SECTION C — CHEMISTRY; METALLURGY

C02 TREATMENT OF WATER, WASTE WATER, SEWAGE, OR SLUDGE

C02F **TREATMENT OF WATER, WASTE WATER, SEWAGE, OR SLUDGE** (processes for making harmful chemical substances harmless, or less harmful, by effecting a chemical change in the substances A62D 3/00; separation, settling tanks or filter devices 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) **[3]**

Note(s) [7, 2006.01]

1. 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.
2. In this subclass, it is desirable to add the indexing codes of groups C02F 101/00 or C02F 103/00.

Subclass index

CHEMICAL OR PHYSICAL TREATMENT.....1/00, 5/00
BIOLOGICAL TREATMENT.....3/00
AERATION OF STRETCHES.....7/00
MULTISTEP TREATMENT.....9/00
TREATMENT OF SLUDGE.....11/00

1/00 **Treatment of water, waste water, or sewage** (C02F 3/00-C02F 9/00 take precedence) **[3, 2006.01]**

1/02 • by heating **[3, 2006.01]**

1/04 • • by distillation or evaporation **[3, 2006.01]**

1/06 • • • Flash evaporation **[3, 2006.01]**

1/08 • • • Thin film evaporation **[3, 2006.01]**

1/10 • • • by direct contact with a particulate solid or with a fluid, as a heat transfer medium **[3, 2006.01]**

1/12 • • • • Spray evaporation **[3, 2006.01]**

1/14 • • • using solar energy **[3, 2006.01]**

1/16 • • • using waste heat from other processes **[3, 2006.01]**

1/18 • • • Transportable devices to obtain potable water **[3, 2006.01]**

1/20 • by degassing, i.e. liberation of dissolved gases **[3, 2006.01]**

1/22 • by freezing **[3, 2006.01]**

1/24 • by flotation (C02F 1/465 takes precedence) **[3, 5, 2006.01]**

1/26 • by extraction **[3, 2006.01]**

1/28 • by sorption (using ion-exchange C02F 1/42; sorbent compositions B01J) **[3, 2006.01]**

1/30 • by irradiation **[3, 2006.01]**

1/32 • • with ultra-violet light **[3, 2006.01]**

1/34 • with mechanical oscillations **[3, 2006.01]**

1/36 • • ultrasonic vibrations **[3, 2006.01]**

1/38 • by centrifugal separation **[3, 2006.01]**

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) **[3, 5, 2006.01]**

1/42 • by ion-exchange **[3, 2006.01]**

1/44 • by dialysis, osmosis or reverse osmosis **[3, 2006.01]**

1/46 • by electrochemical methods **[3, 5, 2006.01]**

1/461 • • by electrolysis **[5, 2006.01]**

1/463 • • • by electrocoagulation **[5, 2006.01]**

1/465 • • • by electroflotation **[5, 2006.01]**

1/467 • • • by electrochemical disinfection **[5, 2006.01]**

1/469 • • by electrochemical separation, e.g. by electro-osmosis, electrodialysis, electrophoresis **[5, 2006.01]**

1/48 • with magnetic or electric fields (C02F 1/46 takes precedence) **[3, 2006.01]**

1/50 • by addition or application of a germicide or by oligodynamic treatment (C02F 1/467 takes precedence) **[3, 5, 2006.01]**

1/52 • by flocculation or precipitation of suspended impurities **[3, 2006.01]**

1/54 • • using organic material **[3, 2006.01]**

1/56 • • • Macromolecular compounds **[3, 2006.01]**

1/58 • by removing specified dissolved compounds (using ion-exchange C02F 1/42; softening water C02F 5/00) **[3, 2006.01]**

1/60 • • Silicon compounds **[3, 2006.01]**

1/62 • • Heavy metal compounds **[3, 2006.01]**

1/64 • • • of iron or manganese **[3, 2006.01]**

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) **[3, 2006.01]**

1/68 • by addition of specified substances, e.g. trace elements, for ameliorating potable water **[3, 2006.01]**

