**B01F**

MIXING, e.g. DISSOLVING, EMULSIFYING, DISPERSING (miscellaneous implements for preparing food, e.g. machines for domestic use for mixing, egg-whisks, cream beaters A47J 43/00; mixing paints B44D 3/06; apparatus specially adapted for mixing radioactively contaminated material G21F 9/008)

**Definition statement**

This place covers:

Agitation and/or homogenization of products formed by a combination of two or more components with the purpose of obtaining an homogeneous composition or homogeneous conditions in the mass of material.

Stirring of a single material with the purpose of obtaining homogeneous conditions in the mass of material.

This subclass covers the mixing, agitation and homogenization of materials, irrespective of the application in which it is produced, whenever the device and/or method is directed to achieve said desired effect.

**References**

**Limiting references**

This place does not cover:

| Disinfection, sterilisation or deodorisation of air | A61L 9/00 |
| Evaporation | B01D 1/00 |
| Distillation | B01D 3/00 |
| Granulation (with or without coating) | B01J 2/00 |
| Reactors | B01J 19/00 |
| Crushing, pulverising, disintegrating | B02 |
| Flotation | B03D |
| Spraying, atomising | B05B, B05C |
| Air-conditioning, air-humidification, ventilation | F24F |
| Drying | F26 |
| Heat-exchange apparatus in which the heat-exchange media are contacted, e.g. cooling towers | F28C |

**Special rules of classification**

In general, devices and methods in which agitation and or contact of materials is produced, the object of said agitation/contact being different than for obtaining an homogeneous mixture (e.g. mass transfer devices and processes, a mere contact of two or more different materials, devices or processes in which agitation/homogenization is intrinsic to the process per se but it is not the primary purpose) are not classified in this subclass.

As a general rule, the following information is to be classified in its whole extent:

What is mixed, i.e. the phases of materials being mixed: groups **B01F 1/00** and **B01F 3/00**.

How it is mixed: groups **B01F 5/00**, **B01F 7/00**, **B01F 9/00**, **B01F 11/00** and **B01F 13/00**.
Auxiliary information: groups **B01F 15/00**.

The use of substances used as emulsifying, wetting, dispersing or foam-producing agents is normally only classified in **B01F 17/00**, except when the related devices for mixing are also disclosed.

With regard to the phases to be mixed, the following is to be observed:

- when only a general reference to the phases is indicated, only the Indexing Codes **B01F 1/00** and **B01F 3/00** are used;
- if reference is made to the use of the device for any kind of mixtures, it is not classified in **B01F 1/00**, **B01F 3/00**, **B01F 1/00** or **B01F 3/00**;
- when the application is of relevance (i.e. the type of product produced is claimed or the device is claimed for making a specific product) then it is also classified in the corresponding application field;
- if the possible application or applications are only mentioned in a generic way (i.e. as possible uses of the device) then the corresponding KW is used instead.

With regard to the way of mixing all parts of the device which are used for mixing are classified in its corresponding group. When more than one mixing device form part of the apparatus, the device is also classified in **B01F 13/10**.

With regard to the auxiliary information the corresponding general fields, if they exist, take precedence. If the only possible classification symbol which can be allocated is a symbol in the group **B01F 15/00** then it has to be classified in the general field (e.g. if it can only be classified in **B01F 15/06** then it is a clear indication that it has to be classified in **F28**).

**Glossary of terms**

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

| Mixing | stirring of a single material |

**B01F 1/00**

Dissolving ((without involving chemical reactions; **B01F 3/04099** takes precedence;) separating by dissolving **B01D**; dissolving to effect cooling **F25D 5/00**)

**Definition statement**

*This place covers:*  
Dissolving of a solid in a liquid in which no chemical reaction is involved (e.g. dissolving salt in water).

**References**

**Informative references**

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

<table>
<thead>
<tr>
<th>Preparation of beverages</th>
<th>A47J 31/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition of cleaning agents in dishwashers</td>
<td>A47L 15/00</td>
</tr>
<tr>
<td>Preparation of dialysates</td>
<td>A61M 1/16</td>
</tr>
<tr>
<td>Dosing solid additives for water treatment</td>
<td>C01F1/68</td>
</tr>
<tr>
<td>Addition of cleaning agents in washing machines</td>
<td>D06F</td>
</tr>
<tr>
<td>Preparation of brine for roads</td>
<td>E01H 10/00</td>
</tr>
<tr>
<td>Dosing solid additives in swimming-pools</td>
<td>E04H 4/00</td>
</tr>
</tbody>
</table>
Special rules of classification

Mixing of a solid with a liquid for preparing dispersions or slurries, i.e. when the solid is not chemically dissolved in the liquid (e.g. a coal slurry) is not classified in this group.

B01F 1/0005
{Methods}

Special rules of classification

Methods for dissolving a solid in a liquid which is only suited for dissolving a specific solid and which is not based on the use of mechanical devices (i.e. specific process recipes for dissolving a specific component, said recipe not being suited for dissolving any other solid) are not classified in this group.

B01F 1/0016
{comprising constructions for blocking or redispersing undissolved solids, e.g. sieves, separators, guiding constructions (B01F 1/0033 takes precedence)}

Definition statement

This place covers:

elements used for blocking undissolved solids, e.g. used as filters at the outlet of the container where the solid is being dissolved. Example:

EP 0 567 734 A1
B01F 3/00
Mixing, e.g. dispersing, emulsifying, according to the phases to be mixed {(C08J 3/02 takes precedence)}

Definition statement
This place covers:
Devices in methods for mixing in which the phases of the materials to be mixed are of relevance.

References
Limiting references
This place does not cover:

| Making solutions, dispersions or latices by other methods than by solution, emulsion or suspension polymerisation techniques | C08J 3/02 |

Special rules of classification
With regard to the phases to be mixed, the following is to be observed:
• when only a general reference to the phases is indicated, only the Indexing Codes B01F 1/00 and B01F 3/00 are used;
• if reference is made to the use of the device for any kind of mixtures, it is not classified in B01F 1/00, B01F 3/00, B01F 1/00 or B01F 3/00;
• when the application is of relevance (i.e. the type of product produced is claimed or the device is claimed for making a specific product) then it is also classified in the corresponding application field;
• if the possible application or applications are only mentioned in a generic way (i.e. as possible uses of the device) then the corresponding KW is used instead.

B01F 3/02
gases with gases or vapours {(for preparing respiratory gases or vapours A61M 16/12)}

Definition statement
This place covers:
Mixing of two or more gases in which mixing devices are used for homogenizing the mixture.

References
Limiting references
This place does not cover:

| Storage and distribution of gases | F17 |
| Ventilation | F24F |

Special rules of classification
Generally, the mere contact of two or more gases for producing a specific composition when no mixing devices are used for actively homogenizing the mixture is not classified in this group.
B01F 3/024
{with moving mixing elements, e.g. with liquid seal (B01F 3/022 takes precedence)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/026
{Mixing systems, i.e. flow charts or diagrams; Arrangements, e.g. comprising controlling means}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/028
{characterised by the construction of the controlling means}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 3/04007
{Introducing a liquid into a gaseous medium, e.g. preparation of aerosols (for air-conditioning F24F 6/00)}

Definition statement
This place covers:
Introducing a liquid into a gas for obtaining a dispersion of droplets of liquid in the gas, wherein the gas is not merely used as a carrier but it is one of the components of the mixture, e.g. mixing of a reducing agent (e.g. ammonia) with a flue gas (the gas does not act as a mere carrier).

Special rules of classification
Introduction of a liquid in a gas, the gas acting as a mere carrier or as means for braking a stream of liquid into droplets, e.g. for spraying of the liquid, is not classified in this group.
B01F 3/04028
{using rotating elements, e.g. rolls, brushes}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group (EP1319435):
B01F 3/04035
{for spraying the liquid radially by centrifugal force}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
**B01F 3/04049**

{using nozzles}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![Diagram](image-url)
B01F 3/04078
{using a gas-liquid mixing column or tower (absorbing units for separating gases or vapours B01D 53/18)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 3/04099
{Introducing a gas or vapour into a liquid medium, e.g. producing aerated liquids (methods for the preparation of non-alcoholic beverages, e.g. of carbonated water A23L 2/00; bottling liquids, e.g. combined with aerating or carbonating B67C 3/00; dispensing beverages on draught combined with carbonating B67D 1/0057, B67D 1/025, B67D 1/0406, B67D 1/0418; dispensing beverages by gas pressure from storage containers, e.g. syphons B67D 1/04; biological treatment of water, waste water or sewage C02F 3/00; impregnating wine with carbon dioxide C12G 1/06; gas introduction means for enzymology or microbiology apparatus C12M 1/04)}

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

<table>
<thead>
<tr>
<th>Water treatment</th>
<th>C02F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparatus for enzymology or microbiology</td>
<td>C12M</td>
</tr>
</tbody>
</table>
B01F 3/04106
{the gas being introduced by bubbling, e.g. within receptacles or tanks (B01F 3/04531, B01F 3/04787 take precedence; introducing gas for agitation only B01F 13/02)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 3/04113
{Arrangement or manipulation of the gas bubbling devices}

Definition statement
This place covers:
Ways of arranging the bubbling elements within the basin or receptacle (e.g. forming a network, on grids, etc.) and elements for manipulating the bubbling elements (e.g. for introducing/elevating them in/from the basin or receptacle).

