G01F

MEASURING VOLUME, VOLUME FLOW, MASS FLOW OR LIQUID LEVEL; METERING BY VOLUME (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; burettes or pipettes B01L 3/02; arrangements of liquid volume meters or volume-flow meters in liquid-delivering apparatus, e.g. for retail sale purposes, B67D 7/16; pumps, fluid motors, details common to measuring or metering devices and pumps or fluid motors F01 - F04; {sampling G01N 1/00}; locating, determining distance or velocity using reflection or reradiation of radio waves, analogous arrangements using other waves G01S; systems for ratio control G05D 11/00; {coin-freed apparatus for metering flow of liquid or gas G07F 15/00})

Definition statement

This place covers:

• Apparatus or methods for measuring the volume flow or mass flow of fluids or fluent solid materials.
• Apparatus or methods for metering by volume.
• Apparatus or methods for measuring the capacity of containers or cavities, or the volume of solid bodies, fluids or fluent solid materials.
• Level indicators.
• Details, accessories, testing or calibrating of the apparatus as described.

References

Limiting references

This place does not cover:

| Measuring linear dimensions to determine volume | G01B |
| Sampling: Preparing specimens for investigation | G01N 1/00 |
| Ratio control | G05D 11/00 |

Application-oriented references

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

<p>| Milk flow sensing devices in milking machines or devices | A01J 5/01 |
| Food containers with dispensing devices for dispensing a certain quantity of powdered or granulated foodstuffs | A47G 19/34 |
| Apparatus for making beverages having water-level controls | A47J 31/56 |
| Measuring blood flow | A61B 5/026, A61B 8/06 |
| Metering media introduced into the human body, e.g. drip meters | A61M 5/168 |
| Controlling the quantity of fluent-solid material fed into a container during packaging by volumetric measurement | B65B 1/36 |
| Controlling the quantity of plastic material, semi-liquids, liquids, or mixed solids and liquids, fed into a container during packaging by volumetric measurement | B65B 3/30 |</p>
<table>
<thead>
<tr>
<th>Application-oriented references</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Separating measured quantities from supply by volume measurement</td>
<td>B65B 37/20</td>
</tr>
<tr>
<td>Bottling liquids or semi-liquids with provision for metering the liquids to be introduced, e.g. when adding syrups</td>
<td>B67C 3/20</td>
</tr>
<tr>
<td>Flowmeters used in apparatus or devices for dispensing beverages on draught</td>
<td>B67D 1/0855</td>
</tr>
<tr>
<td>Arrangements of liquid volume meters or volume-flow meters in liquid-delivering apparatus, e.g. for retail sale purposes</td>
<td>B67D 7/16</td>
</tr>
<tr>
<td>Measuring liquid level in wells</td>
<td>E21B 47/04</td>
</tr>
<tr>
<td>Indicating devices for lubricant level</td>
<td>F01M 11/12</td>
</tr>
<tr>
<td>Measuring intake air flow to generate a control signal for control of supply of combustible mixture in combustion engines</td>
<td>F02D 41/18</td>
</tr>
<tr>
<td>Proportioning devices in lubricating systems</td>
<td>F16N 27/00</td>
</tr>
<tr>
<td>Arrangements for measuring the quantity of conveyed product in pipelines</td>
<td>F17D 3/18</td>
</tr>
<tr>
<td>Adaptation of level indicators to, or mounting on, steam boilers</td>
<td>F22B 37/78</td>
</tr>
<tr>
<td>Controlling water feed or water level for steam generation</td>
<td>F22D 5/00</td>
</tr>
<tr>
<td>Rainfall or precipitation gauges</td>
<td>G01W 1/14</td>
</tr>
<tr>
<td>Apparatus actuated by coins, cards or the like with meter-controlled dispensing of liquid or gas</td>
<td>G07F 15/00</td>
</tr>
<tr>
<td>Reactor-coolant flow measuring or monitoring in nuclear reactors; Moderator- or coolant-level detecting devices in nuclear reactors</td>
<td>G21C 17/032, G21C 17/035</td>
</tr>
<tr>
<td>Accumulators combined with arrangements for measuring, testing, or indicating condition, e.g. level or density of the electrolyte</td>
<td>H01M 10/48</td>
</tr>
</tbody>
</table>

