

**CPC****COOPERATIVE PATENT CLASSIFICATION****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](#) )

**Guidance heading:****F17C 1/00**

**Pressure vessels, e.g. gas cylinder, gas tank, replaceable cartridge** (pressurised apparatus for purposes other than storage, see the relevant subclasses such as [A62C](#) , [B05B](#) ; associated with vehicles, see the appropriate subclass of classes [B60](#) to [B64](#) ; pressure vessels in general [F16J 12/00](#); {autoclaves [B01J 3/04](#); tank vehicles [B60P 3/22](#); railway tank wagons for carrying fluent materials [B61D 5/00](#); accumulators for supplying fluid under pressure [F15B 1/04](#); liquified gas stoves [F24C 3/00](#) })

## F17C 1/002

- . {Storage in barges or on ships }

## F17C 1/005

- . {Storage of gas or gaseous mixture at high pressure and at high density condition, e.g. in the single state phase }

## F17C 1/007

- . {Underground or underwater storage }

## F17C 1/02

- . involving reinforcing arrangements {[F17C 1/14](#), [F17C 1/16](#) take precedence }

## F17C 1/04

- .. Protecting sheathings

## F17C 1/06

- ... Built-up from wound-on bands or filamentary material, e.g. wires

## F17C 1/08

- .. Integral reinforcements, e.g. ribs

## F17C 1/10

- . with provision for protection against corrosion e.g. due to gaseous acid ( {[F17C 1/14](#), [F17C 1/16](#) take precedence } ; inhibiting corrosion of metallic material or incrustation in general [C23F](#) )

## F17C 1/12

- . with provision for thermal insulation ( {[F17C 1/14](#), [F17C 1/16](#) take precedence } ; thermal insulation in general [F16L 59/00](#) )

## F17C 1/14

- . constructed of aluminium; constructed of non-magnetic steel

## F17C 1/16

- . constructed of plastics materials { (shaping of plastics [B29C](#) ) }

**F17C 3/00****Vessels not under pressure**

## F17C 3/005

- . {Underground or underwater containers or vessels (storing in natural or artificial cavities in the earth in general [B65G 5/00](#)) }

## F17C 3/02

- . with provision for thermal insulation (thermal insulation in general [F16L 59/00](#))

refrigerators [F25D](#) ; insulation specially adapted for cryogenic vessels [F17C 13/001](#);  
tank vehicles [B60P 3/22](#); railway tank wagons [B61D 5/00](#) }

- F17C 3/022 . . {Land-based bulk storage containers (civil engineering aspects [E04H 7/00](#)) }
- F17C 3/025 . . {Bulk storage in barges or on ships (constructive aspects [B63B 25/16](#)) }
- F17C 3/027 . . . {Wallpanels for so-called membrane tanks }
- F17C 3/04 . . by insulating layers ([F17C 3/08](#) takes precedence)
- F17C 3/06 . . . on the inner surface, i.e. in contact with the stored fluid
- F17C 3/08 . . by vacuum spaces, e.g. Dewar flask (for household use [A47J 41/02](#))
- F17C 3/085 . . . {Cryostats }
- F17C 3/10 . . by liquid-circulating or vapour-circulating jackets
  
- F17C 3/12 . with provision for protection against corrosion, e.g. due to gaseous acid (protection  
against corrosion in general [C23F](#) )

**F17C 5/00** **Methods or apparatus for filling containers with liquefied, solidified, or compressed gases under pressures** (adding propellants to aerosol containers [B65B 31/00](#))

**NOTE**

This group includes not only the filling of vessels for storage of compressed or liquefied gases, but also the filling of pressurised apparatus insofar as it is not covered by a single other subclass, e.g. [A62C](#) , [B05B](#) .

- F17C 5/002 . {Automated filling apparatus }
- F17C 5/005 . . {for gas bottles, such as on a continuous belt or on a merry-go-round }
- F17C 5/007 . . { for individual gas tanks or containers, e.g. in vehicles (filling with liquid fuel not  
under pressure, [B60S 5/02](#), [B67D 5/00](#)) }
  
- F17C 5/02 . for filling with liquefied gases
- F17C 5/04 . . requiring the use of refrigeration, e.g. filling with helium or hydrogen
  
- F17C 5/06 . for filling with compressed gases

**F17C 6/00** **Methods and apparatus for filling vessels not under pressure with liquefied or solidified gases**

**F17C 7/00** **Methods or apparatus for discharging liquefied, solidified, or compressed gases from pressure vessels, not covered by another subclass**

- F17C 7/02 . Discharging liquefied gases
- F17C 7/04 . . with change of state, e.g. vaporisation

