

**CPC****COOPERATIVE PATENT CLASSIFICATION****C02F****TREATMENT OF WATER, WASTE WATER, SEWAGE, OR**

**SLUDGE** (separation in general [B01D](#); special arrangements on waterborne vessels of installations for treating water, waste water or sewage, e.g. for producing fresh water, [B63J](#); adding materials to water to prevent corrosion [C23F](#); treating radioactively-contaminated liquids [G21F 9/04](#); regeneration of reactants for recirculation into processes, see the relevant places for the processes)

**NOTE**

When classifying in this subclass, classification is also made in group [B01D 15/08](#) insofar as subject matter of general interest relating to chromatography is concerned.

**WARNING**

The following IPC groups are not used in the CPC system. Subject matter covered by these groups is classified in the following CPC groups:

[C02F 9/02](#) to [C02F 9/14](#) covered by [C02F 9/00](#) and subgroup

**C02F 1/00**

**Treatment of water, waste water, or sewage** ([C02F 3/00](#) to [C02F 9/00](#) take precedence)

[C02F 1/001](#)

- {Processes for the treatment of water whereby the filtration technique is of importance ([C02F 1/44](#) takes precedence; construction of filters in general [B01D 24/00](#) to [B01D 41/00](#))}

[C02F 1/002](#)

- • {using small portable filters for producing potable water, e.g. personal travel or emergency equipment, survival kits, combat gear ([C02F 1/003](#) takes precedence)}

[C02F 1/003](#)

- • {using household-type filters for producing potable water, e.g. pitchers, bottles, faucet mounted devices ([C02F 9/005](#) takes precedence)}

[C02F 1/004](#)

- • {using large scale industrial sized filters}

[C02F 1/005](#)

- {Systems or processes based on supernatural or anthroposophic principles, cosmic or terrestrial radiation, geomancy or rhabdomancy}

[C02F 1/006](#)

- {Water distributors either inside a treatment tank or directing the water to several treatment tanks; Water treatment plants incorporating these distributors, with or without chemical or biological tanks (for settling tanks [B01D 21/24](#))}

[C02F 2001/007](#)

- {Processes including a sedimentation step}

[C02F 1/008](#)

- {Control or steering systems not provided for elsewhere in subclass [C02F](#)}

[C02F 1/02](#)

- by heating (methods of steam generation [F22B](#); preheating boiler feed-water or accumulating preheated boiler feed-water [F22D](#))

[C02F 1/025](#)

- • {Thermal hydrolysis}

[C02F 1/04](#)

- • by distillation or evaporation

[C02F 1/041](#)

- • • {by means of vapour compression}

[C02F 1/042](#)

- • • {Prevention of deposits}

[C02F 1/043](#)

- • • {Details}

[C02F 1/045](#)

- • • {for obtaining ultra-pure water}

- C02F 1/046 . . . {under vacuum produced by a barometric column}
- C02F 1/047 . . . {using eolic energy}
- C02F 1/048 . . . {Purification of waste water by evaporation}
- C02F 1/06 . . . Flash evaporation
- C02F 1/08 . . . Thin film evaporation
- C02F 1/10 . . . by direct contact with a particulate solid or with a fluid, as a heat transfer medium
- C02F 1/12 . . . . Spray evaporation
- C02F 1/14 . . . using solar energy
- C02F 1/16 . . . using waste heat from other processes
- C02F 1/18 . . . Transportable devices to obtain potable water
- C02F 1/20 . by degassing, i.e. liberation of dissolved gases (degasification of liquids in general [B01D 19/00](#); arrangement of degassing apparatus in boiler feed supply [F22D](#))
- C02F 1/22 . by freezing
- C02F 1/24 . by flotation ([C02F 1/465](#) takes precedence)
- C02F 1/26 . by extraction
- C02F 1/265 . . {Desalination}
- C02F 1/28 . by sorption (using ion-exchange [C02F 1/42](#); sorbent compositions [B01J](#))
- C02F 1/281 . . {using inorganic sorbents}
- C02F 1/283 . . {using coal, charred products, or inorganic mixtures containing them}
- C02F 1/285 . . {using synthetic organic sorbents}
- C02F 1/286 . . {using natural organic sorbents or derivatives thereof}
- C02F 1/288 . . {using composite sorbents, e.g. coated, impregnated, multi-layered}
- C02F 1/30 . by irradiation
- C02F 1/302 . . {with microwaves}
- C02F 1/305 . . {with electrons}
- C02F 1/307 . . {with X-rays or gamma radiation}
- C02F 1/32 . . with ultra-violet light
- C02F 1/325 . . . {Irradiation devices or lamp constructions}
- C02F 1/34 . with mechanical oscillations
- C02F 1/36 . . ultrasonic vibrations
- C02F 1/38 . by centrifugal separation
- C02F 1/385 . . {by centrifuging suspensions (centrifuges [B04B](#))}
- C02F 1/40 . Devices for separating or removing fatty or oily substances or similar floating material (cleaning or keeping clear the surface of open water from oil or like materials [E02B 15/04](#); devices in sewers for separating liquid or solid substances from sewage [E03F 5/14](#), e.g. for use in drains leading to the sewer [E03F 5/16](#))
- C02F 1/42 . by ion-exchange (ion-exchange in general [B01J](#))