**Informative references**

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

| Filters | B01D |
| Burettes or pipettes | B01L 3/02 |
| Weighing a continuous stream of material during flow | G01G 11/00 |
| Measuring pressure | G01L |
| Measuring speed of fluids, e.g. of air stream | G01P 5/00 |
| Determining a distance or velocity using sonar, radar or lidar techniques | G01S |
| Control of flow; Control of level | G05D 7/00, G05D 9/00 |
| Alarm devices | G08B |
| Electric switches operated by change of liquid level, e.g. float switches, or by a change of fluid flow | H01H 35/18, H01H 35/24 |
G01F 1/00
Measuring the volume flow or mass flow of fluid or fluent solid material wherein the fluid passes through the meter in a continuous flow (measuring a proportion of the volume flow G01F 5/00; measuring speed of flow G01P 5/00; indicating presence or absence of flow G01P 13/00; regulating quantity or ratio (G05D 7/00, G05D 11/02))

Definition statement
This place covers:
Devices specially adapted to be used in open channels

Devices operating
• by measuring the level variations of storage tanks relative to the time
• by using mechanical effects
• by using electric or magnetic effects
• by measuring frequency, phaseshift, or propagation time of electro-magnetic or other waves, e.g. ultrasonic flowmeters
• by using thermal effects

Devices using marked regions or existing inhomogeneities within the fluid stream, e.g. statistically occurring variations in a fluid parameter
Devices for measuring pulsing fluid flows
Devices for measuring flow of a fluid or flow of a fluent solid material in suspension in another fluid
Devices for measuring mass flow of a fluid or a fluent solid material

Relationships with other classification places
Although measuring speed of fluids is classified in G01P 5/00, determination of speed of fluids flowing through tubes is considered as belonging to flow measurement and is generally not classified in G01P 5/00, but in G01F, e.g. G01F 1/66, even if volume flow is not explicitly mentioned in the documents.

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Measuring a proportion of volume flow</th>
<th>G01F 5/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighing a continuous stream of material during flow</td>
<td>G01G 11/00</td>
</tr>
<tr>
<td>Indicating presence or absence of flow</td>
<td>G01P 13/00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Fluidic oscillators</th>
<th>F15C 1/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection means in general</td>
<td>G01H</td>
</tr>
<tr>
<td>Measuring speed by using correlation means in general</td>
<td>G01P 3/80, G01P 5/22</td>
</tr>
<tr>
<td>Arrangements or constructions of Pitot tubes for measuring speed of fluids</td>
<td>G01P 5/165</td>
</tr>
</tbody>
</table>
Special rules of classification

G01F 1/37 and G01F 1/38 take precedence over G01F 1/363 and G01F 1/366.
G01F 1/66 takes precedence over G01F 1/56.
G01F 1/582 takes precedence over G01F 1/586.
G01F 1/58 takes precedence over G01F 1/64.
G01F 1/663, G01F 1/665 and G01F 1/666 take precedence over G01F 1/667.
G01F 1/6847 takes precedence over G01F 1/688.
G01F 1/7082 - G01F 1/7088 take precedence over G01F 1/712.

Devices using Peltier or Seebeck effects are also classified under G01F 1/6888.

Devices for measuring pulsing fluid flow and devices for measuring bidirectional flow are classified in G01F 1/72.

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>Multiple exciters or detector pairs</td>
<td>Vibrating tube Coriolis mass flowmeters with more than one driver or more than one pair of pick-offs (this group is a subgroup of the previous one but, at present, incomplete)</td>
</tr>
<tr>
<td>Special driving or detecting modes</td>
<td>Vibrating tube Coriolis mass flowmeters with special/unusual arrangements of exciters and/or detectors, such as: more than one driver or more than one detector pair; or unusual driving modes</td>
</tr>
</tbody>
</table>

G01F 1/002

{specially adapted to be used in open channels}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group
G01F 1/007
{by measuring the level variations of storage tanks relative to the time}

Definition statement

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

EP2265905
**G01F 1/056**

**{Orbital ball flowmeters}**

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

WO2008044917

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**G01F 1/06**

**using rotating vanes with tangential admission**

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group
G01F 1/10
using rotating vanes with axial admission

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

WO2004020894

G01F 1/20
by detection of dynamic effects of the fluid flow

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

EP1992916
G01F 1/203

{Jet stream flowmeters}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

US3709213

US3705534
**G01F 1/206**

{Measuring pressure, force or momentum of a fluid flow which is forced to change its direction}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group

DE102007000445

US5687768

US5571974

**G01F 1/3227**

{using fluidic oscillators (fluidic oscillators per se F15C 1/00)}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group

