the membranes
. Characteristic pore shapes
. Asymmetric membranes
. Dense layer within the membrane
. Finger pores
. Sponge structure
. Nonporous membranes
. Microfluidic pore structures
. Characteristic thickness
. Surface irregularities
. Patterned membranes
. Catalysts being present on the surface of the membrane or in the pores
. Adsorbents being present on the surface of the membranes or in the pores
. Membrane materials having negatively charged functional groups
. Membrane materials having positively charged functional groups
. Membrane materials having mixed charged functional groups
. Specific permeability or cut-off range
. Thermal or heat-resistance properties
. Mechanical properties, e.g. strength
. Electrical properties
. Degradation or stability over time
. Chemical resistance
. Melting point or glass-transition temperatures
. Molecular weight or degree of polymerization
. Hydrophilic membranes
. Hydrophobic membranes
. Fibre reinforced membranes
. Ion-exchange membranes
. Transmission of light
. Magnetic properties
. Antimicrobial properties