Examples:
• Characterized by the disposition of the bubbling elements:
- Characterized by means for the manipulation of the bubbling elements:
**B01F 3/0412**

{Mounting the bubbling devices or the diffusers (B01F 3/04241 takes precedence)}

**Definition statement**

This place covers:

Details relating the specific mounting of the diffuser elements on the piping system or within the basin or receptacle. Example:

![Diagram](image)

**References**

**Limiting references**

This place does not cover:

| Diffusers                | B01F 3/04241 |

**B01F 3/04241**

{Diffusers}

**Definition statement**

This place covers:

Features related to the nature of the diffuser element, i.e. the mounting of the diffuser elements per se, the shape and the nature of the bubbling element.

Examples:
Characterized by the way in which the bubbling element is assembled:

- Characterized by the shape of the bubbling element, e.g. boxes, discs, domes, plates, rings, coiled tubes, stacked elements, tubes, membranes, etc.
- Characterized by elements for protecting the bubbling elements.
- Characterized by the material with which the diffuser is made, e.g. biocide material, material comprising means for gas storage.
**B01F 3/04248**

*{having injection means, e.g. nozzles with circumferential outlet}*

**Definition statement**

This place covers:

Diffusers wherein the gas is fed through injection means, e.g. nozzles. Example:

**Figure 4**

![Diagram of a diffuser with injection means (nozzles)]

**B01F 3/04255**

*{having elements opening under air pressure, e.g. valves}*

**Definition statement**

This place covers:

Diffusers wherein the gas is fed through mechanical elements which open under air pressure.
Example:

**B01F 3/04262**

{consisting of rigid porous or perforated material}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/04269
{consisting of flexible porous or perforated material, e.g. fabric}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/0446

{Making foam (for cocoa products A23G 1/105; for sweet meats A23G 3/0221; for fire-extinguishing foam A62C 5/02; spray pistols for making foam B05B 7/0018; foam used in forming crevices or fractures for stimulation of oil production E21B 43/26)}

Definition statement

This place covers:

Devices and methods for producing foam by mixing a gas and a liquid (including, e.g., a foaming agent) using mechanical means. Example:

Fig. 1

B01F 3/0446

{using flow mixing means for introducing the gas, e.g. in conduits or in vessels (B01F 3/04106, B01F 3/0876 take precedence; distillation in which liquids are contacted with gaseous media B01D 3/00; jet regulation with aerating means for fresh water plumbing installations E03C 1/084)}

Definition statement

This place covers:

Means for mixing a gas with a liquid using flow mixing means other than by merely bubbling elements.
Example:

Special rules of classification
The specific flow mixer used must be classified accordingly (e.g. in the corresponding mixing means described in main group B01F 5/02).

B01F 3/0468
{by moving liquid and gas in counter current (absorbing units for separating gases or vapours B01D 53/18; in heat exchange apparatus F28C 3/06)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04475

{the liquid flowing in a thin film to absorb the gas (fractional distillation with fractionating columns in which vapour bubbles through liquid B01D 3/16)}

Definition statement

*This place covers:*

Examples:

The thin film flowing horizontally or inclined:

![Diagram](image.png)
The thin film flowing vertically:

B01F 3/04496

{using columns, e.g. multistaged columns}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04503
{by circulating the flow in guiding constructions or conduits}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/0451
{being at least partially immersed in the liquid, e.g. in a closed circuit (B01F 3/04602 takes precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/04517

{The conduits being vertical draft pipes with a lower intake end and an upper exit end}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04531

{using driven stirrers with completely immersed stirring elements
(B01F 3/04453 takes precedence; surface aerating with stirrers near to the
surface B01F 3/04765; flotation machines B03D 1/16)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/04539

{characterised by the introduction of the gas along the axis of the stirrer or along the stirrer elements}

Definition statement

This place covers:

Driven stirrers with associated gas introduction means (e.g. through the shaft, through a tube parallel or surrounding the shaft, etc.). Example:
B01F 3/04588
{the stirrer rotating about a horizontal axis; Stirrers therefor}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04595
{Single stirrer-drive aerating units, e.g. with the stirrer-head pivoting around an horizontal axis}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

US 2007/0164025 A1
B01F 3/04602

{provided with stationary guiding means surrounding at least partially the stirrer}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04609
{with tubes surrounding the stirrer}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04617
{the stirrer being of the centrifugal type, e.g. with a surrounding stator}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/0473

{Surface aerating, e.g. by cascading, spraying or projecting a liquid into a gaseous atmosphere (direct-contact heat exchange apparatus, the heat-exchange media being a liquid and a gas or a vapour F28C 3/06))

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/04765
{with stirrers near to the liquid surface, e.g. partially immersed, for spraying the liquid in the gas or for sucking gas into the liquid, e.g. using stirrers rotating around a horizontal axis or using centrifugal force}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

B01F 3/04773
{the stirrers rotating about a vertical axis}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/0478
{Stirrers therefor}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

EP 0 612 696 A1

Special rules of classification

When the design of the stirrer is of relevance, it is to be classified also here.
B01F 3/04787

{Apparatus for aerating or carbonating beverages (B01F 3/0446, B01F 3/04978 take precedence; using effervescence-generating compositions, e.g. carbon dioxide tablets A23L 2/40)}

Definition statement

This place covers:

Devices for aerating and/or carbonating beverages in which the way of introducing the gas and homogenizing the mixture is of relevance. Example:

References

Limiting references

This place does not cover:

Dispensers for beverages in draught

Special rules of classification

General construction details of a beverage producing machine (e.g. cooling group, dispensing means, general construction of the machine) are not classified in this group.
B01F 3/04794
{for aerating or carbonating beverages within containers, e.g. bottles}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/04801
{Portable appliances comprising a gas cartridge}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 3/04808

{for aerating or carbonating within receptacles or tanks, e.g. distribution machines (B01F 3/04794 takes precedence)}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
**B01F 3/04815**

{Mixing systems, i.e. flow charts or diagrams; Arrangements, e.g. comprising controlling means}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![Diagram](image)

**B01F 3/04829**

{Parts; Accessories}

**Definition statement**

*This place covers:*

Illustrative examples of subject matter classified in this group.
Parts:

Accessories:
B01F 3/04985

{Mixing systems, i.e. flow charts or diagrams}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

B01F 3/06

gases or vapours with solids

References

Limiting references

This place does not cover:

Pneumatic transport of solids in bulk  B65G 53/00
**Definition statement**

This place covers:

Devices and methods for producing emulsions by means of stirring means.

**References**

**Limiting references**

This place does not cover:

| Use of substances as emulsifying agents (in general) | B01F 17/00 |
| Cosmetics | A61K7/00 |
| Medical compositions | A61K 9/00 |

**Special rules of classification**

The specific type of mixer is to be classified accordingly, i.e. in **B01F 5/00, B01F 7/00, B01F 9/00, B01F 11/00** and **B01F 13/00**. Specific details are to be classified in **B01F 15/00**.

Methods (and devices) in which the emulsifying process is specific for the production of a specific product and it is performed on the base of a "recipe" (i.e. steps involving the order of addition of the materials, temperature/pressure conditions, specific type of products with specific compositions, etc.), in which a mechanical homogenizing step is of no or little reference are not classified in this group. Also the production of specific compounds in the form of emulsion are classified in the related application and not here.
**B01F 3/0853**

**{Mixing liquids using driven stirrers}**

**Special rules of classification**

The specific type of driven stirrer is to be accordingly classified in B01F 7/00, B01F 9/00, B01F 11/00 or B01F 13/00.

**B01F 3/0861**

**{Mixing liquids using flow mixing}**

**Special rules of classification**

The specific type of flow mixer is to be accordingly classified in B01F 5/00.

**B01F 3/0869**

**{by uniting flows taken from different parts of a receptacle or silo; Sandglass-type mixing (for particulate material B01F 5/24)}**

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![Diagram](image.png)
Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 3/0876

(by injecting a mixture of liquid and gas)

Definition statement

This place covers:

The mixing of a stream or body of a gas containing liquid with another stream or body of liquid.