EP1094303 EP0295845 US4182172

WO9702470
G01F 1/52
by measuring the height of the fluid level due to the lifting powder of the fluid flow

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
EP0783056

G01F 1/54
by means of chains, flexible bands or wires introduced into and moved by the flow

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
WO9300571

US4594890
**G01F 1/64**

by measuring electrical currents passing through the fluid flow; measuring electrical potential generated by the fluid flow, e.g. by electrochemical, contact or friction effects (G01F 1/58 takes precedence)

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

US3742263

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**G01F 1/661**

{using light}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

US3709599
G01F 1/662

{Constructional details}

Definition statement

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

US2007227261

EP2236993

Fig. 5A
G01F 1/665
{of the drag-type}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

EP1728054

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G01F 1/666
{by detecting noise and sounds generated by the flowing fluid}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

US2009158858

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*FIG. 1*
G01F 1/667

{Schematic arrangements of transducers of ultrasonic flowmeters; Circuits therefor (G01F 1/663, G01F 1/665, G01F 1/666 take precedence)}

Definition statement

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

US2009138215

EP2072972
G01F 1/7048
{the concentration of electrical loaded particles giving an indication of the flow}

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

US2005235757

G01F 1/7088
{using electrical loaded particles as tracers}

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

DE102007038474
GB2447425

G01F 1/74

Devices for measuring flow of a fluid or flow of a fluent solid material in suspension in another fluid

Definition statement

*This place covers:*

Illustrative example of subject matter classified in this group

FR2936312

US7738084
G01F 1/76
Devices for measuring mass flow of a fluid or a fluent solid material (weighing a continuous stream of material during flow G01G 11/00)

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

GB2241789
**G01F 1/785**

{using fluidic bridge circuits}

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group

EP0737302

![Diagram](image1)

**G01F 1/80**

operating by measuring pressure, force, momentum, or frequency of a fluid flow to which a rotational movement has been imparted

**Definition statement**

This place covers:

Illustrative example of subject matter classified in this group

WO9702470

![Diagram](image2)

US2007193371

![Diagram](image3)
**G01F 1/82**

using a driven wheel as impeller and one or more other wheels or moving elements which are angularly restrained by a resilient member, e.g. spring member as the measuring device

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

GB1087350

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**G01F 1/8404**

{details of flowmeter manufacturing methods}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

Details of flow meter manufacturing methods:

Methods for designing flow meters, e.g. numerical simulations of flow meter behaviour or modelling to refine the flow meter design (e.g., eigenvector design): (XP002096659, WO99/28708, US2003097883, EP0271605, WO0165213)

WO0165213:
G01F 1/8409
{constructional details}

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

Constructional details

G01F 1/8413
{means for influencing the flowmeter's motional or vibrational behaviour, e.g., conduit support or fixing means, or conduit attachments}

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

Means for influencing the flow meter's motional or vibrational behaviour, e.g., conduit support or fixing means, or conduit attachments:

Details of tubes, casings or special casings for gyroscopic mass flow meters, e.g. central support manifold fixing the tube(s) ends US5343764:

improved node plates/brace bars: WO2009123632, US5370002;
stiffening means EP0547455, figs 1,3:

FIG. 3A

FIG. 3B

Casings influencing the vibrational behaviour should go both to G01F 1/8409 and G01F 1/8413

**G01F 1/8418**

{motion or vibration balancing means}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

Motion or vibration balancing means:

Definition statement

Rebalancing means (e.g., masses or actuators) EP0759542; Rebalanced flow meter design;

G01F 1/8422
{exciters}

Definition statement

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

Exciters: constructional details for exciters, FR2316582, EP1719983, WO8505677

G01F 1/8427
{detectors}

Definition statement

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

G01F 1/8431
{electronic circuits}

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

G01F 1/8436
{signal processing}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
Signal processing: e.g. details of neural networks, FFT, matrix operations, analogue and digital filtering: WO0049371, US4680974, WO8505677, US5555190

G01F 1/844
{microfluidic or miniaturised flowmeters}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
Microfluidic or miniaturised flow meters: US2005150311 (e.g. capillaries as flow metering tubes)

G01F 1/8445
{micromachined flowmeters}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
Micromachined flow meters: US2007151335 (applying chip technology)

