

## 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)

### Definition statement

*This place covers:*

The physical, chemical and biological treatment of water, waste water or sewage, e.g. by distillation or evaporation, by degassing, by centrifugal separation, by flocculation of suspended impurities or by using plants such as algae.

Selection or use of compositions for such treatments.

Compositions (per se) specially adapted for water treatment.

Softening water and preventing scale; Adding scale preventatives or scale removers to water, e.g. adding sequestering agents.

Aeration of stretches of water.

Multistage treatment of water, waste water or sewage.

Treatment of sludge and devices therefore, e.g. bioreactors. Sludge treatment covered in this subclass is usually restricted to the treatment of sludge obtained from a water treatment process.

Devices for the treatment of water, waste water or sewage, e.g. devices for separating or removing fatty or oily substances or similar floating material.

### Relationships with other classification places

Separation in general is classified in [B01D](#).

Making potable water by desalination or solar evaporation is classified in [C02F](#) and apparatus for separation in general are classified in [B01D](#).

### References

#### Limiting references

*This place does not cover:*

Processes for making harmful chemical substances harmless, or less harmful, by effecting a chemical change in the substances	<a href="#">A62D 3/00</a>
Settling tanks and filter devices in general	<a href="#">B01D</a>
Adding materials to water to prevent corrosion	<a href="#">C23F</a>
Cleaning or keeping clear the surface of open water, e.g. the sea	<a href="#">E02B 15/00</a>
Devices for cleaning or keeping clear the surface of open water	<a href="#">E02B 15/04</a>
Methods for obtaining or collecting drinking water or tap water	<a href="#">E03B 3/00</a>
Treating radioactively-contaminated liquids	<a href="#">G21F 9/04</a>

**Application-oriented references**

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

Special arrangements on waterborne vessels of installations for producing fresh water	<a href="#">B63J 1/00</a>
Special arrangements on waterborne vessels of installations for treating waste water or sewage	<a href="#">B63J 4/00</a>

**Informative references**

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

Medicinal water	<a href="#">A61K</a>
Degasification of liquids in general	<a href="#">B01D 19/00</a>
Ion-exchange in general	<a href="#">B01J</a>
Packing elements in general	<a href="#">B01J 19/32</a>
Devices in sewers for separating liquid or solid substances from sewage	<a href="#">E03F 5/14</a>
Methods of steam generation	<a href="#">F22B</a>
Preheating boiler feed-water or accumulating preheated boiler feed-water	<a href="#">F22D</a>
Incinerators or other apparatus for burning waste liquors	<a href="#">F23G 7/04</a>

**Special rules of classification**

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.

It is desirable to add the indexing symbols of group [C02F 2101/00](#) for the nature of the contaminant and of group [C02F 2103/00](#) for the nature of the water, waste water, sewage or sludge to be treated which are considered to be of interest for search.

Devices are only classified in detail if there is no appropriate, more general place available and if they are clearly related to the water treatment aspect (i.e. if they are not universally applicable). The following symbols can be considered for classifying additional information:

Specifying the nature of the contaminant	<a href="#">C02F 2101/00</a> - <a href="#">C02F 2101/40</a>
Specifying the nature of water, waste water or sludge to be treated	<a href="#">C02F 2103/00</a> - <a href="#">C02F 2103/42</a>
Details of the apparatus used for treatment of water, wastewater or sludge	<a href="#">C02F 2201/00</a> - <a href="#">C02F 2201/784</a>
Specifying details of the apparatus and plants for the biological treatment of water, wastewater or sewage	<a href="#">C02F 2203/00</a>
Controlling or monitoring parameters in water treatment	<a href="#">C02F 2209/00</a> - <a href="#">C02F 2209/445</a>
Specifying general aspects of water treatment	<a href="#">C02F 2301/00</a> - <a href="#">C02F 2301/08</a>
Specific treatment goals	<a href="#">C02F 2303/00</a> - <a href="#">C02F 2303/20</a>
The use of specific compounds in water treatment	<a href="#">C02F 2305/00</a> - <a href="#">C02F 2305/10</a>
The location of water treatment or water treatment device	<a href="#">C02F 2307/00</a> - <a href="#">C02F 2307/08</a>

## Glossary of terms

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

Sludge	Solids that remain after wastewater treatment. This material may be separated, treated and composted into fertiliser. Aqueous suspension of solids resulting from water treatment processes and having a solids concentration of typically more than 2 g/L.
--------	---

## C02F 1/00

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

### Definition statement

*This place covers:*

This group covers processes and apparatus relating to physical and chemical water treatment (ultrapure water, potable water, wastewater).

Treatment concerns only water, waste water or sewage and not any liquids

### References

#### Limiting references

*This place does not cover:*

Biological water treatment	<a href="#">C02F 3/00</a>
Softening water, preventing scale	<a href="#">C02F 5/00</a>
Aeration of stretches of water	<a href="#">C02F 7/00</a>
Multistage treatment of water	<a href="#">C02F 9/00</a>

## 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](#) - [B01D 41/00](#))}**

### Definition statement

*This place covers:*

Methods for separation of water and particles suspended in water.

### References

#### Limiting references

*This place does not cover:*

Membrane treatment	<a href="#">C02F 1/44</a>
Filter devices	<a href="#">B01D 24/00</a> - <a href="#">B01D 41/00</a>

**Informative references**

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

Membrane filters	<a href="#">B01D 61/00</a> - <a href="#">B01D 71/00</a>
------------------	---

**Special rules of classification**

The head group should only be used if none of the more specific groups is appropriate.

**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)}

**Definition statement**

*This place covers:*

This class relates to small portable filters, which are mostly pocket-sized, e.g. filters integrated in drinking straws, canteens or bottles. Bottle-filters can be further characterised using the symbol [C02F 2307/02](#).

**References****Limiting references**

*This place does not cover:*

Household type filters	<a href="#">C02F 1/003</a>
------------------------	----------------------------

**Informative references**

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

Indexing symbol for bottle-filters	<a href="#">C02F 2307/02</a>
------------------------------------	------------------------------

**C02F 1/003**

{using household-type filters for producing potable water, e.g. pitchers, bottles, faucet mounted devices ([C02F 9/20](#) takes precedence)}

**Definition statement**

*This place covers:*

This class contains household filters, e.g. pitchers, larger bottles, cartridges, faucet mounted devices, filters useable either in commercial or residential establishments. Additional details can be classified using Indexing symbols [C02F 2307/02](#) - [C02F 2307/06](#) (see the informative references).

**References****Limiting references**

*This place does not cover:*

Small-scale multistage treatment apparatus	<a href="#">C02F 9/20</a>
--	---------------------------

**Informative references**

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

Filter as part of a bottle	<a href="#">C02F 2307/02</a>
Filter being part of a pitcher or jug	<a href="#">C02F 2307/04</a>
Filter being mounted on a faucet or showerhead	<a href="#">C02F 2307/06</a>
Apparatus for making beverages including water filters	<a href="#">A47J 31/605</a>
Filter condition indicators	<a href="#">B01D 35/143</a>
Liquid dispensers	<a href="#">B67D</a>

**C02F 1/004**

{using large scale industrial sized filters}

**Definition statement**

This place covers:

To be used for large scale (industrial scale) mechanical filtration, e.g. use of a sand filter, rapid filtration. Typical applications are filters in drinking water purification plants, post filtration in wastewater treatment plants, water filtration for industrial water stream.

**References****Informative references**

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

Biofilters	<a href="#">C02F 3/00</a>
Filters in general	<a href="#">B01D</a>

**C02F 1/005**

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

**Definition statement**

This place covers:

Systems or processes based on supernatural or anthroposophic principles. This class is used for all esoteric applications which claim implausible effects (lack of scientific explanation, quackery).

**References****Informative references**

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

Homeopathy, esoteric applications	<a href="#">A61K 41/0004</a>
Screening of terrestrial radiation	<a href="#">A61N 1/16</a>
Radio-esthesia, dowsing	<a href="#">G01V 9/002</a>

### Special rules of classification

Clear treatment steps, e.g. magnetic treatment, irradiation can be classified by adding the corresponding additional information symbol ([C02F 1/48](#), [C02F 1/30](#); etc.).

### 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](#))}**

### Definition statement

*This place covers:*

This class is used for any devices directing the water to be treated into the treatment tank or installation, e.g. pipes, connecting vessels.