**F17C 9/00** **Methods or apparatus for discharging liquefied or solidified gases from vessels not under pressure**

- F17C 9/02 . with change of state, e.g. vaporisation

- F17C 9/04 . . Recovery of thermal energy
  
- F17C 11/00** **Use of gas-solvents or gas-sorbents in vessels** { (absorbing compositions for acetylene [C10L 3/04](#); absorbing compositions for hydrogen [C01B 3/0005](#)) }
  
- F17C 11/002 . {for acetylene }
- F17C 11/005 . {for hydrogen }
- F17C 11/007 . {for hydrocarbon gases, such as methane or natural gas, propane, butane or mixtures thereof (LPG) }
  
- F17C 13/00** **Details of vessels or of the filling or discharging of vessels**
  
- F17C 13/001 . {Thermal insulation specially adapted for cryogenic vessels (vessels not under pressure with insulation [F17C 3/02](#); thermal insulation in general [F16L 59/00](#)) }
- F17C 13/002 . {for vessels under pressure ([F17C 13/008](#) and [F17C 13/02](#) to [F17C 13/12](#) take precedence) }
- F17C 13/003 . . {Means for coding or identifying them and/or their contents }
- F17C 13/004 . {for large storage vessels not under pressure ([F17C 13/008](#) and [F17C 13/02](#) to [F17C 13/12](#) take precedence) }
- F17C 13/005 . {for medium-size and small storage vessels not under pressure ([F17C 13/008](#) and [F17C 13/02](#) to [F17C 13/12](#) take precedence) }
- F17C 13/006 . . {for Dewar vessels or cryostats }
- F17C 13/007 . . . {used for superconducting phenomena (investigating by nuclear magnetic resonance [G01N 24/08](#); magnets having superconductive winding [H01F 6/00](#)) }
  
- F17C 13/008 . {for use under microgravity conditions }
  
- F17C 13/02 . Special adaptations of indicating, measuring, or monitoring equipment (measuring in general [G01](#) )
- F17C 13/021 . . {having the height as the parameter }
- F17C 13/023 . . {having the mass as the parameter }
- F17C 13/025 . . {having the pressure as the parameter }
- F17C 13/026 . . {having the temperature as the parameter }
- F17C 13/028 . . {having the volume as the parameter }
  
- F17C 13/04 . Arrangement or mounting of valves (valves per se [F16K](#) ; {snap-coupling of nipples [F16L 37/00](#) } )
- F17C 13/045 . . {Automatic change-over switching assembly for bottled gas systems with two (or more) gas containers }
  
- F17C 13/06 . Closures, e.g. cap, breakable member ( {for autoclaves [B01J 3/03](#) }; closures for {large } containers in general [B65D](#) {[B65D 90/54](#) } ; {for pressure vessels in general [F16J 13/00](#) } )
  
- F17C 13/08 . Mounting arrangements for vessels

- F17C 13/081 .. {for large land-based storage vessels (supports for large containers in general [B65D 90/12](#)) }
- F17C 13/082 .. {for large sea-borne storage vessels (load-accomodating arrangements for ships or waterborne vessels [B63B 25/12](#)) }
- F17C 13/083 .. {for medium-sized mobile storage vessels, e.g. tank vehicles or railway tank vehicles }
- F17C 13/084 .. {for small-sized storage vessels, e.g. compressed gas cylinders or bottles, disposable gas vessels, vessels adapted for automotive use }
- F17C 13/085 ... {on wheels (hand carts [B62B](#) ) }
- F17C 13/086 .. {for Dewar vessels or cryostats }
- F17C 13/087 ... {used for superconducting phenomena }
- F17C 13/088 .. {for use under microgravity conditions }
- F17C 13/10 . Arrangements for preventing freezing
- F17C 13/12 . Arrangements or mounting of devices for preventing or minimising the effect of explosion (flame traps [A62C 4/00](#)) ; {Other safety measures }
- F17C 13/123 .. {for gas bottles, cylinders or reservoirs for tank vehicles or for railway tank wagons }
- F17C 13/126 .. {for large storage containers for liquefied gas (for large containers in general [B65D 90/22](#)) }

#### Guidance heading:

#### **F17C 2201/00      Vessel construction, in particular geometry, arrangement or size**

- F17C 2201/01 . Shape
  - F17C 2201/0104 .. cylindrical
    - F17C 2201/0109 ... with exteriorly curved end-piece
    - F17C 2201/0114 ... with interiorly curved end-piece
    - F17C 2201/0119 ... with flat end-piece
    - F17C 2201/0123 ... with variable thickness or diameter
  - F17C 2201/0128 .. spherical or elliptical
  - F17C 2201/0133 .. toroidal
  - F17C 2201/0138 .. tubular
  - F17C 2201/0142 .. conical
  - F17C 2201/0147 .. complex
    - F17C 2201/0152 ... Lobes
    - F17C 2201/0157 ... Polygonal
    - F17C 2201/0161 ... Honeycomb
    - F17C 2201/0166 ... divided in several chambers
    - F17C 2201/0171 ... comprising a communication hole between chambers
  - F17C 2201/0176 .. variable
    - F17C 2201/018 ... with bladders
    - F17C 2201/0185 ... with separating membrane