**NOTE**

C02F 1/42  
(continued)

When classifying in group [C02F 1/42](#), details of ion-exchangers can be further indexed by using indexing codes chosen from [C02F 2001/422](#) to [C02F 2001/427](#)

- C02F 2001/422 . . {using anionic exchangers}
- C02F 2001/425 . . {using cation exchangers}
- C02F 2001/427 . . {using mixed beds}
- C02F 1/44 . by dialysis, osmosis or reverse osmosis {(general membrane separation processes [B01D 61/00](#), membrane modules [B01D 63/00](#), electrodialysis [C02F 1/4693](#), combination of membrane modules and bioreactors [C02F 3/1268](#))}
- C02F 1/441 . . {by reverse osmosis}
- C02F 1/442 . . {by nanofiltration}
- C02F 1/444 . . {by ultrafiltration or microfiltration}
- C02F 1/445 . . {by forward osmosis}
- C02F 1/447 . . {by membrane distillation (distillation and evaporation without the use of membranes [C02F 1/04](#))}
- C02F 1/448 . . {by pervaporation}
- C02F 1/46 . by electrochemical methods
- C02F 1/4602 . . {for prevention or elimination of deposits}
- C02F 1/4604 . . {for desalination of seawater or brackish water}
- C02F 1/4606 . . {for producing oligodynamic substances to disinfect the water}
- C02F 1/4608 . . {using electrical discharges}
- C02F 1/461 . . by electrolysis
- C02F 1/46104 . . . {Devices therefor; Their operating or servicing}
- C02F 1/46109 . . . . {Electrodes}

**NOTE**

When classifying in group [C02F 1/46109](#), details of devices for electrolysis can be further indexed by using indexing codes chosen from [C02F 2001/46119](#) to [C02F 2001/46166](#) ]

- C02F 1/46114 . . . . . {Electrodes in particulate form or with conductive and/or non conductive particules between them}
- C02F 2001/46119 . . . . . {Cleaning the electrodes}
- C02F 2001/46123 . . . . . {Movable electrodes}
- C02F 2001/46128 . . . . . {Bipolar electrodes}
- C02F 2001/46133 . . . . . {characterised by the material}
- C02F 2001/46138 . . . . . . {Electrodes comprising a substrate and a coating}
- C02F 2001/46142 . . . . . . . {Catalytic coating}
- C02F 2001/46147 . . . . . . . {Diamond coating}
- C02F 2001/46152 . . . . . {characterised by the shape or form (electrodes in particulate form or with conductive or non-conductive particles between them [C02F 1/46114](#))}
- C02F 2001/46157 . . . . . . {Perforated or foraminous electrodes}

|                 |           |   |
|-----------------|-----------|---|
| C02F 2001/46161 | . . . . . | {Porous electrodes}                             |
| C02F 2001/46166 | . . . . . | {Gas diffusion electrodes}                      |
| C02F 2001/46171 | . . . . . | {Cylindrical or tubular shaped}                 |
| C02F 1/46176    | . . . . . | {Galvanic cells}                                |
| C02F 1/4618     | . . . . . | {for producing "ionised" acidic or basic water} |

**NOTE**

When classifying in group [C02F 1/4618](#), details relating to the production of "ionised" acidic or basic water using electrolysis devices can be further indexed by using indexing codes chosen from [C02F 2001/46185](#) to [C02F 2001/46195](#)

|                 |           |   |
|-----------------|-----------|---|
| C02F 2001/46185 | . . . . . | {only anodic or acidic water, e.g. for oxidizing or sterilizing}  |
| C02F 2001/4619  | . . . . . | {only cathodic or alkaline water, e.g. for reducing}  |
| C02F 2001/46195 | . . . . . | {characterised by the oxidation reduction potential [ORP]}  |
| C02F 1/463      | . . . . . | by electrocoagulation   |
| C02F 1/465      | . . . . . | by electroflotation   |
| C02F 1/467      | . . . . . | by electrochemical disinfection; {by electrooxydation or by electroreduction}   |
| C02F 1/4672     | . . . . . | {by electrooxydation}   |
| C02F 1/4674     | . . . . . | {with halogen or compound of halogens, e.g. chlorine, bromine}  |
| C02F 1/4676     | . . . . . | {by electroreduction}   |
| C02F 1/4678     | . . . . . | {of metals}   |
| C02F 1/469      | . . . . . | by electrochemical separation, e.g. by electro-osmosis, electrodialysis, electrophoresis  |
| C02F 1/4691     | . . . . . | {Capacitive deionisation}   |
| C02F 1/4693     | . . . . . | {electrodialysis}   |
| C02F 1/4695     | . . . . . | {electrodeionisation}   |
| C02F 1/4696     | . . . . . | {electrophoresis}   |
| C02F 1/4698     | . . . . . | {electro-osmosis}   |
| C02F 1/48       | . . . . . | with magnetic or electric fields ( <a href="#">C02F 1/46</a> takes precedence)  |
| C02F 1/481      | . . . . . | {using permanent magnets}   |
| C02F 1/482      | . . . . . | {located on the outer wall of the treatment device, i.e. not in contact with the liquid to be treated, e.g. detachable}   |
| C02F 1/484      | . . . . . | {using electromagnets}  |
| C02F 1/485      | . . . . . | {located on the outer wall of the treatment device, i.e. not in contact with the liquid to be treated, e.g. detachable}   |
| C02F 1/487      | . . . . . | {using high frequency electromagnetic fields, e.g. pulsed electromagnetic fields}   |
| C02F 1/488      | . . . . . | {for separation of magnetic materials, e.g. magnetic flocculation}  |
| C02F 1/50       | . . . . . | by addition or application of a germicide or by oligodynamic treatment {( <a href="#">C02F 1/4606</a> , <a href="#">C02F 1/467</a> , <a href="#">C02F 1/76</a> take precedence )} |
| C02F 1/505      | . . . . . | {by oligodynamic treatment}   |