1/70 • by reduction **[3, 2006.01]**

1/72 • by oxidation **[3, 2006.01]**

1/74 • • with air (aeration of stretches of water C02F 7/00) **[3, 2006.01]**
1/76 • • with halogens or compounds of halogens **[3, 2006.01]**
1/78 • • with ozone **[3, 2006.01]**

3/00 Biological treatment of water, waste water, or sewage [3, 2006.01]
3/02 • Aerobic processes **[3, 2006.01]**
3/04 • • using trickle filters **[3, 2006.01]**
3/06 • • using submerged filters **[3, 2006.01]**
3/08 • • using moving contact bodies **[3, 2006.01]**
3/10 • • Packings; Fillings; Grids **[3, 2006.01]**
3/12 • • Activated sludge processes **[3, 2006.01]**
3/14 • • • using surface aeration **[3, 2006.01]**
3/16 • • • • the aerator having a vertical axis **[3, 2006.01]**
3/18 • • • • the aerator having a horizontal axis **[3, 2006.01]**
3/20 • • • using diffusers **[3, 2006.01]**
3/22 • • • using circulation pipes **[3, 2006.01]**
3/24 • • • using free-fall aeration or spraying **[3, 2006.01]**
3/26 • • • using pure oxygen or oxygen-rich gas **[3, 2006.01]**
3/28 • Anaerobic digestion processes **[3, 2006.01]**
3/30 • Aerobic and anaerobic processes **[3, 2006.01]**
3/32 • characterised by the animals or plants used, e.g. algae **[3, 2006.01]**
3/34 • characterised by the micro-organisms used **[3, 2006.01]**

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) **[3, 2006.01]**
5/02 • Softening water by precipitation of the hardness **[3, 2006.01]**
5/04 • • using phosphates (C02F 5/06 takes precedence) **[3, 2006.01]**
5/06 • • using calcium compounds **[3, 2006.01]**
5/08 • Treatment of water with complexing chemicals or other solubilising agents for softening, scale prevention or scale removal, e.g. adding sequestering agents **[3, 2006.01]**
5/10 • • using organic substances **[3, 2006.01]**
5/12 • • • containing nitrogen (C02F 5/14 takes precedence) **[3, 2006.01]**
5/14 • • • containing phosphorus **[3, 2006.01]**

7/00 Aeration of stretches of water [3, 2006.01]

9/00 Multistep treatment of water, waste water or sewage [3, 2006.01]

Note(s) [3, 7, 2006.01]

1. This group covers only those combined treating operations where the essential characteristic resides in the combination of treatment steps.
2. This group does not cover treatments where the essential characteristic resides in an individual step of the treatment, which treatments are covered by groups C02F 1/00-C02F 7/00. An example of such treatments is a treatment in which the essential characteristic resides in a chemical treatment step and in which the one or more other steps, such as filtration or settlement, are conventional.
3. In this group, 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.
4. Any individual step of a multistep treatment, which is not identified by the classification in the last appropriate place, and which is considered to represent information of interest for search, may also be classified in one or more of groups C02F 1/00-C02F 1/56 or C02F 1/66-C02F 7/00. This can, for example, be the case which it is considered of interest to enable searching of multistep treatments using a combination of classification symbols. Such non-obligatory classification should be given as "additional information".