### References

#### Limiting references

*This place does not cover:*

Water distributors for settling tanks	<a href="#">B01D 21/24</a>
---------------------------------------	----------------------------

### C02F 1/008

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

### Definition statement

*This place covers:*

Control of parameters in the physical or chemical water treatment processes

### References

#### Limiting references

*This place does not cover:*

Control of flocculation processes	<a href="#">C02F 1/5209</a>
Control of biological water treatment processes	<a href="#">C02F 3/006</a>

### Informative references

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

Control parameters and systems	<a href="#">C02F 2209/00</a> - <a href="#">C02F 2209/445</a>
Control in general	<a href="#">G01N</a>

**C02F 1/02**

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

**Definition statement**

*This place covers:*

Treatment of water by heating

**References****Limiting references**

*This place does not cover:*

Methods of steam generation	<a href="#">F22B</a>
Preheating boiler feed-water	<a href="#">F22D</a>

**Informative references**

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

General disinfection or sterilisation of materials or objects by heat	<a href="#">A61L 2/04</a>
Sterilisation of biological materials	<a href="#">A61L 2103/05</a>

**Special rules of classification**

The groups [C02F 1/02](#) - [C02F 1/18](#) cover applications in which the water treatment process concerns mainly the heating of the water to be treated, e.g. disinfection, evaporation, distillation.

**C02F 1/04**

by distillation or evaporation

**Definition statement**

*This place covers:*

Treatment of water using distillation, apparatus details should always be classified in the corresponding classes in [B01D](#).

**References****Informative references**

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

General distillation and evaporation, devices	<a href="#">B01D 1/00</a> - <a href="#">B01D 5/00</a>
---	---

**Special rules of classification**

Seawater desalination can be indexed with the symbol [C02F 2103/08](#).

**C02F 1/041****{by means of vapour compression}****Definition statement***This place covers:*

Treatment of water, waste water or sewage by vapour compression

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

Evaporating with vapour compression	<a href="#">B01D 1/28</a>
-------------------------------------	---------------------------

**C02F 1/042****{Prevention of deposits}****Definition statement***This place covers:*

Prevention of deposits in the context of distillation or evaporation.

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

Electrochemical prevention or elimination of deposits	<a href="#">C02F 1/4604</a>
Softening water, scale prevention	<a href="#">C02F 5/00</a>
Elimination of deposits, scale removal or prevention being a secondary aspect	<a href="#">C02F 2303/22</a>

**C02F 1/045****{for obtaining ultra-pure water}****Definition statement***This place covers:*

Distillation / evaporation process for obtaining ultrapure water.

**Special rules of classification**Symbol [C02F 2103/04](#) should be used for all other processes producing ultrapure water.



**C02F 1/046****{under vacuum produced by a barometric column}****Definition statement***This place covers:*

Treatment of water, waste water or sewage by distillation or evaporation under vacuum produced by a barometric column

**References****Informative references**

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

Vacuum distillation using a barometric column	<a href="#">B01D 3/103</a>
---	----------------------------

**C02F 1/048****{Purification of waste water by evaporation}****Definition statement***This place covers:*

Treatment of wastewater by evaporation and distillation.

**Special rules of classification**

The specific type of wastewater can be further characterised using the symbols under [C02F 2103/00](#) - [C02F 2103/42](#).

**C02F 1/06****Flash evaporation****Definition statement***This place covers:*

Treatment of water, waste water or sewage by flash evaporation, i.e. evaporation under (non-barometric) vacuum or by sudden expansion

**References****Informative references**

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

Flash distillation	<a href="#">B01D 3/06</a>
--------------------	---------------------------

## C02F 1/08

### Thin film evaporation

#### Definition statement

*This place covers:*

Treatment of water, waste water or sewage by evaporating a thin film of liquid on heated surfaces, packing elements or by using a falling film evaporator

#### Relationships with other classification places

Apparatus for filtration like thin film evaporator concerning liquid purification is classified in [B01D](#)

When the liquid purification concerns water, then it's also classified in [C02F 1/08](#)

#### References

##### Informative references

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

Film evaporation	<a href="#">B01D 1/065</a>
Thin layer evaporation	<a href="#">B01D 1/22</a>

## C02F 1/10

### by direct contact with a particulate solid or with a fluid, as a heat transfer medium

#### Definition statement

*This place covers:*

Treatment of water, waste water or sewage by putting the water in direct contact with the heat carrier medium

#### References

##### Informative references

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

Evaporating with heated gases in contact with the liquid	<a href="#">B01D 1/14</a>
--	---------------------------

## C02F 1/12

### Spray evaporation

#### Definition statement

*This place covers:*

Treatment of water, waste water or sewage by dispersing the water in form of droplets (spray) in a gas for evaporating

## References

### Informative references

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

Evaporating by spraying	<a href="#">B01D 1/16</a>
-------------------------	---------------------------

## C02F 1/14

### using solar energy

## Definition statement

*This place covers:*

Treatment of water, waste water or sewage by using solar heat directly or indirectly for evaporating water

## References

### Informative references

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

Evaporating in general using solar energy	<a href="#">B01D 1/0035</a>
---	-----------------------------

## C02F 1/16

### using waste heat from other processes

## Definition statement

*This place covers:*

Treatment of water, waste water or sewage by using waste heat from other processes, e.g. from engine cooling circuits, power plants or industrial production processes

## References

### Informative references

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

Evaporating using waste energy	<a href="#">B01D 1/0058</a>
--------------------------------	-----------------------------

## C02F 1/18

### Transportable devices to obtain potable water

## Definition statement

*This place covers:*

Transportable device and process using such device for treating water by distillation.

## References

### Informative references

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

Mobile apparatus and plants in general	<a href="#">C02F 2201/008</a>
Mobile biological apparatus and plants in general	<a href="#">C02F 2203/008</a>

## 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](#))

### Definition statement

This place covers:

Processes removing dissolved gases such as oxygen, carbon dioxide or halogens. This class is also used for processes directed at removing volatile organic or inorganic compounds, e.g. ammonia. This includes stripping and vacuum processes.

## References

### Informative references

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

Apparatus for degasification of liquids in general	<a href="#">B01D 19/00</a>
Arrangement of degassing apparatus in boiler feed supply	<a href="#">F22D</a>

### Special rules of classification

Indexing symbols for the compounds to be removed should be used if available ([C02F 2101/00](#) - [C02F 2101/40](#)).

## C02F 1/22

### by freezing

### Definition statement

This place covers:

Processes for cleaning water by freezing, separation of ice and slush from water and subsequent melting of ice and slush, e.g. freeze desalination.

### Special rules of classification

Freeze-desalination using methane-hydrates (clathrates) is classified as a combination of [C02F 1/22](#) and [C02F 1/265](#).

**C02F 1/24****by flotation ([C02F 1/465](#) takes precedence)****Definition statement***This place covers:*

Water treatment processes by flotation, e.g. for separating solids and liquids dispersed in water by using microbubbles, dissolved air flotation (DAF).

**References****Limiting references***This place does not cover:*

Electroflotation	<a href="#">C02F 1/465</a>
------------------	----------------------------

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

Flotation devices	<a href="#">B03D 1/14</a>
-------------------	---------------------------

**C02F 1/26****by extraction****Definition statement***This place covers:*

Treatment of water, waste water or sewage by extraction, e.g. removing pollutant from water by extraction, solvent extraction.

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

Solvent extraction	<a href="#">B01D 11/00</a>
--------------------	----------------------------

**C02F 1/28****by sorption (using ion-exchange [C02F 1/42](#); sorbent compositions [B01J](#))****Definition statement***This place covers:*

Treatment of water by sorption, removal of a compound by adsorption on a generally solid sorbent, regardless of the mechanism involved (chemisorption, complexation).

**References****Limiting references***This place does not cover:*

Treatment of water, waste water or sewage by ion exchange	<a href="#">C02F 1/42</a>
---	---------------------------

**Informative references**

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

Sorbents in general	<a href="#">B01J</a>
---------------------	----------------------

**Special rules of classification**

If more than one sorbent is used the head group should be used in combination with the more specific symbols chosen from [C02F 2001/422](#) - [C02F 2001/427](#).

**C02F 1/281**

{using inorganic sorbents}

**Definition statement**

*This place covers:*

Water treatment using natural and synthetic inorganic sorbents. Examples for inorganic sorbents include zeolites, clays, silicagel, metal-hydroxides. Ion exchange occurring at the surface of inorganic sorbents is also classified here.

**References****Informative references**

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

Inorganic sorbents	<a href="#">B01J 20/02</a>
--------------------	----------------------------

**C02F 1/283**

{using coal, charred products, or inorganic mixtures containing them}

**Definition statement**

*This place covers:*

Activated carbon and other coal or carbon based adsorbents, Powdered activated carbon (PAC), carbon black

**References****Informative references**

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

Carbon based sorbents	<a href="#">B01J 20/20</a>
-----------------------	----------------------------

**Special rules of classification**

Only to be used if the carbonaceous compound is the active adsorbent (not for carriers).

**C02F 1/285****{using synthetic organic sorbents}****Definition statement***This place covers:*

Treatment of water, waste water or sewage by sorption using synthetic organic sorbents, e.g. organic adsorbents not occurring naturally, e.g. synthetic polymers.

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

Sorbents comprising synthetic macromolecular compounds	<a href="#">B01J 20/26</a>
--	----------------------------

**C02F 1/286****{using natural organic sorbents or derivatives thereof}****Definition statement***This place covers:*

Sorption using natural organic sorbents such as algae, compost, humic acids, cellulose, etc.