Example:

B01F 3/182

(using a receptacle provided at its bottom discharge opening with oscillating or vibrating opening and closing elements, or with elements fitted on moving chains)

Definition statement

This place covers:

Vibrating elements located in the bottom discharge opening of a receptacle with mixing elements for homogenizing the mixture of solids as it is discharged from the container.
Example:

June 27, 1967

H. P. PEDERSEN
MIXING APPARATUS

3,327,611

Filed Feb. 16, 1965

Fig. 4.

References

Limiting references

This place does not cover:

| Elements for improving the discharge of containers or silos, preventing bridge formation | B65D 88/00 |
**B01F 3/184**

(using rotatable mixing elements at the lower end of discharge hoppers)

**Definition statement**

*This place covers:*

Rotatable elements located in the bottom discharge opening of a receptacle with mixing elements for homogenizing the mixture of solids as it is discharged from the container. Example:

---

**References**

**Limiting references**

*This place does not cover:*

Elements for improving the discharge of containers or silos, preventing bridge formation

---

**B01F 3/20**

Pretreatment of the materials to be mixed *(B28C 5/404, B29B 7/905 take precedence)*

**Definition statement**

*This place covers:*

Treatment of the materials to be fed to the mixer, e.g. heating, cooling, drying, grinding, irradiating, sieving always in combination with the mixing device or method.
References

Limiting references

This place does not cover:

| Pre-treatment of fibres                  | B28C 5/404, |
| Pre-treatment of fibres with means for pretreatment of the charges or fibres | B29B 7/905 |

Special rules of classification

The specific treatments per se are not classified here (i.e. when said operation is the relevant information). Said specific operations are covered by the corresponding general field.

B01F 3/22

Aftertreatment of the mixture

Definition statement

This place covers:
Treatment of the product discharged from the mixer, e.g. heating, cooling, drying, grinding, irradiating, sieving always in combination with the mixing device or method.

Special rules of classification

The specific treatments per se are not classified here (i.e. when said operation is the relevant information). Said specific operations are covered by the corresponding general field.

B01F 5/00

Flow mixers (sprayers, atomisers B05B); Mixers for falling materials, e.g. solid particles (B01F 13/04 takes precedence; centrifugal mixers B04)

Definition statement

This place covers:
The mixing of materials by means of flow mixers, e.g. without using driven mechanical elements (i.e. using passive mixing elements).

This group also covers pumps used for mixing purposes.

References

Limiting references

This place does not cover:

| Mixers combined with safety devices | B01F 13/04 |

Special rules of classification

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.
**B01F 5/0057**

{Mixing by creating a vortex flow, e.g. by tangentially introducing jets (apparatus using free vortex flow in general B04C)}

**Definition statement**

This place covers:

Illustrative examples of subject matter classified in this group.
Definition statement

This place covers:

Vortex mixer in which the discharge of the mixing chamber is located in a specific way so as to influence the movement of the material within the chamber.

Example:

U.S. Patent June 1, 1976 Sheet 1 of 2 3,960,175
B01F 5/0077

{Mixing heads, i.e. compact mixing units or modules, using mixing valves for feeding and mixing at least two components (for homogenizing mixtures B01F 5/0661, mixing valves F16K 11/00)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 5/02
Jet mixers (B01F 5/0057 take precedence; with gas agitation, i.e. for fluidisation B01F 13/02)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
**B01F 5/0206**

{comprising submerged injectors, e.g. nozzles, for injecting high pressure jets in a large volume or in a mixing chamber (B01F 3/04106 takes precedence; injecting an additional component in a conduit B01F 5/0403)}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

**References**

**Limiting references**

This place does not cover:

- the gas being introduced by bubbling

| B01F 3/04106 |
B01F 5/0212
{the injectors being surrounded by guiding tubes}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 5/0218
{the injectors being movable, e.g. rotating}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 5/0256**

{Mixing by intersecting jets (in a stream-impingement mixing head for polymers B29B 7/76)}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
**B01F 5/0268**

*Mixing by jets impinging against a collision plate*

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**B01F 5/04**

*Injector mixers (i.e. one or more components being added to a flowing main component)*

**Definition statement**

*This place covers:*

The mixing of components in which a component is added to another component constituting the main component.

**References**

**Limiting references**

*This place does not cover:*

| Mixing by creating a vortex flow | B01F 5/0057 |
**B01F 5/0401**

{the additional component being axially fed and radially discharged through a circumferential outlet}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

**B01F 5/0415**

{with additional mixing means other than injector mixers, e.g. screens, baffles or rotating elements}

**Special rules of classification**

The additional mixing means (located either before or after the venturi device) is to be accordingly classified.

**B01F 5/0451**

{with additional mixing means other than injector mixers, e.g. screens, baffles or rotating elements}

**Special rules of classification**

The additional mixing means (located either before or after the injection device) is to be accordingly classified.
**B01F 5/0473**

{with additional mixing means other than injector mixers}

**Special rules of classification**

The additional mixing means (located either before or after the injection device) is to be accordingly classified.

**B01F 5/0495**

{a difference of pressure at different points of the conduit provoking introduction of the additional component into the main component (B01F 5/0496 takes precedence)}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**References**

**Limiting references**

*This place does not cover:*

Flow mixers having a container for the additional component fixed to the conduit

B01F 5/0496
B01F 5/0496
{having a container for the additional component fixed to the conduit}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

U.S. Patent Dec. 4, 1990 Sheet 1 of 4 4,974,634
B01F 5/0498

{the additional component being added in a by-pass of the main flow (B01F 5/0496, B01F 5/106 take precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

References

Limiting references

This place does not cover:

| Having a container for the additional component fixed to the conduit | B01F 5/0496 |
| the mixture being discharged from and reintroduced into a receptacle through a recirculation tube into which an additional component is introduced | B01F 5/106 |
B01F 5/06
Mixers in which the components are pressed together through slits, orifices, or screens; {Static mixers; Mixers of the fractal type} ((B01F 7/164, B01F 7/225 take precedence;}) turbo-mixers B01F 5/16; colloid-mills B02C; mixing valves F16K 11/00)

Definition statement

This place covers:

The homogenization of a stream composed by two or more components or the homogenization of the properties of a stream formed by a single component but with non-homogeneous conditions (e.g. layers with different temperature).

The different components are already in contact, the mixing elements being directed to homogenize the stream.

B01F 5/0602

{Static mixers, i.e. mixers in which the mixing is effected by moving the components jointly in changing directions, e.g. in tubes provided with baffles or obstructions (B01F 5/0661, B01F 5/0682 take precedence)}

Definition statement

This place covers:

The mixing of components by change of direction, splitting-recombining of the stream, etc. wherein the shear introduced in the stream is negligible (i.e. the mixing is not based on high shear effect).

References

Limiting references

This place does not cover:

| Mixers in which the components are pressed through slits while introducing shear, | B01F 5/0661 |
| Mixers in which the components are pressed together through screens, plates provided with orifices, foam-like inserts, or through a bed of loose bodies, e.g. beads | B01F 5/0682 |
B01F 5/0603
{the mixture or the components moving in an irregular path, e.g. radially (B01F 5/0646 takes precedence)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
**B01F 5/0604**

{the mixer being composed of stacked plates between which the material is moving, e.g. the plates being provided with grooves or orifices}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![Diagram of a mixer composed of stacked plates]

**B01F 5/061**

{Straight mixing tubes, e.g. with smooth walls, having baffles or obstructions therein without substantial pressure drop; Baffles therefor (for falling-particle mixers **B01F 5/246**)}

**Definition statement**

*This place covers:*

Mixers constituted by baffle elements located inside a tube.

![Diagram of a straight mixing tube with baffles]

65
B01F 5/0611
{the baffles being adjustable}

Definition statement

This place covers:

Illustrative examples of subject matter classified in this group

With active means for adjusting the position of the baffles:

With passive means
With passive means for adjusting the position of the baffles:

DE 10 2009 029 420 A1 2011.03.24

Anhängende Zeichnungen
B01F 5/0613

{comprising a plurality of stacked ducts having their axes parallel to the tube axis}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
**B01F 5/0615**

{composed of consecutive sections of helical formed elements}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![Fig. 1](image1)

![Fig. 2](image2)

**B01F 5/0616**

{the baffles being made by deforming flat pieces of material, e.g. by bonding, folding, deep drawing (B01F 5/0614 takes precedence)}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![US 3,923,288](image3)
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>the baffles being helical elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>B01F 5/0614</td>
</tr>
</tbody>
</table>

**B01F 5/0617**

{composed of consecutive sections of deformed flat pieces of material}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

B01F 5/0618
{the baffles being flat pieces of material, e.g. intermeshing, fixed to the wall, fixed on a central rod}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 5/0619

{composed of consecutive sections of flat pieces of material}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 5/064

{with means for dividing a flow of material into separate subflows and for repositioning and recombining these subflows; Cross-mixing, e.g. conducting the outer layer of the material nearer to the axis of the tube or vice versa (B01F 5/0496 takes precedence; using baffles B01F 5/061, for falling particle mixers B01F 5/246)}

Definition statement

This place covers:
Mixers in which a stream comprising two or more components is subdivided in two or more substreams, said substreams being e.g. reoriented and the substreams are recombined.