- C02F 1/52
  - by flocculation or precipitation of suspended impurities {(C02F 1/463 takes precedence)}
- C02F 1/5209
  - • {Regulation methods for flocculation or precipitation}
- C02F 2001/5218
  - • {Crystallization}
- C02F 1/5227
  - • {Processes for facilitating the dissolution of solid flocculants in water}
- C02F 1/5236
  - • {using inorganic agents}
- C02F 1/5245
  - • • {using basic salts, e.g. of aluminium and iron}
- C02F 1/5254
  - • • {using magnesium compounds and phosphoric acid for removing ammonia}
- C02F 1/5263
  - • {using natural chemical compounds}
- C02F 1/5272
  - • {using specific organic precipitants}
- C02F 1/5281
  - • {Installations for water purification using chemical agents}
- C02F 1/529
  - • {Processes or devices for preparing lime water}
- C02F 1/54
  - • using organic material
- C02F 1/542
  - • • {Phosphorus compounds}
- C02F 1/545
  - • • {Silicon compounds}
- C02F 1/547
  - • • {Tensides}
- C02F 1/56
  - • • Macromolecular compounds
- C02F 1/58
  - by removing specified dissolved compounds (using ion-exchange C02F 1/42; softening water C02F 5/00)
- C02F 1/583
  - • {by removing fluoride or fluorine compounds}
- C02F 1/586
  - • {by removing ammoniacal nitrogen (for biological methods C02F 3/00)}
- C02F 1/60
  - • Silicon compounds {(C02F 1/583 takes precedence)}
- C02F 1/62
  - • Heavy metal compounds
- C02F 1/64
  - • • of iron or manganese
- C02F 1/645
  - • • • {Devices for iron precipitation and treatment by air}
- C02F 1/66
  - by neutralisation; pH adjustment (for degassing C02F 1/20; using ion-exchange C02F 1/42; for flocculation or precipitation of suspended impurities C02F 1/52; for removing dissolved compounds C02F 1/58)
- C02F 1/68
  - by addition of specified substances, e.g. trace elements, for ameliorating potable water (medicinal water A61K)
- C02F 1/681
  - • {by addition of solid materials for removing an oily layer on water}
- C02F 1/682
  - • {by addition of chemical compounds for dispersing an oily layer on water}
- C02F 1/683
  - • {by addition of complex-forming compounds}
- C02F 1/685
  - • {Devices for dosing the additives}
- C02F 1/686
  - • • {Devices for dosing liquid additives}
- C02F 1/687
  - • • {Devices for dosing solid compounds}
- C02F 1/688
  - • • {Devices in which the water progressively dissolves a solid compound}
- C02F 1/70
  - by reduction {(C02F 1/4676 takes precedence)}
- C02F 1/705
  - • {Reduction by metals}
- C02F 1/72
  - by oxidation {(C02F 1/4672 takes precedence)}
- C02F 1/722
  - • {Oxidation by peroxides}

- C02F 1/725 . . {by catalytic oxidation}
- C02F 1/727 . . {using pure oxygen or oxygen rich gas}
- C02F 1/74 . . with air (aeration of stretches of water [C02F 7/00](#))
- C02F 1/76 . . with halogens or compounds of halogens {(C02F 1/4674 takes precedence)}
- C02F 1/763 . . . {Devices for the addition of such compounds in gaseous form}
- C02F 1/766 . . . {by means of halogens other than chlorine or of halogenated compounds containing halogen other than chlorine}
- C02F 1/78 . . with ozone {(C02F 1/4672 takes precedence)}