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

Sorbents comprising naturally occurring natural macromolecular compounds	<a href="#">B01J 20/24</a>
--	----------------------------

**C02F 1/288****{using composite sorbents, e.g. coated, impregnated, multi-layered}****Definition statement***This place covers:*

Processes using coated, impregnated, hybrid and multi-layered sorbents.

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

Coated solid sorbents	<a href="#">B01J 20/32</a>
-----------------------	----------------------------

**Special rules of classification**

Use of layered adsorbents should be classified as combination of class and additional symbol, e.g. [C02F 1/288](#) and [C02F 1/283](#).

**C02F 1/30****by irradiation****Definition statement***This place covers:*

Processes for treating water, waste water or sewage by using radiation sources, e.g. plasma, ionised gas. Irradiation with sunlight should be classified here only if the effect is not due to the UV radiation and if the effect is not achieved by heating.

**C02F 1/302****{with microwaves}****Definition statement***This place covers:*

Treatment of water with microwave radiation.

**References****Informative references**

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

Disinfecting and sterilising with microwaves	<a href="#">A61L 2/12</a>
--	---------------------------

**Special rules of classification**

If microwaves are primarily used for heating [C02F 1/02](#) is used.

**C02F 1/32****with ultraviolet light****Definition statement***This place covers:*

Processes using ultraviolet light (light having a wavelength of approximately 100-400 nm).

**References****Informative references**

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

General disinfection or sterilisation of materials or objects by ultraviolet [UV] radiation	<a href="#">A61L 2/10</a>
---	---------------------------

**Special rules of classification**

[C02F 1/325](#) should always be used when apparatus details are mentioned. Photocatalysis is classified by combining [C02F 1/32](#) or [C02F 1/325](#) with [C02F 1/74](#) and [C02F 2305/10](#).



**C02F 1/325****{Irradiation devices or lamp constructions}****Definition statement***This place covers:*

Devices for UV treatment.

**Special rules of classification**Details should be classified by using the symbols under [C02F 2201/32](#).**C02F 1/34****with mechanical oscillations****Definition statement***This place covers:*Processes using cavitation for the destruction of particles and substances in the water to be treated.  
Mechanical creation by nozzles, valves, throttles or pumps.**References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

General mixing	<a href="#">B01F</a>
----------------	----------------------

**Special rules of classification**

Can be given as additional information for sludge treatment.

**C02F 1/36****ultrasonic vibrations****Definition statement***This place covers:*

Processes using ultrasonic transducer or similar devices to create ultrasound.

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

General disinfection or sterilisation of materials or objects by ultrasonic waves	<a href="#">A61L 2/025</a>
---	----------------------------

**Special rules of classification**If ultrasonic waves are created mechanically, e.g. with a nozzle, classify in [C02F 1/34](#).

**C02F 1/38****by centrifugal separation****Definition statement**

*This place covers:*

Processes for treatment of water, waste water or sewage in which separation is achieved by using centrifugal forces, e.g. hydrocyclones, hydrodynamical separators.

**References****Informative references**

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

Centrifugal separators in general	<a href="#">B04C</a>
-----------------------------------	----------------------

**C02F 1/385****{by centrifuging suspensions (centrifuges [B04B](#))}****Definition statement**

*This place covers:*

Centrifugal separation for treating water.

**References****Limiting references**

*This place does not cover:*

Centrifugal separation of sludge	<a href="#">C02F 11/127</a>
Centrifuges	<a href="#">B04B</a>

**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](#))**

**Definition statement**

*This place covers:*

Devices for removing fatty or oily substances or similar floating material,, e.g. grease traps, oil water separators or oil skimmers

**References****Informative references**

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

Separation of liquids	<a href="#">B01D 17/00</a>
-----------------------	----------------------------

Devices for removing oil from open water surfaces	<a href="#">E02B 15/04</a>
Devices in sewers for removing fat and oil from sewage	<a href="#">E03F 5/14</a>
Devices for use in drains leading to the sewer	<a href="#">E03F 5/16</a>

## **C02F 1/42**

**by ion-exchange (ion-exchange in general [B01J](#))**

### **Definition statement**

*This place covers:*

Use of resin type ion exchangers for treatment of water, waste water or sewage

### **References**

#### **Informative references**

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

Dishwashers comprising water softeners	<a href="#">A47L 15/4229</a>
Ion-exchange in general	<a href="#">B01J 39/00</a> - <a href="#">B01J 49/00</a>
Washing machines comprising water softeners	<a href="#">D06F 39/007</a>

### **Special rules of classification**

Ion exchange using zeolites and other inorganic ion exchangers should be classified in [C02F 1/281](#) (sorption with inorganic sorbents).

## **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](#))}**

### **Definition statement**

*This place covers:*

Water treatment processes using membrane separation.

### **References**

#### **Limiting references**

*This place does not cover:*

Electrodialysis	<a href="#">C02F 1/4693</a>
Membrane bioreactor systems	<a href="#">C02F 3/1268</a>
Submerged membrane bioreactors	<a href="#">C02F 3/1273</a>
Anaerobic membrane bioreactors	<a href="#">C02F 3/2853</a>

**Informative references**

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

Membrane separation, devices	<a href="#">B01D 61/00</a> - <a href="#">B01D 71/82</a>
------------------------------	---

**C02F 1/441**

{by reverse osmosis}

**Definition statement**

*This place covers:*

Treatment of water, waste water, sewage by reverse osmosis

**References****Informative references**

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

Reverse osmosis processes in general	<a href="#">B01D 61/025</a>
--------------------------------------	-----------------------------

**C02F 1/442**

{by nanofiltration}

**Definition statement**

*This place covers:*

Treatment of water, waste water, sewage by nanofiltration

**References****Informative references**

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

Nanofiltration processes in general	<a href="#">B01D 61/027</a>
-------------------------------------	-----------------------------

**C02F 1/444**

{by ultrafiltration or microfiltration}

**Definition statement**

*This place covers:*

Treatment of water, waste water, sewage by ultrafiltration or microfiltration

**References****Informative references**

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

Ultrafiltration processes in general	<a href="#">B01D 61/145</a>
Microfiltration processes in general	<a href="#">B01D 61/147</a>

**C02F 1/46****by electrochemical methods****Definition statement**

*This place covers:*

Electrochemical methods for treating water, if no electrical current (static electrical field) is used [C02F 1/48](#) applies.

**References****Informative references**

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

Electrolytic processes for producing compounds	<a href="#">C25B</a>
Electroplating	<a href="#">C25D</a>

**Special rules of classification**

When classifying in [C02F 1/46](#) the additional symbols under [C02F 2201/46](#) should be used for additional information.

**C02F 1/4604**

**{for desalination of seawater or brackish water}**

**Definition statement**

*This place covers:*

All electrochemical seawater desalination processes not covered by [C02F 1/469](#).

**C02F 1/4606**

**{for producing oligodynamic substances to disinfect the water}**

**Definition statement**

*This place covers:*

Production of disinfecting metallic ions, e.g. Ag, Cu, by electrolysis.

**References****Informative references**

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

Non-electrolytic oligodynamic treatment	<a href="#">C02F 1/505</a>
---	----------------------------

**Glossary of terms**

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

Oligodynamic substances	active substances in very small quantities, used especially to describe the sterilizing effect of some heavy metals against bacteria
-------------------------	--

**C02F 1/4608****{using electrical discharges}****Definition statement***This place covers:*

Treatment of water by applying electrical discharges, generally by using high voltages.

**C02F 1/46104****{Devices therefor; Their operating or servicing}****Definition statement***This place covers:*Electrolytic devices used for water treatment, for additional details not covered by classes in [C02F](#) the symbols [C02F 2001/46119](#) - [C02F 2001/46171](#) , and [C02F 2001/46185](#) - [C02F 2001/46195](#) can be used.**C02F 1/46109****{Electrodes}****Definition statement***This place covers:*

Electrodes for water treatment purposes.

**Special rules of classification**Additional information can be given by using the symbols [C02F 2001/46119](#) - [C02F 2001/46166](#).**C02F 1/46114****{Electrodes in particulate form or with conductive and/or non conductive particles between them}****Definition statement***This place covers:*

Electrolytic cells where the space between anode and cathode is filled with a bed of particles (static or fluidised bed) and electrodes which are themselves comprised of particles.

**C02F 2001/46152****{characterised by the shape or form}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Treatment of water by electrolysis with electrodes in particulate form or with conductive and/or non-conductive particles between them	<a href="#">C02F 1/46114</a>
--	------------------------------

**C02F 1/4618****{for producing "ionised" acidic or basic water}****Definition statement***This place covers:*

Production of acidic, oxidising water at the anode and alkaline, reducing water at the cathode (separation of the streams).