G01F 1/845
{arrangements of measuring means, e.g., of measuring conduits}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
Arrangements of measuring means, e.g., of measuring conduits
G01F 1/8454
{rotating or rotatingly suspended measuring conduits}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

Rotating or rotatingly suspended measuring conduits: Revolving (continuously rotating) measuring pipe(s)/ flow path(s): (EP0424828, DE4125424) EP0424828:

DE4125424:

Rotating fluid guiding part DE20115010U; Oscillating tube being rotatingly suspended (tube connections allowing rotation): (BE681739, US3276257, US3485098); use of a gyroscope: BE681739:
**G01F 1/8459**

{vibrating means being located inside the measuring conduits}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

Vibrating means being located inside the measuring conduits:

Vibrating elements in flow path: EP0867694:

![Diagram of vibrating elements in flow path](image1)

Vibrating metal strip in flow path: US4420983 (fig.11):

![Diagram of vibrating metal strip in flow path](image2)

Vibrating cylinder in flow path: US4420983 (fig 1):

![Diagram of vibrating cylinder in flow path](image3)
G01F 1/8463

{the measuring conduits' cross-section being deformed during measurement, e.g. by periodically deflecting a portion of the conduits' surface}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

The measuring conduits' cross-section being deformed during measurement, e.g. by periodically deflecting a portion of the conduits' surface:

JP6235652 (the cross-section is deformed by the action of the fluid)

EP0316908 (phase difference between deflection of successive wall sections)
G01F 1/8468
{vibrating measuring conduits}

Definition statement

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

Vibrating measuring conduits:

Pipes, flow paths not covered by the sub-classes: e.g. 3-dimensional flow tube configurations not being loops, e.g. US5184518, US4879910; or an out-of-plane bent flow tube (JP4081617) need to be classified under the subclass G01F 1/8468.

US5184518:

JP4081617:
G01F 1/8472

{having curved measuring conduits, i.e. whereby the measuring conduits' curved center line lies within a plane (G01F 1/8481 takes precedence)}

Definition statement

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

Having curved measuring conduits, i.e. whereby the measuring conduits’ curved center line lies within a plane (G01F 1/8481 takes precedence):

Single S: WO8808517;

Single V: US6484591;

Single U: GB2001759 (fig.9):

bent oscillating tube (on bearings) US3485098:
References

Limiting references

This place does not cover:

Having loop-shaped measuring conduits, e.g. the measuring conduits form a loop with a crossing point

G01F 1/8477

{with multiple measuring conduits}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

with multiple curved measuring conduits: 2x triangle in parallel:

US5497666:

2xS in parallel: JP63314415
Definition statement

This place covers:

Illustrative example of subject matter classified in this group

Having loop-shaped measuring conduits, e.g. the measuring conduits form a loop with a crossing point:

Single loop: US5069074

An almost closed omega, even if called a "loop" should be classified in G01F 1/8472 instead.
G01F 1/8486
{with multiple measuring conduits}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
with multiple loop-shaped measuring conduits:
two loops in parallel: WO8505677

two loops in series: EP0271605:

G01F 1/849
{having straight measuring conduits}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
Having straight measuring conduits: single straight tube:
G01F 1/849 (continued)
Definition statement

EP0775893:

US2002020228:

G01F 1/8495
{with multiple measuring conduits}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
with multiple measuring conduits:
Two straight tubes in parallel: WO8808517:
Two straight tubes in series: US7005019:

**G01F 3/00**

Measuring the volume flow of fluids or fluent solid material wherein the fluid passes through the meter in successive and more or less isolated quantities, the meter being driven by the flow (measuring a proportion of the volume flow **G01F 5/00**)

**Definition statement**

*This place covers:*

Devices
- With measuring chambers which expand or contract during measurement;
- with measuring chambers moved during operation;
- with stationary measuring chambers having constant volume during measurement.

Wet gas-meters.