Example:

References

Limiting references

This place does not cover:

Flow mixers having a container for the additional component fixed to the conduit B01F 5/0496
**B01F 5/0641**

{the subflows consisting of at least two flat layers which are recombined, e.g. using means having restriction or expansion zones}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 5/0643
{essentially composed of stacks of sheets, e.g. corrugated sheets}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.


Special rules of classification
If the material is intended to flow, mainly, through the pores, then it is classified in B01F 5/0691
B01F 5/0644

{using elements provided with a plurality of channels or using a plurality of tubes which can either be placed between common spaces or collectors}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 5/0645**

{the channels or tubes crossing each other several times}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

U.S. Patent 1977 4,027,857
Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.

Bent tubes or coiled elements:
Strong change of direction:

DE 20 2007 008 885 U1  2007.11.29
Scallop shape:

Converging/diverging sections:

U.S. Patent April 26, 1977 4,019,721
Undulating conduit (i.e. a succession of converging-diverging sections):

**B01F 5/0656**

{Mixing tubes having therein a cylindrical or conical insert provided with grooves, e.g. the tube being provided with inwardly extending profiles or grooves (B01F 5/0665 takes precedence)}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 5/0659

{Mixing tubes composed of concentric tubular members (pressing the components through tubular members provided with orifices B01F 5/0682)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

References

Limiting references

This place does not cover:

Mixers in which the components are pressed together through screens, plates provided with orifices, foam-like inserts, or through a bed of loose bodies, e.g. beads B01F 5/0682
B01F 5/066
{with movable slits formed between reciprocating surfaces (with movable slits formed between stator-rotor or two rotor systems B01F 7/0075, B01F 7/0085, B01F 7/1625)}

Definition statement
This place covers:
The mixing of components wherein the material flows through slits left between two elements which can be reciprocally adjusted. Example:

B01F 5/0661
{Mixers in which the components are pressed through slits while introducing shear, e.g. the slits being formed by balls and their seats, by the spiros of helical springs (B01F 7/0075 takes precedence)}

Definition statement
This place covers:
The mixing of components wherein the materials are flown through slits with the introduction of high shear forces.
Example:

US 5,937,906

References

Limiting references

This place does not cover:

the mixer being composed of a stator-rotor system with movable slits between surfaces facing each other  

B01F 7/0075

B01F 5/0663

{the slits being formed between opposed planar surfaces, e.g. pushed again each other by springs}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 5/0665**

{the slits being formed between opposed conical or cylindrical surfaces}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

**B01F 5/0682**

{Mixers in which the components are pressed together through screens, plates provided with orifices, foam-like inserts, or through a bed of loose bodies, e.g. beads (B01F 7/0075 takes precedence)}

**Definition statement**

This place covers:

The mixing of components by making them flow through orifices, the shear introduced in the stream being relevant for the homogenization process.

Examples:
Plates with orifices:

Cylinder with orifices:

FIG. 2
Porous elements (cylinders or plates):

Sieve elements (cylinders or plates):
References

_limiting references_

This place does not cover:

| the mixer being composed of a stator-rotor system with movable slits between surfaces facing each other | B01F 7/0075 |

**B01F 5/10**

Circulation mixers {, e.g. at least part of the mixture being discharged from, and reintroduced into, a receptacle, e.g. with rotary stirrer (B01F 5/02 takes precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.


References

_limiting references_

This place does not cover:

| Jet mixers | B01F 5/02 |

---

Fig. 1
B01F 5/102
{the mixture being circulated during mixing through a set of tubes, e.g. involving gradually introducing a component into a circulating flow}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

EP 2 078 657 A1
**B01F 5/104**

{provided with rotary stirrer}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 5/106

{the mixture being discharged from and reintroduced into a receptacle through a recirculation tube into which an additional component is introduced}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 5/18**

**Spray-mixers {; Mixing intersecting sheets of material, e.g. conical liquid sheets (B01F 3/0473, B01F 7/022, B01F 9/025 take precedence)}**

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**US 2005/0279687 A1**

**References**

**Limiting references**

*This place does not cover:*

| Surface aerating | **B01F 3/0473** |
| Mixers with rotary stirring devices in fixed receptacles comprising liquid feeding | **B01F 7/022** |
| Mixers with rotating receptacles comprising liquid spraying devices | **B01F 9/025** |

**Special rules of classification**

The spray can be in the form of a "tubular" jet/spray or in the form of a "two-dimensional" sheet.
**B01F 5/20**

with nozzles ((B01F 3/04049 takes precedence; nozzles per se B05B 1/00))

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Mixing using nozzles</th>
<th>B01F 3/04049</th>
</tr>
</thead>
</table>
B01F 5/205
{for spraying a fluid on falling particles or on a liquid curtain}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 5/22**
with rotary {parts, e.g.} discs {((B01F 3/04035, B01F 7/0075 take precedence))}

**Definition statement**
*This place covers:*
Illustrative example of subject matter classified in this group.

**References**

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

<table>
<thead>
<tr>
<th>For spraying the liquid radially by centrifugal force</th>
<th>B01F 3/04035</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mixer being composed of a stator-rotor system with movable slits between surfaces facing each other</td>
<td>B01F 7/0075</td>
</tr>
</tbody>
</table>
B01F 5/221

{with a disc or a set of discs mounted on a shaft rotating about a vertical axis, on top of which the material to be thrown outwardly is fed}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 5/223

{with repeated action, i.e. the material thrown outwardly being guided, by means provided on the surrounding casing, on top of the next lower disc}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 5/225
{for spraying a liquid on falling particles or on a liquid curtain (B01F 5/223 takes precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

References

Limiting references

This place does not cover:

| Flow mixers with repeated action | B01F 5/223 |
B01F 5/226
{the material being fed on both sides of a part rotating about a vertical axis}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

EP 0 320 480 A1
B01F 5/228
{the rotating part being composed of at least two cooperating members rotating independently about the same vertical axis}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 5/241

{Particle mixers uniting flows of material taken from different parts of a receptacle or from a set of receptacles (for liquids B01F 3/0869; devices for emptying containers from the top with vertical passage located inside the containers B65G 65/365)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>For liquids</th>
<th>B01F 3/0869</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices for emptying containers from the top with vertical passage located inside the containers</td>
<td>B65G 65/365</td>
</tr>
</tbody>
</table>
B01F 5/242
{by means of conduits having inlet openings at different levels}

Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 5/243
{by means of a central conduit or central set of conduits}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 5/244
{the receptacle being divided into compartments for receiving or storing the different components}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 5/245

{Flow collectors therefor}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 5/246
{Falling-particle mixers comprising receptacles provided with fixed guiding elements, e.g. baffles, therein; Cross-mixers comprising crossing channels for guiding the falling particles}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 5/247

(Falling-particle mixers comprising superimposed receptacles, the material flowing from one to the other, e.g. of the sandglass type (for liquids B01F 3/0869))

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

References

Limiting references

This place does not cover:

For liquids B01F 3/0869
B01F 5/248
{the particles falling on a film flowing along the inner wall of a mixer}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
**B01F 5/26**

Falling-particle mixers with moving {or vibrating} means, e.g. stirrers, for increasing the mixing {{B01F 5/24 takes precedence}}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**References**

*Limiting references*

*This place does not cover:*

<table>
<thead>
<tr>
<th>Falling-particle mixers, e.g. with repeated action</th>
<th>B01F 5/24</th>
</tr>
</thead>
</table>
B01F 5/265

{using one central conveyor or several separate conveyors, e.g. belt or screw conveyors, vibrating tables, for discharging flows from receptables, e.g. in layers}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

B01F 7/00

Mixers with rotary stirring devices in fixed receptacles {, i.e. movement of the receptacle not being meant to effect the mixing (B01F 13/08 takes precedence)}; Kneaders (B01F 13/04 takes precedence {; devices especially adapted for mixing foundry sand B22C 5/04})

Definition statement

This place covers:

The mixing of materials by means of rotary stirring devices.

References

Limiting references

This place does not cover:

The mixing of materials by means of moveable stirrers, said movement not being a rotating movement or which are subjected to an additional oscillatory movement
Mixers combined with safety devices \( \text{B01F 13/04} \)
Magnetic mixers \( \text{B01F 13/08} \)
Devices especially adapted for mixing foundry sand \( \text{B22C 5/04} \)

**Special rules of classification**

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

**B01F 7/00008**

{Stirrers, i.e. rotary stirring devices \( \text{B01F 3/04539, B01F 3/04588, B01F 3/0478, B01F 7/028, B01F 11/0091} \) take precedence)}

**Definition statement**

This place covers:

Specific details of rotary stirrers, i.e. their constructional details and geometric design either not covered by the subgroups \( \text{B01F 7/02 and B01F 7/16} \) or details of the stirrers not linked to a specific orientation within a container.