**C02F 3/00**

**Biological treatment of water, waste water, or sewage {(C02F 1/006 takes precedence)}**

- C02F 2003/001 . {using granular carriers or supports for the microorganisms}
- C02F 2003/003 . . {using activated carbon or the like}
- C02F 3/005 . {Combined electrochemical biological processes (aeration by electrolytically produced oxygen bubbles [C02F 3/202](#))}
- C02F 3/006 . {Regulation methods for biological treatment}
- C02F 2003/008 . {using anaerobic baffled reactors}
- C02F 3/02 . Aerobic processes
- C02F 3/025 . . {Biological purification using sources of oxygen other than air, oxygen or ozone}
- C02F 3/04 . . using trickle filters
- C02F 3/043 . . . {Devices for distributing water over trickle filters}
- C02F 3/046 . . . {Soil filtration}
- C02F 3/06 . . using submerged filters
- C02F 3/08 . . using moving contact bodies
- C02F 3/082 . . . {Rotating biological contactors}
- C02F 3/085 . . . {Fluidized beds}
- C02F 3/087 . . . . {Floating beds with contact bodies having a lower density than water}
- C02F 3/10 . . Packings; Fillings; Grids (packing elements in general [B01J 19/30](#), [B01J 19/32](#))
- C02F 3/101 . . . {Arranged-type packing, e.g. stacks, arrays}
- C02F 3/102 . . . {Permeable membranes}
- C02F 3/103 . . . {Textile-type packing}
- C02F 3/104 . . . {Granular carriers}
- C02F 3/105 . . . {Characterized by the chemical composition}
- C02F 3/106 . . . . {Carbonaceous materials}
- C02F 3/107 . . . . {Inorganic materials, e.g. sand, silicates}
- C02F 3/108 . . . . {Immobilising gels, polymers or the like}
- C02F 3/109 . . . {Characterized by the shape ([C02F 3/104](#) takes precedence)}
- C02F 3/12 . . Activated sludge processes
- C02F 3/1205 . . . {Particular type of activated sludge processes}
- C02F 3/121 . . . . {Multistep treatment}

|             |  |
|-------------|--|
| C02F 3/1215 | . . . . {Combinations of activated sludge treatment with precipitation, flocculation, coagulation and separation of phosphates}  |
| C02F 3/1221 | . . . . {comprising treatment of the recirculated sludge}  |
| C02F 3/1226 | . . . . {comprising an absorbent material suspended in the mixed liquor}   |
| C02F 3/1231 | . . . . {Treatments of toxic sewage}   |
| C02F 3/1236 | . . . {Particular type of activated sludge installations}  |
| C02F 3/1242 | . . . . {Small compact installations for use in homes, apartment blocks, hotels or the like}                                     |
| C02F 3/1247 | . . . . . {comprising circular tanks with elements, e.g. decanters, aeration basins, in the form of segments, crowns or sectors} |
| C02F 3/1252 | . . . . {Cylindrical tanks with horizontal axis}   |
| C02F 3/1257 | . . . . {Oxidation ditches}  |
| C02F 3/1263 | . . . . {Sequencing batch reactors [SBR]}  |
| C02F 3/1268 | . . . . {Membrane bioreactor systems}  |
| C02F 3/1273 | . . . . . {Submerged membrane bioreactors}   |
| C02F 3/1278 | . . . {Provisions for mixing or aeration of the mixed liquor}  |
| C02F 3/1284 | . . . . {Mixing devices}   |
| C02F 3/1289 | . . . . {Aeration by saturation under super-atmospheric pressure}  |
| C02F 3/1294 | . . . . {"Venturi" aeration means}   |
| C02F 3/14   | . . . using surface aeration   |
| C02F 3/145  | . . . . {Protection against aerosols}  |
| C02F 3/16   | . . . . the aerator having a vertical axis   |
| C02F 3/165  | . . . . . {using vertical aeration channels}   |
| C02F 3/18   | . . . . the aerator having a horizontal axis   |
| C02F 3/20   | . . . using diffusers  |
| C02F 3/201  | . . . . {Perforated, resilient plastic diffusers, e.g. membranes, sheets, foils, tubes, hoses}                                   |
| C02F 3/202  | . . . . {Aeration by electrolytically produced oxygen bubbles}   |
| C02F 3/203  | . . . . {Swing diffusers}  |
| C02F 3/205  | . . . . {Moving, e.g. rotary, diffusers; Stationary diffusers with moving, e.g. rotary, distributors}                            |
| C02F 3/206  | . . . . . {with helical screw impellers}   |
| C02F 3/207  | . . . . . {with axial thrust propellers}   |
| C02F 3/208  | . . . . {Membrane aeration ( <a href="#">C02F 3/201</a> takes precedence)}   |
| C02F 3/22   | . . . using circulation pipes  |
| C02F 3/223  | . . . . {using "air-lift"}   |
| C02F 3/226  | . . . . {"Deep shaft" processes}   |
| C02F 3/24   | . . . using free-fall aeration or spraying   |
| C02F 3/26   | . . . using pure oxygen or oxygen-rich gas   |
| C02F 3/28   | . Anaerobic digestion processes  |
| C02F 3/2806 | . . {Anaerobic processes using solid supports for micro-organisms}   |