**Special rules of classification**

If the water is primarily used for oxidation [C02F 1/4672](#) applies. For electrochemical reduction use [C02F 1/4676](#). Additional symbols [C02F 2001/46185](#) - [C02F 2001/46195](#) are available.

**C02F 1/463****by electrocoagulation****Definition statement***This place covers:*

Electrochemical production of coagulant, e.g. iron or aluminium ions, usually with dissolution of the electrode.

**References****Informative references**

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

Chemical flocculation or precipitation	<a href="#">C02F 1/52</a> - <a href="#">C02F 1/56</a>
--	---

**C02F 1/465****by electroflotation****Definition statement***This place covers:*

Electrochemical production of microbubbles for flotation.

**References****Informative references**

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

Water treatment by flotation	<a href="#">C02F 1/24</a>
------------------------------	---------------------------

**C02F 1/4672****{by electrooxydation}****Definition statement***This place covers:*

Electrochemical production of oxidants (oxygen, ozone, hydroxyl radicals) at the anode for disinfection and oxidation of organic and inorganic substances.

**References****Informative references**

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

Creating reactive oxygen species	<a href="#">C02F 2305/023</a>
----------------------------------	-------------------------------

**C02F 1/4676****{by electroreduction}****Definition statement***This place covers:*

Electrochemical production of reducing agents (hydrogen), occurring at the cathode.

**C02F 1/4678****{of metals}****Definition statement***This place covers:*

Reduction of metals (electroplating) is included in this group.

**C02F 1/469****by electrochemical separation, e.g. by electro-osmosis, electrodialysis, electrophoresis****Definition statement***This place covers:*

All processes where an electrical field is the driving force for separating substances in water treatment.

**C02F 1/4691****{Capacitive deionisation}****Definition statement***This place covers:*

Removing ions from water by capacitive deionisation.



## References

### Informative references

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

Capacitors	<a href="#">H01G</a>
------------	----------------------

## C02F 1/4693

{electrodialysis}

### Definition statement

*This place covers:*

Treatment of water, waste water, sewage by electrodialysis

## References

### Informative references

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

Electrodialysis processes in general	<a href="#">B01D 61/422</a>
--------------------------------------	-----------------------------

## C02F 1/4695

{electrodeionisation}

### Definition statement

*This place covers:*

Use of an electrodialysis cell wherein one or more of the compartments is filled with ion-exchange material.

## References

### Informative references

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

Electrodeionisation processes in general	<a href="#">B01D 61/48</a>
--	----------------------------

## C02F 1/4698

{electro-osmosis}

### Definition statement

*This place covers:*

Treatment of water, waste water, sewage by using the effect of electro-osmotic flow, i.e. the motion of liquid induced by an applied electrical potential across a porous material such as a capillary tube, membrane or microchannel.

## References

### Informative references

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

Electro-osmosis processes in general	<a href="#">B01D 61/427</a>
--------------------------------------	-----------------------------

## C02F 1/48

with magnetic or electric fields ([C02F 1/46](#) takes precedence)

### Definition statement

*This place covers:*

Includes treatment with an electrical field (no electrical current in the water).

## References

### Limiting references

*This place does not cover:*

Water treatment by electrochemical methods	<a href="#">C02F 1/46</a>
--	---------------------------

### Informative references

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

Eliminating or preventing deposits, scale prevention	<a href="#">C02F 2303/22</a>
Magnetic or electrostatic separation	<a href="#">B03C</a>

## C02F 1/481

{using permanent magnets}

### Definition statement

*This place covers:*

Treatment with permanent magnets.

## C02F 1/484

{using electromagnets}

### Definition statement

*This place covers:*

Treatment using electromagnets.

**C02F 1/487**

**{using high frequency electromagnetic fields, e.g. pulsed electromagnetic fields}**

**Definition statement**

*This place covers:*

Treatment of water by using high frequency electromagnetic fields, e.g. for reducing scale in pipelines. Frequencies above 500 Hz are considered "high frequency" in the present context.

**C02F 1/488**

**{for separation of magnetic materials, e.g. magnetic flocculation}**

**Definition statement**

*This place covers:*

Water treatment processes where a magnetic field is used for separation (includes removing loaded sorbents from water).

**C02F 1/50**

**by addition or application of a germicide or by oligodynamic treatment**  
**{{[C02F 1/4606](#), [C02F 1/467](#), [C02F 1/76](#) take precedence}}**

**Definition statement**

*This place covers:*

Treatment of water by addition of chemicals and compounds that adversely affect the ability of microorganisms, animals and plants to survive or reproduce.

**References****Limiting references**

*This place does not cover:*

Electrochemical methods for producing oligodynamic substances to disinfect the water	<a href="#">C02F 1/4606</a>
Electrochemical disinfection	<a href="#">C02F 1/467</a>
Oxidation with halogens or compounds of halogens	<a href="#">C02F 1/76</a>

**Informative references**

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

Chemicals for disinfection in general	<a href="#">A01N</a>
Methods or apparatus for disinfection in general	<a href="#">A61L</a>

**Synonyms and Keywords**

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

- EN: disinfect, sterilize, sanitize
- DE: sterilisieren, desinfizieren,

- FR: stériliser, désinfecter, aseptiser

## C02F 1/505

{by oligodynamic treatment}

### Definition statement

*This place covers:*

Treatment of water by oligodynamic effect created by the addition of metallic ions of mercury, silver, copper, iron, lead, zinc, bismuth, gold, aluminium.

## C02F 1/52

by flocculation or precipitation of suspended impurities {(C02F 1/463 takes precedence)}

### Definition statement

*This place covers:*

Processes and related installations or apparatus for water treatment by causing coagulation or flocculation. Crystallisation processes are to be included when used for water treatment.

### References

#### Limiting references

*This place does not cover:*

Electrocoagulation	<a href="#">C02F 1/463</a>
--------------------	----------------------------

#### Informative references

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

Flotation processes	<a href="#">C02F 1/24</a>
Sedimentation	B0D21

### Glossary of terms

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

Coagulation	breaking of the electrostatic repulsion to allow growth of "nuclei".
Flocculation	growth of "flocs" mostly by addition of separated nuclei.

### Synonyms and Keywords

*In patent documents the following terms are often used:*

EN	Coagulation, flocculation, precipitation, agglomeration, weighting, ballast
DE	Koagulation, Flockung, Fällung, Agglomeration, Beschwerung, ballast
FR	Coagulation, floculation, précipitation, agglomération, pondération, ballast, lesté.

**C02F 1/5209****{Regulation methods for flocculation or precipitation}****Definition statement**

*This place covers:*

Water treatment documents where the invention information relates to the regulation of coagulation and flocculation, or to the way the coagulated or precipitated matter is separated when no other subclass is provided.

**References****Limiting references**

*This place does not cover:*

Control for chemical and physical water treatment	<a href="#">C02F 1/008</a>
Control for biological water treatment	<a href="#">C02F 3/006</a>

**Informative references**

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

Control parameters	<a href="#">C02F 2209/00</a> - <a href="#">C02F 2209/44</a>
Control in general	<a href="#">G01N</a>

**Special rules of classification**

Use the Indexing Codes under [C02F 2209/00](#) - [C02F 2209/445](#) if applicable.

**C02F 1/5227****{Processes for facilitating the dissolution of solid flocculants in water}****Definition statement**

*This place covers:*

This group concerns processes for improving the dissolution of additives before coagulation or flocculation is performed.

**C02F 1/5236****{using inorganic agents}****Definition statement**

*This place covers:*

Water treatment using inorganic coagulants or flocculants.

**Special rules of classification**

Inorganic polymers should not receive the [C02F 1/56](#) class or Indexing symbol.

**C02F 1/5245****{using basic salts, e.g. of aluminium and iron}****Definition statement***This place covers:*

Treatment of water by addition of inorganic salts with alkaline character.

**C02F 1/5254****{using magnesium compounds and phosphoric acid for removing ammonia}****Definition statement***This place covers:*

Treatment of water in the MAP process, i.e. magnesium ammonium phosphate precipitation process to remove ammonium nitrogen from waste water

**C02F 1/5263****{using natural chemical compounds}****Definition statement***This place covers:*

Treatment of water by flocculation or precipitation of suspended impurities with the use of natural compounds chemically unmodified and unformulated; e.g. chitosan, bacterial products.

**Special rules of classification**Compounds unmodified and unformulated. Formulations comprising them should be classified in [C02F 1/5272](#).**C02F 1/5272****{using specific organic precipitants}****Definition statement***This place covers:*

Treatment of water by flocculation or precipitation of suspended impurities with the use of defined organic compounds and formulations for water treatment, e.g. formulations comprising lignin as coagulant.

**C02F 1/5281****{Installations for water purification using chemical agents}****Definition statement***This place covers:*

Apparatuses and installations comprising devices for water coagulation and precipitation.

**C02F 1/529****{Processes or devices for preparing lime water}****Definition statement***This place covers:*

Water treatment including the preparation of lime water.