**G01F 3/065**

(sliding-vane meters)

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group

US3683694
G01F 3/08
Rotary piston or ring piston meters

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
US5495756

G01F 3/10
Geared or lobed impeller meters

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
US2010307234
G01F 3/10 (continued)

US4856427

GB2120728

G01F 3/12
Meters with nutating members, e.g. discs

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

US5824896

G01F 3/16
in stationary cylinders

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

US4232550
G01F 3/16 (continued)
Definition statement

US5193389

G01F 3/18
involving two or more cylinders

Definition statement

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

GB1356762

G01F 3/26
Tilting-trap meters

Definition statement

This place covers:
Illustrative example of subject matter classified in this group
WO2007079942

G01F 3/28

on carriers rotated by the weight of the liquid in the measuring chambers

Definition statement

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

GB191220935

G01F 3/32

comprising partitioned drums rotating or nutating in a liquid

Definition statement

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

GB2316491
G01F 3/34
comprising bells reciprocating in a liquid

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
DE31633

G01F 5/00
Measuring a proportion of the volume flow

Definition statement
This place covers:
• Flowmeters of any type measuring flow in a by-pass whereby the fluid is flowing simultaneously in both at least one main conduit and a by-pass. The total flow is derived from a known relationship between the section of the by-pass and the section of the main conduit.
• Details of by-passes including such flowmeters, e.g. their arrangement within or aside of the main conduit

References
Limiting references
This place does not cover:

| Compound flowmeters whereby the fluid is flowing either in a by-pass or in a main conduit depending on the flow rate, in order to provide two or more measuring ranges | G01F 7/00 |

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

| Controlling ratio of two or more flows of fluid | G05D 11/02 |

Special rules of classification
Details of specific flowmeters classified in G01F 5/00 are also classified in the relevant sub-groups in G01F 1/00 and G01F 3/00.

Details of flowmeters of the pressure or differential pressure type classified in G01F 5/005 are also classified in the relevant groups G01F 1/34 - G01F 1/50.
Synonyms and Keywords

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

- "auxiliary, secondary, or sub-passage" and "by-pass"
- "primary passage" and "main passage"

G01F 7/00

Volume-flow measuring devices with two or more measuring ranges; Compound meters

References

Limiting references

This place does not cover:

| Flowmeters adapted for low flow rates, e.g. where flow is allowed to pass through the flowmeter only when it can be measured by a flowmeter having a specific range | G01F 15/028 |

Special rules of classification

The following devices are classified in this group:

- Arrangement of at least two flowmeters each having a different range and operated only at their respective range, e.g. compound meters. Arrangement of flow conduits and valves designed to divert the flow to the meter with the proper range.
- Modification to flowmeters in order to increase their range, even when there is only a single flowmeter
- Flowmeters operated simultaneously but each covering a different range

Details of specific flowmeters are also classified in the relevant sub-groups in G01F 1/00 and G01F 3/00.

G01F 9/00

Measuring volume flow relative to another variable, e.g. of liquid fuel for an engine

Definition statement

This place covers:

Measuring volume flow relative to another variable
- with electric, electro-mechanic, electronic or mechanic means
- whereby the other variable is the flight or running time or the speed of a vehicle.

References

Informative references

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

<table>
<thead>
<tr>
<th>Economical driving</th>
<th>B60R 16/0236</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing fuel-injection apparatus</td>
<td>F02M 65/00</td>
</tr>
<tr>
<td>Testing of internal combustion engines</td>
<td>G01M 15/04</td>
</tr>
</tbody>
</table>
**G01F 11/00**

Apparatus requiring external operation and adapted at each repeated and identical operation to measure and separate a predetermined volume of fluid or fluent solid material from a supply or container without regard to weight and to deliver it

**Definition statement**

*This place covers:*

Devices especially adapted for fluent solid material

**Details or accessories**

Devices operating
  * with measuring chambers which expand or contract during measurement
  * with measuring chambers moved during operation
  * with stationary measuring chambers having constant volume during measurement

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Reference</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forming a predetermined ratio of substances to be mixed by feeding the</td>
<td>B01F 15/0441</td>
</tr>
<tr>
<td>components in predetermined amounts</td>
<td></td>
</tr>
<tr>
<td>Single-unit, i.e. unitary hand-held apparatuses with a pump</td>
<td>B05B 11/30</td>
</tr>
<tr>
<td>Bottling liquids with provision for metering the liquid to be introduced</td>
<td>B67C 3/204</td>
</tr>
<tr>
<td>using dosing chambers</td>
<td></td>
</tr>
<tr>
<td>Apparatus for dispensing beverages on draught comprising means for</td>
<td>B67D 1/0007</td>
</tr>
<tr>
<td>automatically controlling the amount to be dispensed based on volumetric</td>
<td></td>
</tr>
<tr>
<td>dosing</td>
<td></td>
</tr>
<tr>
<td>Devices for dosing additives in the treatment of water, waste water, or</td>
<td>C02F 1/685</td>
</tr>
<tr>
<td>sewage</td>
<td></td>
</tr>
<tr>
<td>Pumps specially modified to deliver fixed or variable measured quantities</td>
<td>F04B 13/00</td>
</tr>
</tbody>
</table>