- C02F 3/2813 . . {using anaerobic contact processes}
- C02F 3/282 . . {using anaerobic sequencing batch reactors}
- C02F 3/2826 . . {using anaerobic filters}
- C02F 3/2833 . . {using fluidized bed reactors}
- C02F 3/284 . . {using anaerobic baffled reactors}
- C02F 3/2846 . . {using upflow anaerobic sludge blanket [UASB] reactors}
- C02F 3/2853 . . {using anaerobic membrane bioreactors}
- C02F 3/286 . . {including two or more steps}
- C02F 3/2866 . . {Particular arrangements for anaerobic reactors}
- C02F 3/2873 . . . {with internal draft tube circulation}
- C02F 3/288 . . . {comprising septic tanks combined with a filter}
- C02F 3/2886 . . . {Two story combinations of the Imhoff tank type}
- C02F 3/2893 . . . {with biogas recycling}
- C02F 3/30 . Aerobic and anaerobic processes
- C02F 3/301 . . {Aerobic and anaerobic treatment in the same reactor}
- C02F 3/302 . . {Nitrification and denitrification treatment ([C02F 3/308](#) takes precedence)}
- C02F 3/303 . . . {characterised by the nitrification}
- C02F 3/305 . . . {characterised by the denitrification}
- C02F 3/306 . . . . {Denitrification of water in soil}
- C02F 3/307 . . . {characterised by direct conversion of nitrite to molecular nitrogen, e.g. by using the Anammox process}
- C02F 3/308 . . {Biological phosphorus removal}
- C02F 3/32 . characterised by the animals or plants used, e.g. algae
- C02F 3/322 . . {use of algae}
- C02F 3/325 . . . {as symbiotic combination of algae and bacteria}
- C02F 3/327 . . {characterised by animals and plants}
- C02F 3/34 . characterised by the micro-organisms used
- C02F 3/341 . . {Consortia of bacteria}
- C02F 3/342 . . {characterised by the enzymes used}
- C02F 3/343 . . {for digestion of grease, fat, oil}
- C02F 3/344 . . {for digestion of mineral oil}
- C02F 3/345 . . {for biological oxidation or reduction of sulfur compounds}
- C02F 3/346 . . {Iron bacteria}
- C02F 3/347 . . {Use of yeasts or fungi ([C02F 3/322](#) takes precedence)}
- C02F 3/348 . . {characterised by the way or the form in which the microorganisms are added or dosed}
  
- C02F 5/00** **Softening water; Preventing scale; Adding scale preventatives or scale removers to water, e.g. adding sequestering agents (softening using ion-exchange [C02F 1/42](#))**
- C02F 5/02 . Softening water by precipitation of the hardness



- C02F 5/025 . . {Hot-water softening devices}
- C02F 5/04 . . using phosphates (C02F 5/06 takes precedence)
- C02F 5/06 . . using calcium compounds
- C02F 5/08 . Treatment of water with complexing chemicals or other solubilising agents for softening, scale prevention or scale removal, e.g. adding sequestering agents
- C02F 5/083 . . {Mineral agents}
- C02F 5/086 . . {Condensed phosphates}
- C02F 5/10 . . using organic substances
- C02F 5/105 . . . {combined with inorganic substances}
- C02F 5/12 . . . containing nitrogen (C02F 5/14 takes precedence)
- C02F 5/125 . . . . {combined with inorganic substances}
- C02F 5/14 . . . containing phosphorus
- C02F 5/145 . . . . {combined with inorganic substances}

**C02F 7/00****Aeration of stretches of water****C02F 9/00****Multistage treatment of water, waste water, or sewage****NOTES**

1. This group covers only those combined treating operations where the interest is directed to the relationship between the steps.
2. This group does not cover, for example, chemical treatment followed by settlement or biological treatment involving normal mechanical treatment.

**C02F 9/005**

- . {Portable or detachable small-scale multistage treatment devices, e.g. point of use or laboratory water purification systems (single-stage processes in combination with filtration techniques C02F 1/002 or C02F 1/003)}

**C02F 11/00****Treatment of sludge; Devices therefor**

- C02F 11/002 . {Sludge treatment using liquids immiscible with water}
- C02F 11/004 . {Sludge detoxification}
- C02F 11/006 . {Electrochemical treatment, e.g. electro-oxidation or electro-osmosis}
- C02F 11/008 . {Sludge treatment by fixation or solidification}
- C02F 11/02 . Biological treatment
- C02F 11/04 . . Anaerobic treatment; Production of methane by such processes
- C02F 11/06 . by oxidation (incinerators for burning waste liquors, e.g. sulfite liquor from paper-making plant F23G 7/04)
- C02F 11/08 . . Wet air oxidation
- C02F 11/083 . . . {using deep well reactors}
- C02F 11/086 . . . {in the supercritical state}
- C02F 11/10 . by pyrolysis
- C02F 11/12 . by de-watering, drying, or thickening
- C02F 11/121 . . {Processes for mechanical dehydration of sludge, e.g. by filters}
- C02F 11/122 . . . {using press filters (C02F 11/123 takes precedence)}

- C02F 11/123 . . . {using belt or band filters}
- C02F 11/125 . . . {using screw filters}
- C02F 11/126 . . . {using drum filters}
- C02F 11/127 . . . {by centrifugation}
- C02F 11/128 . . . {Batch processes}
- C02F 11/14 . . with addition of chemical agents
- C02F 11/16 . . using drying or composting beds
- C02F 11/18 . by thermal conditioning (by pyrolysis [C02F 11/10](#))
- C02F 11/185 . . {by pasteurisation}
- C02F 11/20 . . by freezing