**C02F 1/54****using organic material****Definition statement***This place covers:*

Water treatment by organic compounds including oligomers

**Special rules of classification**Non macromolecular compounds. Classify polymers under [C02F 1/56](#)**C02F 1/542****{Phosphorus compounds}****Definition statement***This place covers:*

Water treatment by organic compounds comprising phosphorus functional groups.

**C02F 1/545****{Silicon compounds}****Definition statement***This place covers:*

Water treatment by organic compounds comprising silicon functional groups.

**C02F 1/547****{Tensides}****Definition statement***This place covers:*

Water treatment by surface active organic compounds.

**C02F 1/56****Macromolecular compounds****Definition statement***This place covers:*

Water treatment with organic polymers.

## References

### Informative references

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

Inorganic polymeric compounds	<a href="#">C02F 1/5236</a> , <a href="#">C02F 1/5245</a>
Polymers in general	<a href="#">C08F</a>

## C02F 1/58

by removing specified dissolved compounds (using ion-exchange [C02F 1/42](#); softening water [C02F 5/00](#))

### Definition statement

*This place covers:*

Documents related to removal of specific polluting or unwanted compounds from water.

## References

### Limiting references

*This place does not cover:*

Ion-exchange	<a href="#">C02F 1/42</a>
Softening water	<a href="#">C02F 5/00</a>

## Special rules of classification

The classes [C02F 1/58](#) - [C02F 1/645](#) should only be used if no other class is applicable, for specifying the compound to be removed the Indexing symbols in the range [C02F 2101/00](#) - [C02F 2101/40](#) should be given. Classification of the method and the apparatus used in [C02F](#) is also mandatory.

## 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](#))

### Definition statement

*This place covers:*

Processes directed to obtain or avoid a particular pH value or range in water treatment.

## References

### Informative references

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

Degassing	<a href="#">C02F 1/20</a>
Ion-exchange	<a href="#">C02F 1/42</a>
Flocculation and precipitation	<a href="#">C02F 1/52</a>
Removing dissolved compounds	<a href="#">C02F 1/58</a>



## Special rules of classification

Classify here when invention information concerns pH adjustment. In all other cases involving pH measurement or adjustment use symbols from [C02F 1/66](#) or [C02F 2209/06](#).

## C02F 1/68

**by addition of specified substances, e.g. trace elements, for ameliorating potable water (medicinal water [A61K](#))**

### Definition statement

*This place covers:*

Adding specific substances, e.g. vitamins, trace elements or carbon dioxide to water.

### References

#### Informative references

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

Medicinal water	<a href="#">A61K</a>
-----------------	----------------------

## C02F 1/681

**{by addition of solid materials for removing an oily layer on water}**

### Definition statement

*This place covers:*

Addition of adsorbents to the water for removing oil from water (remediating oil spills).

## C02F 1/683

**{by addition of complex-forming compounds}**

### Definition statement

*This place covers:*

Water treatment by addition of any molecules forming a complex with a target, regardless their other characteristics or use

### Synonyms and Keywords

*In patent documents the following terms are often used:*

sequestering, complexing, scavenging, chelating

## C02F 1/685

**{Devices for dosing the additives}**

### Definition statement

*This place covers:*

Water treatment devices for adding chemicals to water in a controlled manner.

## References

### Informative references

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

Dosing of halogens in gaseous form	<a href="#">C02F 1/763</a>
------------------------------------	----------------------------

## C02F 1/686

{Devices for dosing liquid additives}

### Definition statement

*This place covers:*

Water treatment devices for adding chemicals in liquid form.

## C02F 1/687

{Devices for dosing solid compounds}

### Definition statement

*This place covers:*

Water treatment devices for adding chemicals in solid form to water in a controlled manner.

## C02F 1/688

{Devices in which the water progressively dissolves a solid compound}

### Definition statement

*This place covers:*

Water treatment devices for adding chemicals to water in a controlled manner exploiting the flow of water which gradually dissolves the product to be dosed. Includes the use of tablets or granular products enclosed in a device.

## C02F 1/70

by reduction {([C02F 1/4676](#) takes precedence)}

### Definition statement

*This place covers:*

Water treatment processes wherein pollutants are chemically reduced.

## References

### Limiting references

*This place does not cover:*

Electrochemical reduction processes	<a href="#">C02F 1/4676</a>
-------------------------------------	-----------------------------

**C02F 1/705****{Reduction by metals}****Definition statement***This place covers:*

Water treatment processes wherein pollutants are reduced by metallic compounds (in zero valence state).

**C02F 1/72****by oxidation {(C02F 1/4672 takes precedence)}****Definition statement***This place covers:*

Water treatment processes wherein pollutants are chemically oxidized.

**References****Limiting references***This place does not cover:*

Electrochemical oxidation processes	<a href="#">C02F 1/4672</a>
-------------------------------------	-----------------------------

**C02F 1/722****{Oxidation by peroxides}****Definition statement***This place covers:*

Water treatment processes wherein pollutants are oxidized by peroxides.

**C02F 1/725****{by catalytic oxidation}****Definition statement***This place covers:*

Water treatment processes wherein pollutants are oxidized by catalytic reactions. Includes the use of heterogeneous catalysts.

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

Fenton type oxidation	<a href="#">C02F 2305/026</a>
Photocatalysts	<a href="#">C02F 2305/10</a>

### Special rules of classification

Photocatalysis is classified by combining [C02F 1/32](#) or [C02F 1/325](#) with [C02F 1/725](#) and [C02F 2305/10](#).

## C02F 1/727

{using pure oxygen or oxygen rich gas}

### Definition statement

*This place covers:*

Water treatment processes wherein pollutants are oxidized by pure oxygen or oxygen enriched gas.

### References

#### Informative references

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

Reactive oxygen species, singlet oxygen, OH radical	<a href="#">C02F 2305/023</a>
---	-------------------------------

## C02F 1/74

with air (aeration of stretches of water [C02F 7/00](#))

### Definition statement

*This place covers:*

Water treatment processes wherein pollutants are oxidized by air.

### References

#### Limiting references

*This place does not cover:*

Activated sludge processes using surface aeration	<a href="#">C02F 3/14</a>
Activated sludge processes using diffusers	<a href="#">C02F 3/20</a>
Aeration of stretches of water	<a href="#">C02F 7/00</a>

## C02F 1/76

with halogens or compounds of halogens {([C02F 1/4674](#) takes precedence)}

### Definition statement

*This place covers:*

Water treatment processes wherein pollutants are oxidized by halogens.

### References

#### Limiting references

*This place does not cover:*

Electrochemical oxidation using halogens	<a href="#">C02F 1/4674</a>
--	-----------------------------

**C02F 1/763****{Devices for the addition of such compounds in gaseous form}****Definition statement***This place covers:*

Water treatment devices for adding halogens in gaseous form to water in a controlled manner.

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

Dosing of substances in general	<a href="#">C02F 1/685</a>
---------------------------------	----------------------------

**C02F 1/766****{by means of halogens other than chlorine or of halogenated compounds containing halogen other than chlorine}****Definition statement***This place covers:*

Water treatment processes wherein pollutants are oxidized by halogens explicitly different from chlorine, e.g. bromine.

**C02F 1/78****with ozone {([C02F 1/4672](#) takes precedence)}****Definition statement***This place covers:*

Water treatment processes wherein pollutants are oxidized by ozone.

**References****Limiting references***This place does not cover:*

Electrochemical oxidation using ozone	<a href="#">C02F 1/4672</a>
---------------------------------------	-----------------------------

**C02F 3/00****Biological treatment of water, waste water, or sewage {([C02F 1/006](#) takes precedence)}****Definition statement***This place covers:*

This group covers processes relating to biological water treatment. Devices are only classified in detail if there is no appropriate, more general place available and if they are clearly related to the water treatment aspect (not universally applicable).

## References

### Limiting references

*This place does not cover:*

Water distributors	<a href="#">C02F 1/006</a>
--------------------	----------------------------

## Glossary of terms

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

Aerobic	presence of dissolved oxygen
Anoxic	oxygen not present as dissolved oxygen but in the form of nitrate, sulfate, etc.
Anaerobic	absence of oxygen

## C02F 3/005

**{Combined electrochemical biological processes (aeration by electrolytically produced oxygen bubbles [C02F 3/202](#))}**

### Definition statement

*This place covers:*

Processes in which electrochemical treatment and biological treatment are directly combined, e.g. the electrodes being covered by a biofilm or electrodes being directly immersed in an activated sludge tank.

## References

### Informative references

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

Electrochemical water treatment in general	<a href="#">C02F 1/46</a> - <a href="#">C02F 1/4698</a>
Electrochemical aeration	<a href="#">C02F 3/202</a>

## C02F 3/006

**{Regulation methods for biological treatment}**

### Definition statement

*This place covers:*

To be used if the control of a biological water treatment process is the main invention.

