

## SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

### F17 STORING OR DISTRIBUTING GASES OR LIQUIDS

**F17B GAS-HOLDERS OF VARIABLE CAPACITY** (self-acting gas cut-off devices A47J 27/62, G05D; flame traps A62C 4/00; gas mixers B01F, F16K 11/00, G05D 11/00; construction or assembling of bulk storage containers employing civil-engineering techniques E04H 7/00; gas compressors F04; valves F16K; damping pulsations in valves or pipes F16K, F16L; pipes F16L; stopping devices for gas mains F16L 55/10; vessels adapted for storing compressed, liquefied, or solidified gases F17C; gas distribution systems F17D 1/04; detecting leakage F17D 5/02, G01M; supervising or alarm devices F17D 5/02, G08B; control of combustion in burners F23N; gas flow or pressure regulators G05D)

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|-------|---|------|--|
| 1/00  | <b>Gas-holders of variable capacity</b> (large containers in general B65D 88/00; storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00) | 1/08 | • • • using resilient materials for packing, e.g. leather  |
| 1/007 | • with telescopically movable ring-shaped parts (F17B 1/10 takes precedence; sealing of rings F17B 1/04) [2]  | 1/10 | • • Guiding moving parts   |
| 1/013 | • with movables discs (F17B 1/10 takes precedence; sealing of discs F17B 1/04) [2]  | 1/12 | • • Gas admission or discharge arrangements  |
| 1/02  | • Details   | 1/14 | • • Safety devices, e.g. prevention of excess pressure   |
| 1/04  | • • Sealing devices for sliding parts (in general F16J 15/00)   | 1/16 | • of wet type  |
| 1/06  | • • • using sealing liquids   | 1/18 | • • bell-shaped  |
|       |   | 1/20 | • • telescopic   |
|       |   | 1/22 | • • • spirally-guided  |
|       |   | 1/24 | • of dry type  |
|       |   | 1/26 | • • with flexible walls, e.g. bellows (connection of valves to inflatable elastic bodies B60C 29/00) |

**F17C VESSELS FOR CONTAINING OR STORING COMPRESSED, LIQUEFIED, OR SOLIDIFIED GASES; FIXED-CAPACITY GAS-HOLDERS; FILLING VESSELS WITH, OR DISCHARGING FROM VESSELS, COMPRESSED, LIQUEFIED, OR SOLIDIFIED GASES** (storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00; construction or assembling of bulk storage containers employing civil-engineering techniques E04H 7/00; variable-capacity gas-holders F17B; liquefaction or refrigeration machines, plants, or systems F25)

#### Subclass index

VESSLS UNDER PRESSURE; VESSELS NOT UNDER PRESSURE; DETAILS.....1/00, 3/00, 13/00  
 FILLING; DISCHARGING.....5/00, 6/00, 7/00, 9/00  
 USE OF GAS-SOLVENTS OR GAS-ABSORBENTS.....11/00

- |      |  |      |  |
|------|--|------|--|
| 1/00 | <b>Pressure vessels, e.g. gas cylinder, gas tank, replaceable cartridge</b> (pressurised apparatus for purposes other than storage, <u>see</u> the relevant subclasses such as A62C, B05B; associated with vehicles, <u>see</u> the appropriate subclass of classes B60-B64; pressure vessels in general F16J 12/00) | 1/16 | • constructed of plastics materials  |
| 1/02 | • involving reinforcing arrangements [4]   | 3/00 | <b>Vessels not under pressure</b>  |
| 1/04 | • • Protecting sheatings   | 3/02 | • with provision for thermal insulation (thermal insulation in general F16L 59/00)   |
| 1/06 | • • • built-up from wound-on bands or filamentary material, e.g. wires [4]   | 3/04 | • • by insulating layers (F17C 3/08 takes precedence)  |
| 1/08 | • • Integral reinforcements, e.g. ribs   | 3/06 | • • • on the inner surface, i.e. in contact with the stored fluid [4]  |
| 1/10 | • with provision for protection against corrosion, e.g. due to gaseous acid (inhibiting corrosion of metallic material or incrustation in general C23F) [4]  | 3/08 | • • by vacuum spaces, e.g. Dewar flask (for household use A47J 41/02)  |
| 1/12 | • with provision for thermal insulation (thermal insulation in general F16L 59/00) [4]   | 3/10 | • • by liquid-circulating or vapour-circulating jackets  |
| 1/14 | • constructed of aluminium; constructed of non-magnetic steel  | 3/12 | • with provision for protection against corrosion, e.g. due to gaseous acid (protection against corrosion in general C23F)                                     |
|      |  | 5/00 | <b>Methods or apparatus for filling pressure vessels with liquefied, solidified, or compressed gases</b> (adding propellants to aerosol containers B65B 31/00) |

**Note(s)**

This group covers:

- the filling of vessels for storage of compressed or liquefied gases;
  - the filling of pressurised apparatus insofar as it is not covered by a single other subclass, e.g. A62C, B05B.
- 5/02 • for filling with liquefied gases
- 5/04 • • requiring the use of refrigeration, e.g. filling with helium or hydrogen
- 5/06 • for filling with compressed gases
- 6/00 Methods or apparatus for filling vessels not under pressure with liquefied or solidified gases [3]**
- 7/00 Methods or apparatus for discharging liquefied, solidified, or compressed gases from pressure vessels, not covered by another subclass**
- 7/02 • Discharging liquefied gases
- 7/04 • • with change of state, e.g. vaporisation [3]