**C02F 2101/00****Nature of the contaminant**

- C02F 2101/003 . {Explosive compounds, e.g. TNT}
- C02F 2101/006 . {Radioactive compounds}
- C02F 2101/10 . Inorganic compounds
  - C02F 2101/101 . . {Sulfur compounds}
  - C02F 2101/103 . . {Arsenic compounds}
  - C02F 2101/105 . . {Phosphorus compounds}
  - C02F 2101/106 . . {Selenium compounds}
  - C02F 2101/108 . . {Boron compounds}
- C02F 2101/12 . . Halogens or halogen-containing compounds
  - C02F 2101/14 . . . Fluorine or fluorine-containing compounds
- C02F 2101/16 . . Nitrogen compounds, e.g. ammonia
  - C02F 2101/163 . . . {Nitrates}
  - C02F 2101/166 . . . {Nitrites}
  - C02F 2101/18 . . . Cyanides
- C02F 2101/20 . . Heavy metals or heavy metal compounds
  - C02F 2101/203 . . . {Iron or iron compound}
  - C02F 2101/206 . . . {Manganese or manganese compounds}
  - C02F 2101/22 . . . Chromium or chromium compounds, e.g. chromates
- C02F 2101/30 . Organic compounds
  - C02F 2101/301 . . {Detergents, surfactants}
  - C02F 2101/303 . . {Complexing agents}
  - C02F 2101/305 . . {Endocrine disruptive agents}
  - C02F 2101/306 . . {Pesticides}
  - C02F 2101/308 . . {Dyes; Colorants; Fluorescent agents}
  - C02F 2101/32 . . Hydrocarbons, e.g. oil
    - C02F 2101/322 . . . {Volatile compounds, e.g. benzene}
    - C02F 2101/325 . . . {Emulsions}
    - C02F 2101/327 . . . {Polyaromatic Hydrocarbons [PAH's]}

- C02F 2101/34 . . containing oxygen
- C02F 2101/345 . . . {Phenols}
- C02F 2101/36 . . containing halogen
- C02F 2101/363 . . . {PCB's; PCP's}
- C02F 2101/366 . . . {Dioxine; Furan}
- C02F 2101/38 . . containing nitrogen
- C02F 2101/40 . . containing sulfur

**C02F 2103/00****Nature of the water, waste water, sewage or sludge to be treated**

- C02F 2103/001 . {Runoff or storm water}
- C02F 2103/002 . {Grey water, e.g. from clothes washers, showers or dishwashers}
- C02F 2103/003 . {Wastewater from hospitals, laboratories and the like, heavily contaminated by pathogenic microorganisms}
- C02F 2103/005 . {Black water originating from toilets}
- C02F 2103/006 . {Dental effluents}
- C02F 2103/007 . {Contaminated open waterways, rivers, lakes or ponds}
- C02F 2103/008 . {Originating from marine vessels, ships and boats, e.g. bilge water or ballast water}
- C02F 2103/02 . Non-contaminated water, e.g. for industrial water supply
- C02F 2103/023 . . {Water in cooling circuits}
- C02F 2103/026 . . {Treating water for medical or cosmetic purposes}
- C02F 2103/04 . . For obtaining ultra-pure water
- C02F 2103/06 . Contaminated groundwater or leachate
- C02F 2103/08 . Seawater, e.g. for desalination
- C02F 2103/10 . from quarries or from mining activities
- C02F 2103/12 . from the silicate or ceramic industries, e.g. waste waters from cement or glass factories
- C02F 2103/14 . Paint wastes
- C02F 2103/16 . from metallurgical processes, i.e. from the production, refining or treatment of metals, e.g. galvanic wastes
- C02F 2103/18 . from the purification of gaseous effluents
- C02F 2103/20 . from animal husbandry
- C02F 2103/22 . from the processing of animals, e.g. poultry, fish, or parts thereof
- C02F 2103/24 . . from tanneries
- C02F 2103/26 . from the processing of plants or parts thereof
- C02F 2103/28 . . from the paper or cellulose industry
- C02F 2103/30 . from the textile industry
- C02F 2103/32 . from the food or foodstuff industry, e.g. brewery waste waters
- C02F 2103/322 . . {from vegetable oil production, e.g. olive oil production}
- C02F 2103/325 . . {from processes relating to the production of wine products}
- C02F 2103/327 . . {from processes relating to the production of dairy products}

- C02F 2103/34 . from industrial activities not provided for in groups [C02F 2103/12](#) to [C02F 2103/32](#)
- C02F 2103/343 . . {from the pharmaceutical industry, e.g. containing antibiotics}
- C02F 2103/346 . . {from semiconductor processing, e.g. waste water from polishing of wafers}
- C02F 2103/36 . . from the manufacture of organic compounds
- C02F 2103/365 . . . {from petrochemical industry (e.g. refineries)}
- C02F 2103/38 . . . Polymers
- C02F 2103/40 . . from the manufacture or use of photosensitive materials
- C02F 2103/42 . from bathing facilities, e.g. swimming pools
- C02F 2103/44 . from vehicle washing facilities
  