## References

### Limiting references

*This place does not cover:*

Control of physical and chemical water treatment processes	<a href="#">C02F 1/008</a>
Control of flocculation or precipitation processes	<a href="#">C02F 1/5209</a>

**Informative references**

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

Control parameters	<a href="#">C02F 2209/00</a> - <a href="#">C02F 2209/445</a>
Control in general	<a href="#">G01N</a>

**Special rules of classification**

Symbols for the specific controlled parameters should be used if possible ([C02F 2209/00](#)-[C02F 2209/445](#)).

**C02F 3/02****Aerobic processes****Definition statement**

*This place covers:*

All aerobic water treatment processes, which are not covered by the following more specific groups.

**C02F 3/04****using trickle filters****Definition statement**

*This place covers:*

Trickling filters, i.e. biofilm reactors where the filter medium is not submerged in the water to be treated.

**C02F 3/043****{Devices for distributing water over trickle filters}****Definition statement**

*This place covers:*

Devices for distributing the water over the filter such as rotating arms, sprinklers.

**C02F 3/046****{Soil filtration}****Definition statement**

*This place covers:*

Filters using the soil as filter medium, the filters can be arranged in a column above the ground.

**C02F 3/06****using submerged filters****Definition statement**

*This place covers:*

Biofilters where the filter medium is completely submerged in the water to be treated.

**Special rules of classification**

The filter medium (fillings, grids, packing elements) is classified in [C02F 3/10](#) and subgroups.

**C02F 3/08****using moving contact bodies****Definition statement**

*This place covers:*

This class contains processes which use larger biofilm carriers which are in movement in the reactor. Rotating biological contactors are classified in [C02F 3/082](#).

**Special rules of classification**

Not for smaller biofilm carriers such as used in fluidised bed reactors. These should be classified in [C02F 3/085](#). The carrier could be classified in [C02F 3/10](#) and subgroups.

**C02F 3/10****Packings; Fillings; Grids (packing elements in general [B01J 19/30](#), [B01J 19/32](#))****Definition statement**

*This place covers:*

Packings, fillings and grids used as biofilm carrier (shape, arrangement, material).

**References****Informative references**

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

Separating processes characterised by the packing of the sorbent material	<a href="#">B01D 15/206</a>
Packed scrubbers	<b>B01D47/54</b>
Packing elements	<a href="#">B01J 19/30</a> , <a href="#">B01J 19/32</a>

**C02F 3/101****{Arranged-type packing, e.g. stacks, arrays}****Definition statement**

*This place covers:*

Biological treatment of water, waste water or sewage by aerobic processes using arrangement of a plurality of tanks, packings, grids, disks in stacks, arrays.



**C02F 3/102****{Permeable membranes}****Definition statement**

*This place covers:*

Membrane acting as support for the biofilm (not primarily for separation or aeration).

**Special rules of classification**

In case the membrane is used primarily for separating activated sludge or other substances from water [C02F 3/1268](#), [C02F 3/1273](#) and [C02F 3/2853](#) should be used.

**C02F 3/103****{Textile-type packing}****Definition statement**

*This place covers:*

Textiles acting as biofilm support.

**C02F 3/104****{Granular carriers}****Definition statement**

*This place covers:*

Granular carrier used as a packing or filling.

**C02F 3/105****{Characterized by the chemical composition}****Definition statement**

*This place covers:*

Packing, filler or carrier defined by the chemical composition, e.g. carbon based, inorganic, gels, polymers, etc.

**C02F 3/12****Activated sludge processes****Definition statement**

*This place covers:*

This group comprises all aerobic processes in which the microorganisms are present in the form of an activated sludge, i.e. located on or in flocs which are suspended in the water to be treated.

**C02F 3/121****{Multistep treatment}****Definition statement**

*This place covers:*

The treatment steps are carried out in different treatment tanks.

**References****Informative references**

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

Sludge treatment	<a href="#">C02F 11/00</a>
------------------	----------------------------

**Special rules of classification**

Treatment with several steps carried out in a single tank should be classified in [C02F 3/1263](#) (SBR).

**C02F 3/1215****{Combinations of activated sludge treatment with precipitation, flocculation, coagulation and separation of phosphates}****Definition statement**

*This place covers:*

Phosphate removal by chemical precipitation in combination with activated sludge treatment, e.g. by dosing salts of iron or aluminium directly into the activated sludge tank.

**References****Informative references**

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

Precipitation and flocculation	<a href="#">C02F 1/52</a> - <a href="#">C02F 1/56</a>
Phosphorous compounds	<a href="#">C02F 2101/105</a>

**Special rules of classification**

If precipitation and separation is performed as a separate treatment, e.g. after the clarifier, [C02F 1/5245](#) should be used.

**C02F 3/1221****{comprising treatment of the recirculated sludge}****Definition statement**

*This place covers:*

Reduction of surplus sludge by heating, ultrasonic treatment, oxidation carried out in a side stream (e.g. return sludge stream).

**C02F 3/1226****{comprising an absorbent material suspended in the mixed liquor}****Definition statement***This place covers:*

Using adsorbents or inert solids in suspension in the activated sludge tank, e.g. activated carbon powder or zeolites. The aim of the use of the adsorbents is to adsorb harmful substances or to improve the settleability of the flocs rather than to act as a carrier material.

**Special rules of classification**

This class is not used for classifying fluidised bed reactors. These should be classified in [C02F 3/085](#).

**C02F 3/1242****{Small compact installations for use in homes, apartment blocks, hotels or the like}****Definition statement***This place covers:*

Small wastewater treatment plants such as upgraded septic tanks and other compact devices for use in small communities, hotels or single houses.

**C02F 3/1257****{Oxidation ditches}****Definition statement***This place covers:*

Extended aeration with simultaneous sludge stabilisation.

**C02F 3/1263****{Sequencing batch reactors [SBR]}****Definition statement***This place covers:*

Sequencing batch reactors (SBR) for carrying out several treatment steps batchwise in a single tank.

**C02F 3/1268****{Membrane bioreactor systems}****Definition statement***This place covers:*

Membrane bioreactor systems for aerobic treatment of water.

## References

### Informative references

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

Membrane processes	<a href="#">C02F 1/44</a>
Electrodialysis	<a href="#">C02F 1/4693</a>
Anaerobic membrane treatment	<a href="#">C02F 3/2853</a>
General membrane treatment	<a href="#">B01D 61/00</a>

## Special rules of classification

If the membrane is used to further purify the wastewater after a clarifier or other liquid-solid separation [C02F 1/44](#) should be used.

### C02F 3/1273

#### {Submerged membrane bioreactors}

### Definition statement

*This place covers:*

The membrane module is submerged in the activated sludge suspension (treatment tank).

### C02F 3/1284

#### {Mixing devices}

### Definition statement

*This place covers:*

Mixing devices for keeping the activated sludge suspended.

## References

### Informative references

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

General mixing	<a href="#">B01F</a>
----------------	----------------------

## Special rules of classification

Mixing in the context of aeration: [C02F 3/14](#), [C02F 3/20](#) - [C02F 3/26](#).

### C02F 3/14

#### using surface aeration

### Definition statement

*This place covers:*

Activated sludge treatment using mechanical surface aeration.

**C02F 3/20****using diffusers****Definition statement**

*This place covers:*

Aeration in activated sludge processes whereby diffusers are used for aeration.

**References****Informative references**

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

Dispersing gas in a liquid	<a href="#">B01F 23/23</a>
----------------------------	----------------------------

**C02F 3/22****using circulation pipes****Definition statement**

*This place covers:*

Circulation of the activated sludge suspension is achieved by injecting air (mammoth-pump effect).

**References****Informative references**

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

Dispersing gas in a liquid	<a href="#">B01F 23/23</a>
----------------------------	----------------------------

**C02F 3/226****{"Deep shaft" processes}****Definition statement**

*This place covers:*

Processes using very deep treatment tanks for improving oxygen transfer.

**C02F 3/28****Anaerobic digestion processes****Definition statement**

*This place covers:*

Anaerobic treatment of wastewater.

**References****Informative references**

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

Anaerobic treatment of sludge	<a href="#">C02F 11/04</a>
-------------------------------	----------------------------

## Special rules of classification

Combined aerobic and anaerobic processes (Bio-P removal, nitrogen removal) are classified in [C02F 3/30](#) - [C02F 3/308](#).

## Glossary of terms

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

Aerobic	presence of dissolved oxygen
Anoxic	oxygen not present as dissolved oxygen but in the form of nitrate, sulfate, etc.
Anaerobic	absence of oxygen

## C02F 3/2806

**{Anaerobic processes using solid supports for microorganisms}**

### Definition statement

*This place covers:*

Anaerobic biofilm processes using reactors with fixed beds, fluidised beds or membranes as biomass carrier.