**References**

**Limiting references**

This place does not cover:

| The stirrer rotating about a horizontal axis; Stirrers therefor | \( \text{B01F 3/04588} \) |
| Stirrers therefor | \( \text{B01F 3/0478} \) |
| Mixers with rotary stirring devices in fixed receptacles provided with buckets | \( \text{B01F 7/028} \) |
| Stirrers constructions | \( \text{B01F 11/0091} \) |
B01F 7/00058
{with mechanical means to alter the position of the stirring elements}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/00066
{deformable by centrifugal force}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
**B01F 7/00075**

{the position of the stirring elements depending on the direction of rotation of the stirrer}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

**B01F 7/001**

{Fixing of the stirrer to the shaft}

**Definition statement**

This place covers:

Details for attaching the mixing elements to the rotating shaft.

**References**

**Informative references**

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

| Devices for fastening or securing constructional elements or machine parts together | F16B |
B01F 7/00183
{with stirring elements moving with respect to the stirrer shaft, e.g. floating or comprising contracting chambers}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 7/0025
{with arms, paddles, vanes or blades}

Definition statement
This place covers:
Stirrers producing a flow with a radial component.

B01F 7/00341
{Propellers, i.e. stirrers having an axial outflow, e.g. of the ship or aircraft propeller type or having means on the propeller to guide the flow}

Definition statement
This place covers:
Stirrers producing an axial movement on the flow.
B01F 7/00433
{ribbon shaped, i.e. with an open space between the helical ribbon flight and the rotating axis}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/00441
{forming open frameworks or cages}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/00566
{with rigid wires or flexible rods}

Definition statement
This place covers:
Illustrative examples of subject matter classified in this group.
B01F 7/00575
{with a bent rod of non helical configuration supported at one end}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/00583

{Openwork frame or cage stirrers not provided for elsewhere}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 7/00591
{provided with tubes for guiding the material}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/00633
{provided with a plurality of similar elements}

Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.

U.S. Patent Oct. 18, 2005 Sheet 17 of 24 US 6,955,793 B1
**B01F 7/00641**

{provided with a plurality of dissimilar elements}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 7/0065
{comprising helical elements and paddles}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

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

<table>
<thead>
<tr>
<th>Flexible shafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>F16C 1/00</td>
</tr>
</tbody>
</table>
B01F 7/00708

{The axis comprising stirring means and feeding or discharging means fixed on the same axis}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

References

Informative references

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

| Mixers for cement | B28C 5/1292 |

B01F 7/00725

{Connection of the rotating axis with the drive}

Definition statement

This place covers:
Details for attaching the rotating shaft to the drive unit.

References

Limiting references

This place does not cover:

| Couplings for connecting two shafts together | F16D |
B01F 7/00733

{Submerged mixers, i.e. with a submerged stirrer and drive unit, e.g. displaceable on a vertical beam (submerged stirring devices for introducing a gas in a liquid B01F 3/04595)}

Definition statement

This place covers:

Mixers in which both the stirring element and the driving unit are submersed in the body of the fluid.

Example:
B01F 7/00741

\{Vertical beam constructions therefor\}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

DE 10 2007 062 563 A1 2009.06.25
Anhangende Zeichnungen

B01F 7/00758

\{the stator rotor system being formed by substantial flat surfaces\}

Definition statement

This place covers:
Rotor-stator systems in which the material flows between the rotor and the stator in a radial direction with regard to the rotating shaft.
Examples:
References

Informative references

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

<table>
<thead>
<tr>
<th>Crushing or disintegrating disc mills</th>
<th>B02C 7/005, B02C 7/02, B02C 7/04, B02C 7/06, B02C 7/08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc mills (paper making)</td>
<td>D21D 1/30</td>
</tr>
</tbody>
</table>

B01F 7/00766

{provided with intermeshing elements}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
**B01F 7/00775**

(provided with ribs, ridges or grooves on one surface)

**Definition statement**

*This place covers:*

Illustrative examples of subject matter classified in this group.

**EP 2 172 513 A1**
B01F 7/008

{the stator rotor system being formed by conical or cylindrical surfaces, e.g. curved surfaces}

Definition statement

This place covers:

Rotor-stator systems in which the material flows between the rotor and the stator in a direction substantially parallel to the rotating shaft. The form of the rotor and/
or the stator can be substantially cylindrical or substantially conical. Examples:
**B01F 7/00808**

{provided with intermeshing elements}

**Definition statement**

*This place covers:*

Illustrative examples of subject matter classified in this group.
B01F 7/00816
{provided with ribs, ridges or grooves on one surface}

**Definition statement**

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 7/0085
{the stirring devices being composed of two independently driven coaxial rotors facing each other, e.g. having intermeshing teeth}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 7/00866
{provided with intermeshing elements}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/00883
{with rotating surfaces next to one another, e.g. on parallel axis}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

WO 2008/032422
Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/009
{provided with ribs, ridges or grooves on one surface}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 7/00908
{Pipe mixers, i.e. mixing material flowing continuously through pipes, e.g. column mixers}

Definition statement
This place covers:
Rotary stirrers arranged in a pipe or conduit through which the materials flow in a continuous way.
Examples:

DE 10 2006 017 045 A1 2009.10.08
Anhängende Zeichnungen
B01F 7/00916
{the stirrer being driven by the moving material}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 7/022
{comprising liquid feeding, e.g. spraying means (in general B01F 15/0203)}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/024
{the liquid being fed through the shaft of the stirrer}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/1605

{with relative displacement, e.g. vertical, between stirrer and receptacle for bringing them into operative position, e.g. with an independent receptacle or with means to close the receptacle; Fixing elements for the receptacle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/161

{with vertical displacement of the stirrer, e.g. with additional means for axially displacing or for pivoting the stirrer about a vertical axis in order to co-operate with several receptacles}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/1615

{with the stirrer-head pivoting about a horizontal axis to bring the stirrer in and out of operative position, e.g. with a receptacle pivoting about a horizontal axis for emptying}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

---

**FIG. 4**

---

[Diagram showing a device with labeled parts]
B01F 7/162
{the stirrers being driven from the bottom of the receptacle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/1625
{the stirrers having a central axial inflow and a substantially radial outflow, e.g. centrifugal rotors with several rotors rotating in opposite direction}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/163

{with the inflow from one side only, e.g. stirrers placed on the bottom of the receptacle, or used as a bottom discharge pump}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

FIG. 2
B01F 7/1635
{the stirrers co-operating with stationary guiding elements, e.g. surrounding stators or intermeshing stators (B01F 7/164 takes precedence)}

Definition statement

*This place covers:*
Illustrative example of subject matter classified in this group.

References

*Limiting references*

*This place does not cover:*

| The stirrers co-operating with surrounding stators, or with intermeshing stators | B01F 7/164 |
B01F 7/164
{the stirrers co-operating with surrounding stators, or with intermeshing stators, e.g. comprising slits, orifices or screens}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/1645
{the stirrers co-operating with stationary guiding elements (B01F 7/164 takes precedence)}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
**B01F 7/165**

{Pan-type mixers, i.e. mixers in which the stirring elements move along the bottom of a pan-shaped receptacle (with stirring elements moving along the wall or bottom of the receptacle for scraping in general B01F 7/00208)}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**References**

**Informative references**

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

| Pan-type mixers for cement | B28C 5/166 |
**B01F 7/1655**

{the stirrers being additionally moved radially, or oscillating about an axis perpendicular to the stirrer axis *(B01F 7/30 takes precedence)*}

**Definition statement**

*This place covers:*

Illustrative examples of subject matter classified in this group.
References

Limiting references

This place does not cover:

| With stirrers having planetary motion | B01F 7/30 |

B01F 7/166

{with stirrers rotating at different speeds or in opposite direction about the same axis}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/1665
{having two or more stirrers on separate shafts, e.g. the shape of the receptacle matching with the periphery of the rotating stirrers (B01F 7/166 takes precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/167
{the receptacle being subdivided in adjacent compartments}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/1675
{co-operating with deflectors or baffles fixed to the receptacle (B01F 7/1635, B01F 7/1645 take precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/168
{the baffles being of cylindrical shape, e.g. a mixing chamber surrounding the stirrer, the baffle being displaced axially to form an interior mixing chamber}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/1685
{the baffles being adjustable or movable (B01F 7/168 takes precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 7/169
{the receptacle being divided into superimposed compartments}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 7/1695
{with an independent receptacle-stirrer unit, the stirrer being adapted to be coupled to a drive mechanism}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 9/00
Mixers with rotating receptacles, {i.e. the rotary motion is imparted to effect the mixing} ({B01F 11/0002,} B01F 13/04 take precedence); {Mixing the contents of packages or like independent containers by rotating them}

References
Limiting references
This place does not cover:
Mixers combined with safety devices B01F 13/04

Special rules of classification
Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.
B01F 9/0001

{the receptacles being submitted to rotation about two different axes, e.g. receptacles having planetary motion}

Definition statement

This place covers:

Illustrative examples of subject matter classified in this group.
B01F 9/0003
{Use of centrifuges for mixing}

Definition statement
This place covers:
Centrifuges used for mixing materials.