- C02F 2201/00** **Apparatus for treatment of water, waste water or sewage**
- C02F 2201/001 . Build in apparatus for autonomous on board water supply and wastewater treatment (e.g. for aircrafts, cruiseships, oil drilling platforms, railway trains, space stations)
- C02F 2201/002 . Construction details of the apparatus
- C02F 2201/003 . . Coaxial constructions, e.g. a cartridge located coaxially within another
- C02F 2201/004 . . Seals, connections
- C02F 2201/005 . . Valves
- C02F 2201/006 . . Cartridges
- C02F 2201/007 . . Modular design
- C02F 2201/008 . Mobile apparatus and plants, e.g. mounted on a vehicle (for biological treatment [C02F 2203/008](#))
- C02F 2201/009 . Apparatus with independent power supply, e.g. solar cells, windpower, fuel cells (for electrolysis apparatus [C02F 2201/46165](#))
- C02F 2201/32 . Details relating to UV-irradiation devices
- C02F 2201/322 . . Lamp arrangement
- C02F 2201/3221 . . . Lamps suspended above a water surface or pipe
- C02F 2201/3222 . . . Units using UV-light emitting diodes [LED]
- C02F 2201/3223 . . . Single elongated lamp located on the central axis of a tubular reactor
- C02F 2201/3224 . . . Units using UV-light guiding optical fibers
- C02F 2201/3225 . . . Lamps immersed in an open channel, containing the liquid to be treated
- C02F 2201/3226 . . . Units using UV-light emitting lasers
- C02F 2201/3227 . . . Units with two or more lamps
- C02F 2201/3228 . . . Units having reflectors, e.g. coatings, baffles, plates, mirrors
- C02F 2201/324 . . Lamp cleaning installations, e.g. brushes
- C02F 2201/326 . . Lamp control systems
- C02F 2201/328 . . Having flow diverters (baffles)
- C02F 2201/46 . Apparatus for electrochemical processes
- C02F 2201/461 . . Electrolysis apparatus
- C02F 2201/46105 . . . Details relating to the electrolytic devices
- C02F 2201/4611 . . . . Fluid flow

- C02F 2201/46115 . . . . Electrolytic cell with membranes or diaphragms
- C02F 2201/4612 . . . . Controlling or monitoring
- C02F 2201/46125 . . . . . Electrical variables
- C02F 2201/4613 . . . . . Inverting polarity
- C02F 2201/46135 . . . . . Voltage
- C02F 2201/4614 . . . . . Current
- C02F 2201/46145 . . . . . Fluid flow
- C02F 2201/4615 . . . . . Time
- C02F 2201/46155 . . . . Heating or cooling
- C02F 2201/4616 . . . . Power supply
- C02F 2201/46165 . . . . . Special power supply, e.g. solar energy or batteries
- C02F 2201/4617 . . . . . DC only
- C02F 2201/46175 . . . . . Electrical pulses
- C02F 2201/4618 . . . . Supplying or removing reactants or electrolyte
- C02F 2201/46185 . . . . . Recycling the cathodic or anodic feed
- C02F 2201/4619 . . . . Supplying gas to the electrolyte ([gas diffusion electrodes C02F 2001/46166](#))
- C02F 2201/46195 . . . . Cells containing solid electrolyte
- C02F 2201/48 . . Devices for applying magnetic or electric fields
- C02F 2201/483 . . . using coils
- C02F 2201/486 . . . using antenna
- C02F 2201/78 . . Details relating to ozone treatment devices
- C02F 2201/782 . . Ozone generators
- C02F 2201/784 . . Diffusers or nozzles for ozonation
  
- C02F 2203/00** **Apparatus and plants for the biological treatment of water, waste water or sewage**
- C02F 2203/002 . . comprising an initial buffer container
- C02F 2203/004 . . comprising a selector reactor for promoting floc-forming or other bacteria
- C02F 2203/006 . . details of construction, e.g. specially adapted seals, modules, connections
- C02F 2203/008 . . Mobile apparatus and plants, e.g. mounted on a vehicle
  
- C02F 2209/00** **Controlling or monitoring parameters in water treatment**
- C02F 2209/001 . . Upstream control, i.e. monitoring for predictive control
- C02F 2209/003 . . Downstream control, i.e. outlet monitoring, e.g. to check the treating agents, such as halogens or ozone, leaving the process
- C02F 2209/005 . . Processes using a programmable logic controller [PLC]
- C02F 2209/006 . . . comprising a software program or a logic diagram
- C02F 2209/008 . . . comprising telecommunication features, e.g. modems or antennas
- C02F 2209/01 . . Density
- C02F 2209/02 . . Temperature
- C02F 2209/03 . . Pressure