## C02F 3/282

**{using anaerobic sequencing batch reactors}**

### Definition statement

*This place covers:*

Biological treatment of water, waste water or sewage with several treatment sets batchwise in a single anaerobic tank

## References

### Informative references

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

Aerobic SBR processes	<a href="#">C02F 3/1263</a>
-----------------------	-----------------------------

## C02F 3/2833

**{using fluidized bed reactors}**

### Definition statement

*This place covers:*

Biological treatment of water, waste water or sewage by anaerobic digestion processes using a reactor with fluidized bed, the water passing through a granular solid material at high enough velocity to suspend the solid

## References

### Informative references

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

Aerobic fluidised bed processes	<a href="#">C02F 3/085</a>
Chemical or physical processes and apparatus conducted in the presence of fluids and solid particles	<a href="#">B01J 8/00</a>

## C02F 3/2846

{using upflow anaerobic sludge blanket [UASB] reactors}

### Definition statement

This place covers:

Reactors containing an anaerobic sludge bed, internal separators and gas collectors.

## C02F 3/2853

{using anaerobic membrane bioreactors}

### Definition statement

This place covers:

Membrane bioreactors for anaerobic processes.

## References

### Informative references

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

Membrane processes	<a href="#">C02F 1/44</a>
Electrodialysis	<a href="#">C02F 1/4693</a>
Membrane bioreactor systems	<a href="#">C02F 3/1268</a>
Submerged membrane bioreactors	<a href="#">C02F 3/1273</a>
General membrane treatment	<a href="#">B01D 61/00</a>

## C02F 3/286

{including two or more steps}

### Definition statement

This place covers:

Treatment with two or more anaerobic steps (no oxygen, nitrate, nitrite available).

## References

### Informative references

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

Aerobic multi-step processes	<a href="#">C02F 3/121</a>
------------------------------	----------------------------

**C02F 3/2873****{with internal draft tube circulation}****Definition statement***This place covers:*

Internal circulation is achieved by the gas bubbles created during the fermentation process (carbon dioxide, methane).

**C02F 3/2886****{Two story combinations of the Imhoff tank type}****Definition statement***This place covers:*

Biological treatment of water, waste water or sewage by anaerobic digestion processes with two story septic tank combination, i.e. Imhoff tank: simple reactors, precursors of the UASB reactors.

**C02F 3/30****Aerobic and anaerobic processes****Definition statement***This place covers:*

Processes which are characterised by a combination of anaerobic, anoxic and aerobic process steps, particularly for the biological removal of phosphorous and nitrogen.

**Glossary of terms**

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

Aerobic	presence of dissolved oxygen
Anoxic	oxygen not present as dissolved oxygen but in the form of nitrate, sulfate, etc.
Anaerobic	absence of oxygen

**C02F 3/301****{Aerobic and anaerobic treatment in the same reactor}****Definition statement***This place covers:*

No separate reactors used for the anaerobic, anoxic and aerobic treatment steps.

**C02F 3/302****{Nitrification and denitrification treatment ([C02F 3/308](#) takes precedence)}****Definition statement***This place covers:*

Biological nitrogen removal by means of combined nitrification / denitrification treatment.



## References

### Limiting references

*This place does not cover:*

Biological phosphorous removal	<a href="#">C02F 3/308</a>
--------------------------------	----------------------------

## C02F 3/303

{characterised by the nitrification}

### Definition statement

*This place covers:*

Biological nitrification processes, i.e. biological processes for oxidising ammonia to nitrite and/or nitrate.

## C02F 3/305

{characterised by the denitrification}

### Definition statement

*This place covers:*

Biological denitrification processes, i.e. biological processes for reducing nitrite and nitrate to elemental nitrogen.

## C02F 3/308

{Biological phosphorus removal}

### Definition statement

*This place covers:*

Biological processes for reducing phosphorous.

## References

### Informative references

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

Combination of chemical precipitation of phosphorous and activated sludge treatment	<a href="#">C02F 3/1215</a>
---	-----------------------------

## C02F 3/327

{characterised by animals and plants}

### Definition statement

*This place covers:*

Biological treatment of water, waste water or sewage by using any plants or any animals, e.g. constructed wetlands, worms, algae, protozoa

**C02F 3/34****characterised by the microorganisms used****Definition statement***This place covers:*

Biological treatment processes using special types of microorganisms (specific species or consortia which are identified and not commonly used).

**References****Informative references**

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

Biotechnology, microorganisms in general	<a href="#">C12N</a>
--	----------------------

**C02F 3/341****{Consortia of bacteria}****Definition statement***This place covers:*

Groups of bacteria which are specified and achieve a synergistic effect.

**C02F 3/342****{characterised by the enzymes used}****Definition statement***This place covers:*

Specific enzymes produced by microorganisms. Also for the use of the pure enzymes.

**C02F 3/348****{characterised by the way or the form in which the microorganisms are added or dosed}****Definition statement***This place covers:*

Dosing of the bacteria in a specific form, e.g. lyophilised, as a powder, together with nutrients) or dosing at a specific location (e.g. in a sidestream).

**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](#))**

**Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water.

**References****Informative references**

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

Softening using ion-exchange	<a href="#">C02F 1/42</a>
Detergents	<a href="#">C11D</a>

**C02F 5/02**

**Softening water by precipitation of the hardness**

**Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein hardness is eliminated by precipitation before it may result in adverse effects.

**C02F 5/04**

**using phosphates ([C02F 5/06](#) takes precedence)**

**Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein hardness is eliminated by precipitation using phosphates before it may result in adverse effects.

**References****Limiting references**

*This place does not cover:*

Softening using calcium compounds	<a href="#">C02F 5/06</a>
-----------------------------------	---------------------------

**C02F 5/06****using calcium compounds****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein hardness is eliminated by precipitation using calcium compounds before it may result in adverse effects.

**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****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale.

**References****Informative references**

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

Use of complexing agents	<a href="#">C02F 1/683</a>
--------------------------	----------------------------

**C02F 5/083****{Mineral agents}****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein mineral agents are used.

**C02F 5/086****{Condensed phosphates}****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein condensed phosphates are used.

**C02F 5/10****using organic substances****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein organic substances not provided for in the following groups are used.

**C02F 5/105****{combined with inorganic substances}****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein organic substances not provided for in the following groups are used in combination with inorganic substances.

**C02F 5/12****containing nitrogen ([C02F 5/14](#) takes precedence)****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein organic substances comprising nitrogen are used.

**References****Limiting references**

*This place does not cover:*

Softening using organic substances containing phosphorous	<a href="#">C02F 5/14</a>
---	---------------------------

**C02F 5/125****{combined with inorganic substances}****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein organic substances comprising nitrogen are used in combination with inorganic substances.

**C02F 5/14****containing phosphorus****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein organic substances comprising phosphorus are used.

**C02F 5/145****{combined with inorganic substances}****Definition statement**

*This place covers:*

This group covers processes and apparatus relating to chemical water treatment to prevent clogging or the presence of hard deposits on apparatus in contact with water, wherein the adverse effects of hardness are avoided by preventing it to form scale or by removing existing scale wherein organic substances comprising phosphorus are used in combination with inorganic substances.

**C02F 7/00****Aeration of stretches of water****Definition statement**

*This place covers:*

Aeration of stretches of natural waters, like rivers, lakes or ponds. Devices for such use such as boats or fixed installations.

**References****Informative references**

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

Dispersing gas in a liquid	<a href="#">B01F 23/23</a>
----------------------------	----------------------------

**Special rules of classification**

Treatment other than aeration should be classified using the relevant classes in combination with [C02F 2103/007](#).

**C02F 9/00****Multistage treatment of water, waste water or sewage****Definition statement**

*This place covers:*

Treatment operations, carried out in a defined order in three or more different treatment stages, each stage occurring in a separate location, e.g. apparatus, reactor or compartment.

## References

### Informative references

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

Activated sludge multistep treatment	<a href="#">C02F 3/121</a>
Anaerobic multistep treatment	<a href="#">C02F 3/286</a>
Multistage treatment	<a href="#">C02F 2301/08</a>

## Special rules of classification

Group [C02F 9/00](#) 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](#). Any individual step of a multistep treatment 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](#) as "additional information".

## C02F 9/20

### Portable or detachable small-scale multistage treatment devices, e.g. point of use or laboratory water purification systems

#### Definition statement

*This place covers:*

Processes incorporating several treatment steps in a compact, transportable device in the size of a small cupboard, e.g. filter units on wheels, laboratory devices for ultrapure water production or dispensers comprising advanced water treatment.

## References

### Informative references

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

Small transportable filters	<a href="#">C02F 1/002</a>
Household type filters	<a href="#">C02F 1/003</a>

## C02F 11/00

### Treatment of sludge; Devices therefor

#### Definition statement

*This place covers:*

In the present context sludge is defined as an aqueous suspension of solids resulting from water treatment processes and having a solids content of more than 0.2% (2 g/L).

## C02F 11/002

### {Sludge treatment using liquids immiscible with water}

#### Definition statement

*This place covers:*

Extraction of contaminants from sludge.