**Informative references**

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

<table>
<thead>
<tr>
<th>Reference</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dough-dividing machines with division boxes in a revolving body with</td>
<td>A21C 5/04</td>
</tr>
<tr>
<td>radially-working pistons</td>
<td></td>
</tr>
<tr>
<td>Food containers dispensing a certain quantity of powdered or granulated</td>
<td>A47G 19/34</td>
</tr>
<tr>
<td>foodstuffs, e.g. sugar</td>
<td></td>
</tr>
<tr>
<td>Beverage-making apparatus with dispensing means for adding a measured</td>
<td>A47J 31/40</td>
</tr>
<tr>
<td>quantity of ingredients</td>
<td></td>
</tr>
<tr>
<td>Dispensers for liquid or pasty soap dispensing dosed volume</td>
<td>A47K 5/1202</td>
</tr>
<tr>
<td>Using squeeze bottles or the like for soap</td>
<td>A47K 5/122</td>
</tr>
<tr>
<td>Peristaltic pumps</td>
<td>F04B 43/12</td>
</tr>
<tr>
<td>Hand operated grease guns</td>
<td>F16N 3/02</td>
</tr>
<tr>
<td>Air operated grease guns</td>
<td>F16N 5/02</td>
</tr>
</tbody>
</table>
Special rules of classification

G01F 11/04 takes precedence over G01F 11/021.
G01F 19/005 takes precedence over G01F 11/025.
G01F 11/34, G01F 11/40 and G01F 11/46 takes precedence over G01F 11/282.

G01F 11/261
{for fluent solid material}

Definition statement

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

WO2006123228

G01F 11/262
{for liquid or semi-liquid}

Definition statement

This place covers:
Illustrative example of subject matter classified in this group
G01F 11/262 (continued)
Definition statement

US4893732

DE8624916U

FR2590555

G01F 11/263
{with valves}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
G01F 11/286

{where filling of the measuring chamber is effected by squeezing a supply container that is in fluid connection with the measuring chamber and excess fluid is sucked back from the measuring chamber during relaxation of the supply container}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

US5884816

G01F 11/288

{squeezing of the supply vessel causing filling of the measuring chamber and backflow from the measuring chamber to the supply vessel being prevented by a check valve (G01F 11/46 take precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group
G01F 11/288 (continued)
Definition statement

US5127553

G01F 11/32
for liquid or semiliquid

Definition statement

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

US5601212

G01F 11/40
for fluent solid material

Definition statement

This place covers:
Illustrative example of subject matter classified in this group
G01F 13/00
Apparatus for measuring by volume and delivering fluids or fluent solid materials, not provided for in the preceding groups

Definition statement
This place covers:
Apparatus for measuring by volume and delivering fluids or fluent solid materials, not provided for in the preceding groups
• for fluent solid material
• measuring volume in function of time

Taps comprising counting- and recording means

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Apparatus for weighing a continuous stream of material</th>
<th>G01G 11/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of flow</td>
<td>G05D 7/00</td>
</tr>
</tbody>
</table>

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

| Counting mechanisms | G06M       |

G01F 15/00
Details of, or accessories for, apparatus of the preceding groups insofar as such details or appliances are not adapted to particular types of such apparatus

Definition statement
This place covers:
Means for regulating or setting the meter for a predetermined quantity

Valves
Devices
• characterised by the use of a particular material, e.g. anti-corrosive material
• comprising means to prevent fraud
• comprising lubricating means

Means for compensating or correcting for variations in pressure, density or temperature

Indicating or recording devices, e.g. for remote indication

Air or gas separators in combination with liquid meters; Liquid separators in combination with gas meters

Means for preventing damage by freezing or excess pressure or insufficient pressure

Cleaning arrangements; Filters

Casings, e.g. of special material

Diaphragms; Bellows; Mountings therefor

Supports or connecting means for meters

References

Limiting references

This place does not cover:

| Details of, or accessories of apparatuses | G01F 17/00, G01F 19/00, G01F 22/00, G01F 23/00 |