|               |  |
|---------------|--|
| C02F 2209/04  | • Oxidation reduction potential [ORP]  |
| C02F 2209/05  | • Conductivity or salinity   |
| C02F 2209/055 | • • Hardness   |
| C02F 2209/06  | • pH   |
| C02F 2209/07  | • Alkalinity   |
| C02F 2209/08  | • Chemical Oxygen Demand [COD]; Biological Oxygen Demand [BOD]                         |
| C02F 2209/09  | • Viscosity  |
| C02F 2209/10  | • Solids, e.g. total solids [TS], total suspended solids [TSS] or volatile solids [VS] |
| C02F 2209/105 | • • Particle number, particle size or particle characterisation                        |
| C02F 2209/11  | • Turbidity  |
| C02F 2209/12  | • Volatile Fatty Acids (VFAs)  |
| C02F 2209/14  | • NH <sub>3</sub> -N   |
| C02F 2209/15  | • NO <sub>3</sub> -N   |
| C02F 2209/16  | • Total nitrogen (tkN-N)   |
| C02F 2209/18  | • PO <sub>4</sub> -P   |
| C02F 2209/19  | • SO <sub>4</sub> -S   |
| C02F 2209/20  | • Total organic carbon [TOC]   |
| C02F 2209/21  | • Dissolved organic carbon [DOC]   |
| C02F 2209/22  | • O <sub>2</sub>   |
| C02F 2209/225 | • • in the gas phase   |
| C02F 2209/23  | • O <sub>3</sub>   |
| C02F 2209/235 | • • in the gas phase   |
| C02F 2209/24  | • CO <sub>2</sub>  |
| C02F 2209/245 | • • in the gas phase   |
| C02F 2209/26  | • H <sub>2</sub> S   |
| C02F 2209/265 | • • in the gas phase   |
| C02F 2209/28  | • CH <sub>4</sub>  |
| C02F 2209/285 | • • CH <sub>4</sub> in the gas phase   |
| C02F 2209/29  | • Chlorine compounds   |
| C02F 2209/30  | • H <sub>2</sub>   |
| C02F 2209/32  | • CO   |
| C02F 2209/34  | • N <sub>2</sub> O   |
| C02F 2209/36  | • Biological material, e.g. enzymes or ATP   |
| C02F 2209/38  | • Gas flow rate  |
| C02F 2209/40  | • Liquid flow rate   |
| C02F 2209/42  | • Liquid level   |
| C02F 2209/44  | • Time   |
| C02F 2209/445 | • • Filter life  |

**C02F 2301/00      General aspects of water treatment**

- C02F 2301/02 . Fluid flow conditions
- C02F 2301/022 . . Laminar
- C02F 2301/024 . . Turbulent
- C02F 2301/026 . . Spiral, helicoidal, radial
- C02F 2301/028 . . Tortuous
- C02F 2301/04 . Flow arrangements
- C02F 2301/043 . . Treatment of partial or bypass streams
- C02F 2301/046 . . Recirculation with an external loop
- C02F 2301/06 . Pressure conditions
- C02F 2301/063 . . Underpressure, vacuum
- C02F 2301/066 . . Overpressure, high pressure
- C02F 2301/08 . Multistage treatments, e.g. repetition of the same process step under different conditions
- C02F 2301/10 . Temperature conditions for biological treatment
- C02F 2301/103 . . Psychrophilic treatment
- C02F 2301/106 . . Thermophilic treatment

**C02F 2303/00****Specific treatment goals**

- C02F 2303/02 . Odour removal or prevention of malodour
- C02F 2303/04 . Disinfection
- C02F 2303/06 . Sludge reduction, e.g. by lysis
- C02F 2303/08 . Corrosion inhibition
- C02F 2303/10 . Energy recovery
- C02F 2303/12 . Prevention of foaming
- C02F 2303/14 . Maintenance of water treatment installations
- C02F 2303/16 . Regeneration of sorbents, filters
- C02F 2303/18 . Removal of treatment agents after treatment
- C02F 2303/185 . . The treatment agent being halogen or a halogenated compound
- C02F 2303/20 . Prevention of biofouling
- C02F 2303/22 . Eliminating or preventing deposits, scale removal, scale prevention  
([C02F 1/042](#), [C02F 1/4602](#), [C02F 5/00](#) take precedence)
- C02F 2303/24 . Separation of coarse particles, e.g. by using sieves or screens
- C02F 2303/26 . Reducing the size of particles, liquid droplets or bubbles, e.g. by crushing, grinding, spraying, creation of micro-bubbles or nano-bubbles

**C02F 2305/00****Use of specific compounds during water treatment**

- C02F 2305/02 . Specific form of oxidant
- C02F 2305/023 . . Reactive oxygen species, singlet oxygen, OH radical
- C02F 2305/026 . . Fenton's reagent
- C02F 2305/04 . Surfactants, used as part of a formulation or alone
- C02F 2305/06 . Nutrients for stimulating the growth of microorganisms
- C02F 2305/08 . Nanoparticles or nanotubes



- C02F 2305/10 . Photocatalysts
- C02F 2305/12 . Inert solids used as ballast for improving sedimentation ([C02F 3/1226 takes precedence](#))
- C02F 2305/14 . Additives which dissolves or releases substances when predefined environmental conditions are reached, e.g. pH or temperature

**C02F 2307/00****Location of water treatment or water treatment device**

- C02F 2307/02 . as part of a bottle
- C02F 2307/04 . as part of a pitcher or jug
- C02F 2307/06 . Mounted on or being part of a faucet, shower handle or showerhead
- C02F 2307/08 . Treatment of wastewater in the sewer, e.g. to reduce grease, odour
- C02F 2307/10 . as part of a potable water dispenser, e.g. for use in homes or offices
- C02F 2307/12 . as part of household appliances such as dishwashers, laundry washing machines or vacuum cleaners
- C02F 2307/14 . Treatment of water in water supply networks, e.g. to prevent bacterial growth