## References

### Informative references

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

Extraction for soil reclamation	<a href="#">B09C 1/02</a>
---------------------------------	---------------------------

## C02F 11/004

### {Sludge detoxification}

#### Definition statement

*This place covers:*

Immobilisation or removal of toxic compounds.

## References

### Informative references

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

Chemical means for combating harmful chemical agents	<a href="#">A62D 3/00</a>
Chemical reclamation of contaminated soil	<a href="#">B09C 1/08</a>

## C02F 11/008

### {Sludge treatment by fixation or solidification}

#### Definition statement

*This place covers:*

Solidification of the sludge, e.g. by vitrification.

## References

### Informative references

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

Reclamation of contaminated soil by vitrification	<a href="#">B09C 1/067</a>
---	----------------------------

## C02F 11/02

### Biological treatment

#### Definition statement

*This place covers:*

Aerobic and anaerobic biological sludge treatment.



## References

### Informative references

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

Biological reclamation of contaminated soils	<a href="#">B09C 1/10</a>
--	---------------------------

## C02F 11/04

### Anaerobic treatment; Production of methane by such processes

#### Definition statement

*This place covers:*

Comprises all anaerobic processes for sludge treatment (mostly carried out in digesters).

## C02F 11/06

by oxidation (incinerators for burning waste liquors, e.g. sulfite liquor from paper-making plant [F23G 7/04](#))

#### Definition statement

*This place covers:*

Oxidation of sludge including thermal oxidation such as incineration.

## References

### Informative references

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

Incinerators for burning sludge from water treatment installations	<a href="#">F23G 7/001</a>
Incineration of waste liquors	<a href="#">F23G 7/04</a>

## C02F 11/08

### Wet air oxidation

#### Definition statement

*This place covers:*

Wet air oxidation is defined as oxidation under elevated temperatures and pressure ( $p \gg 100$  bar,  $T \gg 100^\circ\text{C}$ ).

#### Special rules of classification

Exceptionally, treatment of wastewater can also be classified here if this is the most appropriate class.

**C02F 11/086****{in the supercritical state}****Definition statement***This place covers:*

The supercritical state for water is defined as  $p > 221$  bar,  $T > 374^{\circ}\text{C}$ .

**C02F 11/10****by pyrolysis****Definition statement***This place covers:*

Thermal treatment of sludge under reducing conditions (absence of oxygen or other oxidants).

**References****Informative references**

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

Destructive distillation of solid carbonaceous materials for production of gas, coke, tar	<a href="#">C10B</a>
---	----------------------

**C02F 11/12****by de-watering, drying or thickening****References****Informative references**

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

Drying solid materials or objects by removing liquid therefrom	<a href="#">F26B</a>
--	----------------------

**Special rules of classification**

Thermal drying is classified in the head group, if the sludge is heated for other purposes, [C02F 11/18](#) and subgroups should be used.

**C02F 11/127****by centrifugation****Definition statement***This place covers:*

Extraction of water from sludge using centrifuges, hydrocyclones or other hydrodynamic separators using centrifugal forces.

## References

### Informative references

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

Centrifugal separation of water, waste water or sewage	<a href="#">C02F 1/38</a>
Centrifugation of aqueous suspensions	<a href="#">C02F 1/385</a>
Centrifuges	<a href="#">B04B</a>
Apparatus using free vortex flow	<a href="#">B04C</a>

## C02F 11/128

### using batch processes

### Glossary of terms

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

Batch process	A batch process is a process in which the feed is not introduced in a continuous stream, but as a series of discrete charges, each of which may be processed over one or more states of treatment.
---------------	--

## C02F 11/13

### by heating

### Definition statement

*This place covers:*

Drying of sludge by heating includes direct or indirect heating. The actual purpose of treatment is to use heat to dry the sludge.

### Special rules of classification

Thermal drying is classified in this group. If the sludge is heated for conditioning, then classification is made in group [C02F 11/18](#) and subgroups thereof or if the sludge is treated by pyrolysis, then classification is made in group [C02F 11/10](#). This group should be used for cases where drying by heating is the actual purpose of the treatment. If heating is a side-effect of treatment, classification is made in other relevant places, e.g. [C02F 11/15](#).

## C02F 11/14

### with addition of chemical agents

### Definition statement

*This place covers:*

De-watering, drying or thickening of sludge by the addition of chemical agents, e.g. flocculants added during or before the dewatering process.

### Special rules of classification

In groups [C02F 11/14](#) - [C02F 11/148](#), if inorganic and organic substances are added independently in different processes steps, the group [C02F 11/143](#) or subgroup thereof, along with [C02F 11/147](#) should be used. If inorganic and organic substances are added in the same treatment step, the group [C02F 11/148](#) should be used.

**C02F 11/148**

**Combined use of inorganic and organic substances, being added in the same treatment step**

**Special rules of classification**

Addition of organic and inorganic compounds having a synergistic effect to the same treatment step. Coated compounds comprising inorganic and organic functions are classified in this group.

**C02F 11/15**

**by treatment with electric, magnetic or electromagnetic fields; by treatment with ultrasonic waves (for the purpose of heating [C02F 11/131](#))**

**Definition statement**

*This place covers:*

De-watering, drying or thickening of sludge by treatment with electric, magnetic or electromagnetic fields; or with ultrasonic waves, e.g. by treatment with electromagnetic waves or ultrasonic waves in order to disrupt or lyse cellular material, or break cell walls of cells in the sludge, or transform bound water in the sludge into free water.

**References****Limiting references**

*This place does not cover:*

Using electromagnetic or ultrasonic waves	<a href="#">C02F 11/131</a>
---	-----------------------------

**C02F 11/16**

**using drying or composting beds**

**Definition statement**

*This place covers:*

De-watering or drying of sludge with drying or composting beds, e.g. several drainage layers for the separation of the solid from the liquid fraction of sludge.

**References****Informative references**

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

Composting of household refuse	<a href="#">C05F 9/04</a>
--------------------------------	---------------------------

**C02F 11/18**

**by thermal conditioning (by pyrolysis [C02F 11/10](#))**

**Definition statement**

*This place covers:*

Thermal sludge conditioning other than drying.

## References

### Limiting references

*This place does not cover:*

Sludge treatment by pyrolysis	<a href="#">C02F 11/10</a>
-------------------------------	----------------------------

### Informative references

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

Thermal conditioning of soil	<a href="#">B09C 1/06</a>
------------------------------	---------------------------

## Special rules of classification

Drying, dewatering of sludge is classified in [C02F 11/12](#).

## C02F 11/185

{by pasteurisation}

### Definition statement

*This place covers:*

Heating of sludge above 60°C for the purpose of disinfection.

## C02F 2101/00

**Nature of the contaminant**

### Definition statement

*This place covers:*

The nature of the contaminant, i.e. chemical composition or class of chemical is specified here.

## C02F 2103/00

**Nature of the water, waste water, sewage or sludge to be treated**

### Definition statement

*This place covers:*

The nature of the water to be treated such as wastewater from specific origin or pure water for specific applications.

## C02F 2201/00

**Apparatus for treatment of water, waste water or sewage**

### Definition statement

*This place covers:*

Constructional details related to the apparatus used for water treatment.

**C02F 2201/008****Mobile apparatus and plants, e.g. mounted on a vehicle****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Mobile apparatus and plants, e.g. mounted on a vehicle, for the biological treatment of water, wastewater or sewage	<a href="#">C02F 2203/008</a>
---	-------------------------------

**C02F 2201/009****Apparatus with independent power supply, e.g. solar cells, windpower or fuel cells****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Electrolysis apparatus with special power supply, e.g. solar energy or batteries	<a href="#">C02F 2201/46165</a>
--	---------------------------------

**C02F 2201/4619****Supplying gas to the electrolyte****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Gas diffusion electrodes for water treatment by electrolysis	<a href="#">C02F 2001/46166</a>
--	---------------------------------

**C02F 2203/00****Apparatus and plants for the biological treatment of water, waste water or sewage****Definition statement***This place covers:*

Constructional details related to the apparatus used for biological water treatment.

**C02F 2209/00****Controlling or monitoring parameters in water treatment****Definition statement***This place covers:*

Controlling or monitoring parameters in water treatment. Details relating to the measuring device and controller used for controlling or monitoring the parameters.

**C02F 2301/00****General aspects of water treatment****Definition statement***This place covers:*

General aspects of water treatment, such as fluid flow conditions, e.g. flow arrangements, pressure conditions.

**C02F 2303/00****Specific treatment goals****Definition statement***This place covers:*

Specific treatment goals, e.g. disinfection, corrosion inhibition, removal of agents after treatment.

**C02F 2305/00****Use of specific compounds during water treatment****Definition statement***This place covers:*

Use of specific compounds in water treatment, e.g. surfactants, nutrients, nanoparticles.

**C02F 2307/00****Location of water treatment or water treatment device****Definition statement***This place covers:*

Location of water treatment or water treatment device, e.g. as part of a bottle, pitcher or mounted on a faucet.