Informative references

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

<table>
<thead>
<tr>
<th>Valves for diaphragm type gas meters</th>
<th>G01F 3/221</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm type gas meters characterized by constructional features of membranes</td>
<td>G01F 3/225</td>
</tr>
<tr>
<td>Details or accessories of dosing devices</td>
<td>G01F 11/006</td>
</tr>
<tr>
<td>Valves</td>
<td>G01F 15/005</td>
</tr>
<tr>
<td>Cleaning arrangements; Filters</td>
<td>G01F 15/12</td>
</tr>
<tr>
<td>Diaphragms; Bellows; Mountings therefor</td>
<td>G01F 15/16</td>
</tr>
<tr>
<td>Connecting means e.g. bypass conduits (not electrical connecting means)</td>
<td>G01F 15/185</td>
</tr>
<tr>
<td>Filters in general</td>
<td>B01D</td>
</tr>
<tr>
<td>Cleaning in general</td>
<td>B08B</td>
</tr>
<tr>
<td>Valves in general</td>
<td>F16K</td>
</tr>
</tbody>
</table>

Special rules of classification

G01F 15/014 takes precedence over G01F 15/006.
G01F 1/08 and G01F 1/12 take precedence over G01F 15/026.
G01F 15/063 takes precedence over G01F 15/068.
G01F 17/00

Methods or apparatus for determining the capacity of containers or cavities, or the volume of solid bodies (measuring linear dimensions to determine volume G01B)

Definition statement
This place covers:
Methods or apparatus for determining the capacity of containers or cavities, or the volume of solid bodies, including by measurement of pressure of gas

References

Limiting references
This place does not cover:

| Methods or apparatuses for measuring volume of fluids or fluent solid material, not otherwise provided for, e.g. involving measurement of pressure | G01F 22/00, G01F 22/02 |
| Measuring linear dimensions to determine volume | G01B |

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

| Detecting, measuring or recording for diagnostic purposes: measuring volume of limbs, e.g. plethysmography | A61B 5/1073 |
| Determining well or borehole volumes | E21B 47/003 |
| Sensing or measuring mail pieces | G07B 17/00661 |

G01F 19/00

Calibrated capacity measures for fluids or fluent solid material, e.g. measuring-cups ((powder measuring spoons A61J; burettes, weighing bottles B01L))

Definition statement
This place covers:
• Measuring spoons or scoops
• Calibrated capacity measures adapted for semi-liquid, e.g. fat or non fluent solid material, e.g. filamentary

References

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

| Shop or like accessories: hand implements, e.g. grocers' scoops | A47F |
| Drinking vessels or saucers used for table service | A47G 19/22 |
| Cooking spoons | A47J 43/281 |
| Spoons for serving ice-cream | A47J 43/282 |
| Devices for administering medicines orally, e.g. spoons | A61J 7/00 |
G01F 19/00 (continued)
Informative references

<table>
<thead>
<tr>
<th>Burettes, weighing bottles</th>
<th>B01L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighing apparatus combined with handles of tools or household implements</td>
<td>G01G 19/56</td>
</tr>
</tbody>
</table>

G01F 19/002
{Measuring spoons or scoops}

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

US6125699

US5347865

G01F 19/005
{for semi-liquid, e.g. fat}

Definition statement
This place covers:
Illustrative example of subject matter classified in this group
G01F 19/007

{for non fluent solid material, e.g. filamentary}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group

US5255439

US4165565

US4120094
G01F 22/00
Methods or apparatus for measuring volume of fluids or fluent solid material, not otherwise provided for

Definition statement
This place covers:
Methods or apparatus for measuring volume of fluids or fluent solid material, not otherwise provided for, e.g. involving measurement of pressure

References
Limiting references
This place does not cover:

| Indicating or measuring liquid level by measurement of pressure of the liquid | G01F 23/14 |

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

| Methods or apparatus for determining the capacity of containers or cavities, or the volume of solid bodies | G01F 17/00 |

Special rules of classification
Group G01F 22/02 contains apparatuses and methods whereby in order to determine the volume of fluids or fluid solid material in a container, the pressure of the gas above the fluid in the container is measured in order to determine the volume occupied by the gas and deduct the volume occupied by the fluid from this measurement and the known volume of the container.