9/02 • involving a separation step **[7, 2006.01]**
9/04 • at least one step being a chemical treatment **[7, 2006.01]**
9/06 • • Electrochemical treatment **[7, 2006.01]**
9/08 • at least one step being a physical treatment **[7, 2006.01]**
9/10 • • Thermal treatment **[7, 2006.01]**
9/12 • • Irradiation or treatment with electric or magnetic fields **[7, 2006.01]**
9/14 • at least one step being a biological treatment **[7, 2006.01]**

11/00 Treatment of sludge; Devices therefor [3, 2006.01]
11/02 • Biological treatment **[3, 2006.01]**
11/04 • • Anaerobic treatment; Production of methane by such processes **[3, 2006.01]**
11/06 • by oxidation **[3, 2006.01]**
11/08 • • Wet air oxidation **[3, 2006.01]**
11/10 • by pyrolysis **[3, 2006.01]**
11/12 • by de-watering, drying, or thickening **[3, 2006.01]**
11/14 • • with addition of chemical agents **[3, 2006.01]**
11/16 • • using drying or composting beds **[3, 2006.01]**
11/18 • by thermal conditioning (by pyrolysis C02F 11/10) **[3, 2006.01]**
11/20 • • by freezing **[3, 2006.01]**

Indexing scheme associated with groups C02F 1/00-C02F 11/00 relating to the nature of the contaminant in the water, waste water, sewage or sludge. [7]

101/00 Nature of the contaminant [7, 2006.01]

101/10 • Inorganic compounds **[7, 2006.01]**
101/12 • • Halogens or halogen-containing compounds **[7, 2006.01]**
101/14 • • • Fluorine or fluorine-containing compounds **[7, 2006.01]**
101/16 • • Nitrogen compounds, e.g. ammonia **[7, 2006.01]**
101/18 • • • Cyanides **[7, 2006.01]**
101/20 • • Heavy metals or heavy metal compounds **[7, 2006.01]**
101/22 • • • Chromium or chromium compounds, e.g. chromates **[7, 2006.01]**
101/30 • Organic compounds **[7, 2006.01]**
101/32 • • Hydrocarbons, e.g. oil **[7, 2006.01]**
101/34 • • containing oxygen **[7, 2006.01]**
101/36 • • containing halogen **[7, 2006.01]**
101/38 • • containing nitrogen **[7, 2006.01]**

Indexing scheme associated with groups C02F 1/00-C02F 11/00, relating to the nature of the water, waste water, sewage or sludge to be treated. [7]

103/00 Nature of the water, waste water, sewage or sludge to be treated [7, 2006.01]

103/02 • Non-contaminated water, e.g. for industrial water supply **[7, 2006.01]**
103/04 • • for obtaining pure or ultra-pure water **[7, 2006.01]**
103/06 • Contaminated groundwater or leachate **[7, 2006.01]**
103/08 • Seawater, e.g. for desalination **[7, 2006.01]**
103/10 • from quarries or from mining activities **[7, 2006.01]**
103/12 • from the silicate or ceramic industries, e.g. waste waters from cement or glass factories **[7, 2006.01]**
103/14 • Paint wastes **[7, 2006.01]**
103/16 • from metallurgical processes, i.e. from the production, refining or treatment of metals, e.g. galvanic wastes **[7, 2006.01]**
103/18 • from the wet purification of gaseous effluents **[7, 2006.01]**
103/20 • from animal husbandry **[7, 2006.01]**
103/22 • from the processing of animals, e.g. poultry, fish, or parts thereof **[7, 2006.01]**
103/24 • • from tanneries **[7, 2006.01]**
103/26 • from the processing of plants or parts thereof **[7, 2006.01]**
103/28 • • from the paper or cellulose industry **[7, 2006.01]**
103/30 • from the textile industry **[7, 2006.01]**
103/32 • from the food or foodstuff industry, e.g. brewery waste waters **[7, 2006.01]**
103/34 • from the chemical industry not provided for in groups C02F 103/12-C02F 103/32 **[7, 2006.01]**
103/36 • • from the manufacture of organic compounds **[7, 2006.01]**
103/38 • • • Polymers **[7, 2006.01]**
103/40 • • from the manufacture or use of photosensitive materials **[7, 2006.01]**
103/42 • from bathing facilities, e.g. swimming pools **[7, 2006.01]**
103/44 • from vehicle washing facilities **[7, 2006.01]**