References
Limiting references
This place does not cover:

| Centrifuges per se | B04B |

B01F 9/0005
{the receptacles rotating about an axis at an angle to their longitudinal axis}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

EP 1 247 563 A2

FIG. 1 (A)
**B01F 9/0007**

{the material flowing continuously through the receptacles from feed to discharge, e.g. the feed and discharge being at the same end}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**Special rules of classification**

This group is not limited to feed and discharge being at the same end but also covers the case with inlet and outlet at opposite ends.
B01F 9/0009

{with at least one screw inside the receptacle for feeding or discharging, e.g. the axis of screw and receptacle being parallel}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 9/0014

{Mixing the contents of packages or like independent containers, e.g. tins, bottles, by rotating them}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 9/0016
{the containers being supported by driving means, e.g. by rotating rollers}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 9/0018**

{the containers being modified for coupling to rotating frames or the like; Containers therefor; Coupling means therefor}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 9/002
{for test-tubes or like small containers, e.g. containing blood samples}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 9/0021

{Several containers being held in a support for simultaneous mixing, optionally with feeding and discharging means, e.g. for bottles in crates}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 9/0023

{Imparting a composite movement to a plurality of bottles}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

Fig. 1
B01F 9/0025

{by means of a rotary table provided with a plurality of bottle grippers at its periphery, an additional movement being imparted to the grippers}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 9/0027

{the bottles being submitted to a screw-motion about an axis perpendicular to the axis of the bottles and lying intermediate the ends of the bottles}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 9/0029

{essentially by rotating bottles about an axis perpendicular to the bottle axis and lying outside the bottles, using a rotating drum provided with pockets for the bottles at its periphery}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

B01F 9/0032

{Parts or components, e.g. receptacles, feeding or discharging means (B01F 9/0009 takes precedence)}

References

Limiting references

This place does not cover:

Mixers with rotating receptacles with at least one screw inside the receptacle for feeding or discharging

Special rules of classification

The holding elements for mounting the containers on the mixing device should be classified in B01F 15/00733, but some documents are still classified in B01F 9/0032
B01F 9/0034
{Receptacles, e.g. provided with liners}

Definition statement

This place covers:
Specific features of the receptacles/containers not covered by the groups B01F 9/02 and B01F 9/10.
Examples:

Surface characteristics:

Geometry of the internal chamber:
{characterised by the shape or cross-section of the receptacle, e.g. of Y-, Z-, S-, or X shape}

**Definition statement**

*This place covers:*

Receptacles having a special shape to enhance the mixing effect while being rotated.
Examples:
B01F 9/02

rotating about a horizontal or inclined axis, e.g. drum mixers

References

Informative references

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drum mixers for cement</td>
<td>B28C 5/18</td>
</tr>
<tr>
<td>Drum mixers mounted on a vehicle for cement mixing and transport</td>
<td>B28C 5/42</td>
</tr>
</tbody>
</table>

B01F 9/06

with fixed bars {, i.e. stationary, or fixed on the receptacle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 9/08

with {moving, e.g.} rotating stirring devices {, i.e. moving with respect to the receptacle}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 9/103
{co-operating with stationary mixing elements (B01F 9/106 takes precedence)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

References
Limiting references
This place does not cover:

| Mixers with rotating receptacles, the receptacle comprising a rotary part | B01F 9/106 |
B01F 9/106
{the receptacle comprising a rotary part, e.g. the bottom, and a stationary part, e.g. the wall, with optional use of a stirrer; the receptacle comprising parts moving in opposite directions}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 11/00
Mixers with shaking, oscillating, or vibrating mechanisms (B01F 13/04 takes precedence)

Definition statement
This place covers:
Devices in which shaking, oscillating or vibrating movements are involved for mixing or agitating components, wherein the relevant part is the type of movement produced and the mixing effect achieved.

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Mixers combined with safety devices</th>
<th>B01F 13/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices for generating or transmitting vibrations, in general. Drive units as such for generating the shaking, oscillating, or vibrating movement</td>
<td>B06B</td>
</tr>
</tbody>
</table>
Means for damping vibrations | F16F
---|---
Gearings | F16H

**Special rules of classification**

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.

**B01F 11/0002**

{with a mixing receptacle rotating alternately in opposite directions, or rotating about an axis which intersects the receptacle axis at an angle}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
**B01F 11/0005**

{Mixing the contents of independent containers, e.g. test-tubes, by shaking or oscillating them}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**EP 1 201 297 A1**

---

**B01F 11/0008**

{Holders therefor}

**Special rules of classification**

The holding elements for mounting the containers on the mixing device should be classified in **B01F 15/00733**, but some documents are still classified in **B01F 9/0032**.
**B01F 11/0011**

{for beverage bottles, e.g. within crates or with feeding means for the bottles}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

**Glossary of terms**

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

| Beverage bottle | Hand-portable container suitable for containing beverages or similar liquids, and where the content is to be agitated. |
**B01F 11/0014**

{with supporting means moving in a horizontal plane, e.g. describing an orbital path for moving the containers about an axis which interserts the receptacle axis at an angle (B01F 11/0017, B01F 11/0022, B01F 11/0031, B01F 11/0034 take precedence)}

**Definition statement**

*This place covers:*

Illustrative examples of subject matter classified in this group.
References

*Limiting references*

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>By pivoting the containers about an axis</td>
<td>B01F 11/0017</td>
</tr>
<tr>
<td>The containers being submitted to a rectilinear movement</td>
<td>B01F 11/0022</td>
</tr>
<tr>
<td>The vibrations being caused by an unbalanced rotating member</td>
<td>B01F 11/0031</td>
</tr>
<tr>
<td>The vibrations being caused by electromagnets</td>
<td>B01F 11/0034</td>
</tr>
</tbody>
</table>
B01F 11/0017

{by pivoting the containers about an axis (B01F 11/0025, B01F 11/0031, B01F 11/0034 take precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

Figure 2

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>The containers being submitted to a composite movement not in a horizontal plane, e.g. rectilinear and pivoting</td>
<td>B01F 11/0025</td>
</tr>
<tr>
<td>The vibrations being caused by an unbalanced rotating member</td>
<td>B01F 11/0031</td>
</tr>
<tr>
<td>The vibrations being caused by electromagnets</td>
<td>B01F 11/0034</td>
</tr>
</tbody>
</table>
B01F 11/0028
{the containers being submitted to a wobbling movement}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.


FIG.4
**B01F 11/0037**

{with means for transporting test tubes to and from the stirring device}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 11/0042

{Comprising a receptacle to only a part of which the movement is imparted; Periodically deforming flexible tubular members through which the material is flowing}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 11/0045**

{comprising a receptacle with a deformable part, e.g. a membrane, to which a motion is imparted}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

![FIG. 1](image1)

![FIG. 2](image2)
B01F 11/0054

{having a rotary stirrer oscillating axially (having rotary stirrers with additional radial movement, or oscillating about an axis perpendicular to the stirrer axis, B01F 7/1655)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
**B01F 11/0057**

{for material flowing continuously axially therethrough}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

---

**B01F 11/006**

{having an annular trough vibrating about its central axis}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 11/0062
{having a receptacle submitted to a composite movement, i.e. at least one movement being vibratory or oscillatory}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 11/0065
{the material being contained in a flexible bag submitted to periodical deformation}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

Fig. 5a
B01F 11/0071

{the material being directly submitted to a pulsating movement, e.g. by means of an oscillating piston or air column (solvent extraction of liquid solution comprising vibrating mechanisms B01D 11/0438; stationary reactors of pulsating type B01J 19/185)}

Definition statement

This place covers:

Illustrative examples of subject matter classified in this group.
B01F 11/0077
{for material continuously moving therethrough (B01F 11/0042, B01F 11/0057, B01F 11/006, B01F 11/0241 take precedence)}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 11/008
{the stirrers performing an oscillatory, vibratory or shaking movement (B01F 11/0054, B01F 11/04 take precedence)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

References
Limiting references
This place does not cover:

| Mixers with pendulum stirrers | B01F 11/04 |
B01F 11/0082
{performing a rectilinear reciprocating movement}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

**FIG. 1**
B01F 11/0085

{performing a superposed additional movement other than oscillation, vibration or shaking}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 11/0088

{performing an oscillatory movement about an axis}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

References

Limiting references

This place does not cover:

| Devices for generating or transmitting vibrations, in general. Drive units as such for generating the shaking, oscillating, or vibrating movement. | B06B |
| Gearings | F16H |
Special rules of classification

This type of stirrers are included here:
**B01F 11/04**

with pendulum stirrers {, i.e. with stirrers suspended so as to oscillate about fixed points or axes (stirrers per se B01F 11/0091)}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

---

**B01F 13/00**

Other mixers; Mixing plant, including combinations of {mixers, e.g. of} dissimilar mixers

**Special rules of classification**

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.
B01F 13/0013

{Mixers with an endless belt for transport of the material, e.g. in layers or with mixing means above or at the end of the belt}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 13/0015
{Mixers having moving endless chains or belts, e.g. provided with paddles, as mixing elements}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 13/0016
{Movable or transportable mixing devices or plants}

Definition statement
This place covers:
Mixing devices or plants which are designed to be transported or moved from one place to another, or that during operation can be held or displaced.