G01F 23/00
Indicating or measuring liquid level, or level of fluent solid material, e.g. indicating in terms of volume, indicating by means of an alarm (in wells E21B 47/04; adaptation to, or mounting on, steam boilers F22B 37/78; level regulation G05D; alarm devices G08B; {for accumulators H01M 10/48})

Definition statement
This place covers:
Devices
• for discrete indicating and measuring
• with a probe suspended by a wire or thread
• with a probe suspended by rotatable arms
• using buoyant probes
• with a stationary probe, where a liquid specimen is separated from the mean mass and measured
• with over-flow pipes
• characterised by the level signal processing means

Devices whereby the level is determined
• by gauge glasses or other apparatus involving a window or transparent tube for directly observing the level to be measured or the level of a liquid column in free communication with the main body of the liquid
• by dip members, e.g. dip-sticks
• by measurement of pressure
• by measurement of weight, e.g. to determine the level of stored liquefied gas
• by measurement of physical variables, other than linear dimensions, pressure or weight, dependent on the level to be measured, e.g. by difference of heat transfer of steam or water
• by floats

Level indicators mostly detecting and interface between liquid or fluent solid material and a gas above, but also interfaces between different phases, e.g. immiscible liquids superposed in a container.

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

| Monitoring infusion flow anomalies by detecting the amount of infusate remaining                           | A61M 5/1684 |
| Controlling of liquid level in devices for separation of solid particles from liquid by sedimentation       | B01D 21/34 |
| Arrangement of indicating or measuring devices for the level of molten metal                             | B22D 2/003 |
| In continuous casting of metals, controlling or regulating processes or operations for pouring responsive of molten or slag level | B22D 11/181 |
| In continuous casting of metals, controlling or regulating processes or operations for removing cast stock responsive of molten or slag level | B22D 11/201 |
| Water level measuring or regulating devices in washing machines                                         | D06F 39/087 |
| Measuring or locating liquid level in wells                                                             | E21B 47/047 |
| Adaptations to, or mountings on steam boilers of level indicators                                      | F22B 37/78 |
| Measuring depth of open water, e.g. sea, lake, river, canal                                             | G01C 13/008 |
| Level control                                                                                           | G05D 9/00  |
| Level alarms responsive to moisture                                                                     | G08B 21/20 |
| Switches operated by float                                                                               | H01H 35/18 |
| Switches actuated by a float carrying a magnet                                                           | H01H 36/02 |
| Accumulators combined with arrangements for measuring electrolyte level                                 | H01M 10/484 |
| Support or mounting means for aerials used in level-measurement devices                                  | H01Q 1/225 |

Special rules of classification
G01F 23/02 - G01F 23/28 take precedence over G01F 23/0007.
G01F 23/40 takes precedence over G01F 23/0023.
G01F 23/32 takes precedence over G01F 23/003.
G01F 23/30 - G01F 23/76 take precedence over G01F 23/0038.
G01F 23/00 (continued)

Special rules of classification

G01F 23/02 takes precedence over G01F 23/0046.

In group G01F 23/0038 buoyant probes normally occupy a large height in a container and don't move. The force exerted by the liquid on them is detected to determine the level.

G01F 23/0061 includes for example electrical circuits for treating the signal, for example filtering or averaging signals to compensate for sloshing, treating multiple level signals, transmitting the measured level signal, power saving circuits.

G01F 23/0076 and G01F 23/0092 can for example be used for inclination signals in order to compensate the level signal.

Group G01F 23/303 contains mainly mechanical arrangements around the float to prevent errors due to sloshing. Electronic circuits for compensating for sloshing should be classified in G01F 23/303 only if associated with a measurement using a float and should always be classified in G01F 23/0061 or sub groups.

G01F 25/00

Testing or calibrating apparatus for measuring volume, volume flow or liquid level, or for metering by volume

References

Limiting references

This place does not cover:

| Adjusting, correcting or compensating means for flowmeters using rotating vanes with tangential admission | G01F 1/08 |
| Adjusting, correcting or compensating means for flowmeters using rotating vanes with axial admission | G01F 1/12 |
| Correcting or compensating means for flowmeters of the pressure or differential pressure type | G01F 1/50 |
| Compensating or correcting for variations in velocity of sound in ultrasonic flowmeters | G01F 1/668 |
| Thermal flowmeters comprising means to store calibration data for flow signal calculation or correction | G01F 1/6965 |

Informative references

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

| Testing or calibrating of devices for controlling, indicating, metering or registering quantity or price of liquid transferred by devices for transferring liquid from bulk storage containers into vehicles or into portable containers | B67D 7/085 |
| Testing or calibrating devices for speedometers for measuring speed of fluids or speed of bodies relative to fluids | G01P 21/025 |

Special rules of classification

G01F 25/0015 - G01F 25/0046 take precedence over G01F 25/0053