**9/00 Methods or apparatus for discharging liquefied or solidified gases from vessels not under pressure**

- 9/02 • with change of state, e.g. vaporisation
- 9/04 • • Recovery of thermal energy [3]

**11/00 Use of gas-solvents or gas-sorbents in vessels****13/00 Details of vessels or of the filling or discharging of vessels**

- 13/02 • Special adaptations of indicating, measuring, or monitoring equipment (measuring in general G01)
- 13/04 • Arrangement or mounting of valves (valves per se F16K)
- 13/06 • Closures, e.g. cap, breakable member (closures for containers in general B65D)
- 13/08 • Mounting arrangements for vessels
- 13/10 • Arrangements for preventing freezing
- 13/12 • Arrangements or mounting of devices for preventing or minimising the effect of explosion (flame traps A62C 4/00)

**F17D PIPE-LINE SYSTEMS; PIPE-LINES** (distributing water E03B; pumps or compressors F04; fluid dynamics F15D; valves or the like F16K; pipes, laying pipes, supports, joints, branches, repairing, work on the entire line, accessories F16L; steam traps or the like F16T; fluid-pressure electric cables H01B 9/06)

**Note(s)**

In this subclass, the following expression is used with the meaning indicated:

- "pipe-line systems" means systems described in flow sheets as well as arrangements of co-operating elements, the elements per se being covered by the relevant subclasses.

**1/00 Pipe-line systems** (conveying articles or materials through a pipe-line by means of a fluid carrier B65G 51/00, B65G 53/00; dispensing, delivering or transferring liquids B67D; apparatus or devices for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers, e.g. for retail sale purposes, B67D 7/00; conveying material which has been excavated by a dredger or soil shifter through a pipe-line E02F 7/10; sewer pipe-line systems E03F 3/00; thermal insulation of pipe-lines F16L 59/00; central heating systems F24D) [2]

- 1/02 • for gases or vapours
- 1/04 • • for distribution of gas
- 1/05 • • Preventing freezing (by heating F16L 53/00)
- 1/06 • • for steam
- 1/065 • • Arrangements for producing propulsion of gases or vapours [2]
- 1/07 • • • by compression [2]
- 1/075 • • • by mere expansion from an initial pressure level, e.g. by arrangement of a flow-control valve [2]
- 1/08 • for liquids or viscous products (water-main or service pipe systems E03B 7/04; domestic hot-water supply systems F24D 17/00) [2]
- 1/12 • • Conveying liquids or viscous products by pressure of another fluid [2]
- 1/13 • • Conveying liquids or viscous products by gravity [2]
- 1/14 • • Conveying liquids or viscous products by pumping [2]
- 1/16 • • Facilitating the conveyance of liquids or effecting the conveyance of viscous products by modification of their viscosity [2]
- 1/17 • • • by mixing with another liquid [2]
- 1/18 • • • by heating [2]

- 1/20 • Arrangements or systems of devices for influencing or altering dynamic characteristics of the systems, e.g. for damping pulsations caused by opening or closing of valves (fluid dynamics F15D; damping pulsations in fluids in pipes in general F16L 55/04) [2]

**3/00 Arrangements for supervising or controlling working operations**

- 3/01 • for controlling, signalling, or supervising the conveyance of a product [2]
- 3/03 • for controlling, signalling, or supervising the conveyance of several different products following one another in the same conduit, e.g. for switching from one receiving tank to another [2]
- 3/05 • • the different products not being separated (separation of contaminants by distillation B01D 3/00) [2]
- 3/08 • • the different products being separated by "go-devils", e.g. spheres (cleaning devices moved along the inside of pipe-lines by a fluid B08B 9/053) [2]
- 3/10 • for taking out the product in the line (investigating or analysing materials by determining their chemical or physical properties G01N) [2]
- 3/12 • for injecting a composition into the line [2]
- 3/14 • for eliminating water (separation of liquids B01D, e.g. B01D 17/00; separation of gases or vapours B01D 53/00) [2]
- 3/16 • for eliminating particles in suspension (from liquids by sedimentation B01D 21/00; separation by filtration or otherwise B01D 24/00-B01D 51/00; centrifugal apparatus B04) [2]

- 3/18 • for measuring the quantity of conveyed product (measuring volume or volume flow, in general G01F) [2]

**5/00 Protection or supervision of installations**  
 (arrangements for protecting foundations E02D 31/00; protecting pipes from damage or internal or external wear F16L 57/00, against corrosion or scale F16L 58/00; investigation of the fluid-tightness of structures G01M 3/00) [2]

- 5/02 • Preventing, monitoring, or locating loss [2]  
 5/04 • • by means of a signalling fluid enclosed in a double wall [2]  
 5/06 • • using electric or acoustic means [2]  
 5/08 • Protection of installations or persons from the effects of high voltage induced in the pipe-line (emergency protective circuit arrangements H02H) [2]