B01F 13/0018
{Movable mixing devices, i.e. apt to be shifted or displaced from one place to another, e.g. by human force}

Definition statement
This place covers:
Mixing devices which can be displaced from one place to another, but which, during use, it remains on a supporting structure (e.g. a dough mixer which can be displaced but, during use, remains on a baking table).
B01F 13/002
{portable during use, e.g. hand-held (B05C 17/00553 takes precedence, whisks comprising mixing wires A47J 43/1087)}

Definition statement
This place covers:
Mixing devices which, during use, is held by the user, e.g. mixing syringes, paint mixers held and operated by a person.

References
Limiting references
This place does not cover:

Hand tools or apparatus using hand held tools with means allowing the stock of material to consist of at least two different components B05C 17/00553

B01F 13/005
{Mixers with loose mixing elements, e.g. balls, in a receptacle}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

EP 1 985 554 A1

FIG 2

![Diagram of mixing device]
B01F 13/0059
{Micromixers}

Definition statement
This place covers:
Microdevices used for mixing or agitating components. Micromixers used in other type of microdevice (e.g. in a Lab-on-a-chip).

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Microreactors</th>
<th>B01J 19/0093</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microdevices used in laboratory apparatus</td>
<td>B01L 3/5027</td>
</tr>
<tr>
<td>Microstructural devices per se</td>
<td>B81B</td>
</tr>
<tr>
<td>Apparatus and methods for manufacturing microdevices</td>
<td>B81C</td>
</tr>
<tr>
<td>Micropumps</td>
<td>F04B 19/006</td>
</tr>
<tr>
<td>Microvalves</td>
<td>F16K 99/0001</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Microreactors</th>
<th>B01J 19/0093</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microdevices used in laboratory apparatus</td>
<td>B01L 3/5027</td>
</tr>
</tbody>
</table>

Special rules of classification
The classification of micromixers is done in the following way:
If the way of mixing is already covered by any of the mixing techniques covered by the rest of the groups of B01F, the document is classified both in B01F 13/0059 (or subgroups) and in the subgroups representing the mixing technique (e.g. flow mixing, rotating stirrer, mixing using vibrating mechanisms, etc.).
If the way of mixing is exclusive for microdevices, then the document is accordingly classified in B01F 13/0074 (or subgroups).
{Hydrodynamic focussing}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.

U.S. Patent

Mar. 6, 2001

Sheet 2 of 5

US 6,196,525 B1
**B01F 13/0064**

*Mixing chamber*

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

DE 20 2005 005 628 U1
B01F 13/0066
{Interdigital streams, i.e. lamellae}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 13/0067

{The interdigital streams being concentric lamellae}

Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 13/0071

{the components to be mixed being combined in a single independent droplet, e.g. these droplets being divided by a non-miscible fluid or consisting of independent droplets}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 13/0072
{the components being formed by independent droplets which are alternated, the mixing of the components being achieved by diffusion between droplets}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

EP 1 259 316 B1

Fig. 4  Fig. 5  Fig. 6

Fig. 7

Liquid 1  Liquid 2

0.3 mm
B01F 13/0076

(using electrohydrodynamic [EHD] or electrokinetic [EKI] phenomena to mix or move the fluids)

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
**B01F 13/0077**

(using magnetohydrodynamic [MHD] phenomena to mix or move the fluids)

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

![Diagram of magnetohydrodynamic phenomena](image1)

**B01F 13/0079**

(using heat to mix or move the fluids)

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

![Diagram of heat distribution](image2)
Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 13/0086

{using roughness of the surfaces}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 13/0091
{using ciliary stirrers to move or stir the fluids}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.
**B01F 13/0098**

*Mixing after turning the mixing vessel upside down*

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group.

---

**B01F 13/02**

Mixers with gas {or liquid} agitation, e.g. with air supply tubes {{B01F 3/04106 takes precedence; supplying ingredients in concrete mixers with a pneumatic or hydraulic conveyor B28C 7/062; fluidising devices facilitating filling or emptying of containers B65D 88/72}}

**Definition statement**

This place covers:

Mixing using a gas or a liquid as agitation means, said gas or liquid not mixing with the materials forming the mixture.

**References**

**Limiting references**

This place does not cover:

| Mixing, the gas being introduced by bubbling | B01F 3/04106 |
B01F 13/0809

{the mixture being directly submitted to an electromagnetic field without use of a stirrer, e.g. for material comprising ferromagnetic particles, or for molten metal}

Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group.

EP 1 407 812 A1
B01F 13/0818
{using independent floating stirring elements}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

US 3,807,704
B01F 13/0827
{using supported or suspended stirring elements}

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 13/1005
{with several silos arranged in a row or around a central delivery point, e.g. provided with proportioning means}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.

---

B01F 13/1041

{comprising mixers specially adapted for mixing in combination with disintegrating (B01F 7/048, B01F 13/1002 take precedence)}

**Definition statement**

*This place covers:*

Mixing devices and methods which, additionally, comprise means for disintegrating material.

**References**

**Limiting references**

*This place does not cover:*

| Crushing, pulverising or disintegrating in general; milling | B02C |
**B01F 13/1055**

{Mixing plant with mixing receptacles receiving material dispensed from several component receptacles, e.g. paint tins}

**Definition statement**

This place covers:

Illustrative examples of subject matter classified in this group.
B01F 13/1058

{with component receptacles fixed in a circular configuration on a horizontal table, e.g. the table being able to be indexed about a vertical axis}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 13/1072

{Plants with a plurality of mixing receptacles or mixing tools, e.g. the receptacles or tools being able to be indexed into different working positions along a line or along a circle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

B01F 15/00

Accessories for mixers {; Auxiliary operations or auxiliary devices; Parts or details of general application}

Definition statement

This place covers:

Details or accessories of mixers when in direct combination with the mixing device per se, the accessory not being the essential element as such.

Special rules of classification

Accessories or mechanical details covered by a general (function-oriented) subclass and being the relevant information (claimed and/or described) in the document are not classified in this group.

Where existing, classification must be made in the EC class for invention related information, or in the Indexing Code for additional information.
**B01F 15/00006**

{Mixing heads comprising a driven stirrer (mixing heads without driven stirrer B01F 5/0077)}

**Definition statement**

*This place covers:*

Illustrative examples of subject matter classified in this group.
B01F 15/00012
{the stirrer being provided with a surrounding stator}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

B01F 15/00019
{Washing or cleaning mixers, e.g. using knockers or scrapers; Inhibiting build-up of material on machine parts (cleaning in general B08B)}

References
Limiting references
This place does not cover:

| Cleaning in general | B08B |

B01F 15/00123
{Controlling; Testing; Measuring (B01F 15/0408 takes precedence)}

Definition statement
This place covers:
Control, test or measuring elements in combination with the mixing device, the specific details of said elements not being of relevance.
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring, testing in general</td>
<td>G01</td>
</tr>
<tr>
<td>Control systems in general</td>
<td>G05D</td>
</tr>
</tbody>
</table>

B01F 15/00435

{Drives, e.g. for reciprocating motion; Transmissions; Brakes; Couplings (B01F 15/00201, B01F 15/00668 take precedence; drives using magnetic couplings B01F 13/08)}

Definition statement

This place covers:

The mentioning of the driving means, transmissions, brakes or couplings (in a generic form) in combination with the mixing device.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting or supporting stirrer shafts on receptacles</td>
<td>B01F 15/00668</td>
</tr>
<tr>
<td>Wind motors</td>
<td>F03D</td>
</tr>
<tr>
<td>Hydraulic motors</td>
<td>F15B</td>
</tr>
<tr>
<td>Brakes</td>
<td>F16D</td>
</tr>
<tr>
<td>Couplings</td>
<td>F16D</td>
</tr>
<tr>
<td>Transmissions</td>
<td>F16G, F16H</td>
</tr>
<tr>
<td>Electric motors</td>
<td>H02K</td>
</tr>
</tbody>
</table>

Special rules of classification

Drive units, transmissions, brakes or couplings per se, i.e. when said elements and/or their details are the essential part of the described or claimed invention are not classified in this group.

B01F 15/00441

{Construction of driving shafts}

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shafts, in general</td>
<td>F16C</td>
</tr>
</tbody>
</table>
B01F 15/00467

{Driving reciprocating or oscillating stirrers}

References

Limiting references

This place does not cover:

| Devices for generating or transmitting vibrations, in general. Drive units as such for generating the shaking, oscillating, or vibrating movement |
| B06B |

B01F 15/00733

{Clamping or holding arrangements for mounting receptacles on mixing devices, e.g. for shaking, vibrating or rotating the receptacle}

Special rules of classification

The holding elements for mounting the receptacles on mixing devices are to be classified in B01F 15/00733 but some are still left in B01F 9/0032

B01F 15/0074

{having a cup-shaped or cage-type form}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

![Illustrative example](Fig. 9)
B01F 15/00746
{having a jaw-type or finger-type shape}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
**B01F 15/00753**

(of the vertically movable, two-plates type)

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group.
B01F 15/00785
{by rotating them about an axis parallel to the plane of the opening}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 15/00792
{by moving them in the plane of the opening (B01F 15/00818 takes precedence)}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group.

References
Limiting references
This place does not cover:

| Moving covers on a cylindrical drum in a circular path along the drum | B01F 15/00818 |
B01F 15/00798
{by rotating them about an axis perpendicular to the plane of the opening}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

B01F 15/00805
{by moving them perpendicular to the plane of the opening}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 15/00811
{and moving them afterwards in another direction}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 15/00818
{Moving covers on a cylindrical drum in a circular path along the drum}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group.

B01F 15/00824
{Receptacles (B01F 9/0032, B01F 15/00779 take precedence)}

Definition statement

This place covers:
Specific features of the receptacles/containers in which the mixing is performed not covered by any of the main groups B01F 1/00, B01F 3/00, B01F 5/00, B01F 7/00, B01F 9/00, B01F 11/00 and B01F 13/00.

B01F 15/00831
{Nature of the receptacle}

Definition statement

This place covers:
The material or surface finish of the (walls of the) receptacle.
B01F 15/0087

{comprising compartments keeping the materials to be mixed separated until the mixing is initiated (B65D 81/32 takes precedence)}

Definition statement

This place covers:

Containers, receptacles or set of them for keeping the materials to be mixed until the moment of mixing. Normally this kind of materials are to be mixed immediately before their final use (e.g. for specific glues or polymers, paints, beverages, medicaments, dental material, bone cement, etc.).

Examples:
References

Limiting references

This place does not cover:

| Containers, packaging elements, or packages for packaging two or more different materials which must be maintained separate prior to use in admixture | B65D 81/32 |
B01F 15/00876

(Configuration of the interior)

Definition statement

**This place covers:**

The shape of the receptacle, when relevant for the mixing process. Elements attached to the receptacle as auxiliary means not covered by the previous subgroups. Example:
B01F 15/00883
{provided with baffles, plates or bars on the wall or the bottom}

Definition statement

This place covers:

Illustrative examples of subject matter classified in this group.
Definition statement

This place covers:
Illustrative example of subject matter classified in this group.
B01F 15/00909

{Closely surrounding the rotating element}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.
B01F 15/00915
[Baffles; Flow breakers]

Definition statement

This place covers:
Illustrative examples of subject matter classified in this group.
B01F 15/00922

{Maintenance, e.g. replacing, repairing or inspecting; Making mixers or parts thereof}

Definition statement

This place covers:

General measures directed to the maintenance, repairing, or inspection of mixing devices (e.g. means for mounting/dismounting specific parts, observation elements as man-holes, etc.).
It also covers ways of making the mixing elements which are not covered by specific general fields as B29C, B22, B23 etc. Examples:
Definition statement

This place covers:

General specification about how the mixer is built-up, e.g. how the different elements are brought up together, how elements are mounted, etc.

Examples:
Feed or discharge mechanisms

Definition statement

This place covers:
Devices for feeding or discharging the mixer in combination with the mixing device.
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Category</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveying of materials, in general</td>
<td>B65G</td>
</tr>
<tr>
<td>Loaing or unloading, in general</td>
<td>B65G88/00</td>
</tr>
</tbody>
</table>

Special rules of classification

The feeding or discharging means per se are not classified in this group.

**B01F 15/0268**

{the gate carrying a stirrer acting as discharge pump}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

---

**B01F 15/04**

Forming a predetermined ratio of the substances to be mixed (controlling ratio of two or more flows of fluid or fluent material G05D 11/02 (G05D 11/00 takes precedence))

Definition statement

This place covers:

Devices and methods for controlling the ratio of the components to be mixed in combination with means for mixing (i.e. homogenizing) the mixture of merged components.
References

Limiting references

This place does not cover:

| Ratio control | G05D 11/00 |

Special rules of classification

Generally control systems for establishing a correct ratio of components are not classified in this group.

B01F 15/0404

{Forming mixtures with changing ratio or gradient}

Definition statement

This place covers:

Illustrative examples of subject matter classified in this group.

WO 2007/121263

PCT/US2007/006461

[Figure 8]
B01F 15/0412

{Forming a predetermined ratio of two or more flows, e.g. using flow-sensing or flow controlling devices (B01F 15/0408 takes precedence)}

Definition statement

This place covers:

Forming a ratio of components when said components are continuously flowing.

B01F 15/0441

{by feeding the components in predetermined amounts}

Definition statement

This place covers:

Forming a ratio of components when said components are fed batchwise.

B01F 15/06

Heating or cooling systems

Definition statement

This place covers:

Heating or cooling elements in combination with the mixing device, the specific details of the heat-exchange means not being of relevance.
References

Limiting references

This place does not cover:

Heat exchangers in general F28

B01F 17/00

Use of substances as emulsifying, wetting, dispersing or foam-producing agents {(see for particular applications relevant classes, e.g. lubricant emulsions C10M; fuel emulsions C10L 1/32; detergents C11D; colour and dye dispersions C09; textile applications D06; cosmetics A61K; food A23L 29/10; biocides A01N; petrol winning E21B; hydrometallurgy, metal liquid-liquid extraction C22B; mixers B01F 3/00; polymers mixing; waxes C08; paper D21H; demulsification (anti foam) B01D 19/04)}

Definition statement

This place covers:

Emulsions, dispersions and suspensions if claimed per se

Compounding ingredients for forming emulsions, dispersions, suspensions

Different types of emulsions, dispersions (micro-, nanoemulsions, multiple emulsions, w/o emulsions)

Relationships with other classification places

Cosmetic preparations are classified in A61K 8/00 and A61Q

Compositions for drilling of boreholes or wells are classified in C09K 8/50

Organic dyes are classified in C09B

Coating compositions are classified in C09D

Lubricants are classified in C10M

Detergent compositions are classified in C11D

References

Informative references

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

<table>
<thead>
<tr>
<th>Topic</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticides, disinfectants</td>
<td>A01N</td>
</tr>
<tr>
<td>Food</td>
<td>A23</td>
</tr>
<tr>
<td>Cosmetic preparations</td>
<td>A61K 8/00, A61Q</td>
</tr>
<tr>
<td>Emulsion polymerisation</td>
<td>C08F 2/22</td>
</tr>
<tr>
<td>Dyes, pigments</td>
<td>C09B</td>
</tr>
<tr>
<td>Coatings, inks, paints</td>
<td>C09D</td>
</tr>
<tr>
<td>Lubricants</td>
<td>C10M</td>
</tr>
<tr>
<td>Detergents</td>
<td>C11D</td>
</tr>
</tbody>
</table>
Special rules of classification

Only the compounds that form the emulsion are classified, ingredients that belong to another subgroup/subclass are classified there.

For example: organic dye dispersion, the dye is only classified in C09B.

When main claims are general, for example a dispersed particle in a liquid, it's classified in B01F 17/00.

In absence of an indication to the contrary, classification is made in the last appropriate place.

Documents classified in the mixture groups are also classified in the individual group of B01F 17/00.

Glossary of terms

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

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emulsifier</td>
<td>compound that promotes the dispersion of one liquid in another, as in the mixture of oil and water by lowering the surface tension between the two phases</td>
</tr>
<tr>
<td>Emulsion</td>
<td>disperse systems of two or more immiscible liquids, one forming the continuous phase and the other the dispersant phase</td>
</tr>
</tbody>
</table>

B01F 17/0064

{Organic compounds containing phosphorus}

Definition statement

This place covers:

e.g. phosphonic, phosphoric acids