F17C 2201/019	...	with pistons
F17C 2201/0195	...	with bellows
F17C 2201/03	.	Orientation
F17C 2201/032	..	with substantially vertical main axis
F17C 2201/035	..	with substantially horizontal main axis
F17C 2201/037	..	with sloping main axis
F17C 2201/05	.	Size
F17C 2201/052	..	large (>1000 m <sup>3</sup> )
F17C 2201/054	..	medium (>1 m <sup>3</sup> )
F17C 2201/056	..	Small (<1 m <sup>3</sup> )
F17C 2201/058	..	portable (<30 l)
F17C 2201/06	.	Vessel construction using filling material in contact with the handled fluid

#### Guidance heading:

#### **F17C 2203/00      Vessel construction, in particular walls or details thereof**

F17C 2203/01	.	Reinforcing or suspension means
F17C 2203/011	..	Reinforcing means
F17C 2203/012	...	on or in the wall, e.g. ribs
F17C 2203/013	...	in the vessel, e.g. columns
F17C 2203/014	..	Suspension means
F17C 2203/015	...	Bars
F17C 2203/016	...	Cords
F17C 2203/017	...	Magnetic means
F17C 2203/018	...	by attachment at the neck
F17C 2203/03	.	Thermal insulations
F17C 2203/0304	..	by solid means
F17C 2203/0308	...	Radiation shield
F17C 2203/0312	....	cooled by external means
F17C 2203/0316	....	cooled by vaporised gas from the interior
F17C 2203/032	....	Multi-sheet layers
F17C 2203/0325	...	Aerogel
F17C 2203/0329	...	Foam
F17C 2203/0333	....	Polyurethane
F17C 2203/0337	...	Granular
F17C 2203/0341	....	Perlite
F17C 2203/0345	...	Fibres
F17C 2203/035	....	Glass wool

F17C 2203/0354	...	Wood
F17C 2203/0358	...	in form of panels
F17C 2203/0362	..	by liquid means
F17C 2203/0366	...	Cryogen
F17C 2203/037	...	Water
F17C 2203/0375	..	by gas
F17C 2203/0379	...	Inert
F17C 2203/0383	...	Air
F17C 2203/0387	...	Cryogen
F17C 2203/0391	..	by vacuum
F17C 2203/0395	...	Getter
F17C 2203/06	.	Materials for walls or layers thereof; Properties or structures of walls or their materials
F17C 2203/0602	..	Wall structures; Special features thereof
F17C 2203/0604	...	Liners
F17C 2203/0607	...	Coatings
F17C 2203/0609	...	Straps, bands or ribbons
F17C 2203/0612	...	Wall structures
F17C 2203/0614	....	Single wall
F17C 2203/0617	.....	with one layer
F17C 2203/0619	.....	with two layers
F17C 2203/0621	.....	with three layers
F17C 2203/0624	.....	with four or more layers
F17C 2203/0626	....	Multiple walls
F17C 2203/0629	.....	Two walls
F17C 2203/0631	.....	Three or more walls
F17C 2203/0634	..	Materials for walls or layers thereof
F17C 2203/0636	...	Metals
F17C 2203/0639	....	Steels
F17C 2203/0641	.....	Non-magnetic steels
F17C 2203/0643	.....	Stainless steels
F17C 2203/0646	....	Aluminium
F17C 2203/0648	....	Alloys or compositions of metals
F17C 2203/0651	.....	Invar
F17C 2203/0653	....	Lead
F17C 2203/0656	....	in form of filaments
F17C 2203/0658	...	Synthetics
F17C 2203/066	....	Plastics
F17C 2203/0663	....	in form of fibers or filaments
F17C 2203/0665	.....	radially wound
F17C 2203/0668	.....	axially wound
F17C 2203/067	.....	helically wound

F17C 2203/0673	.....	Polymers
F17C 2203/0675	....	with details of composition
F17C 2203/0678	...	Concrete
F17C 2203/068	..	Special properties of materials for vessel walls
F17C 2203/0682	...	with liquid or gas layer
F17C 2203/0685	...	flexible
F17C 2203/0687	...	superconducting
F17C 2203/069	...	Break point in the wall
F17C 2203/0692	...	transparent
F17C 2203/0695	...	pre-constrained
F17C 2203/0697	...	comprising nanoparticles

**F17C 2205/00**      **Vessel construction, in particular mounting arrangements, attachments or identifications means**

F17C 2205/01	.	Mounting arrangements
F17C 2205/0103	..	Exterior arrangements
F17C 2205/0107	...	Frames
F17C 2205/0111	...	Boxes
F17C 2205/0115	...	Dismountable protective hulls
F17C 2205/0119	...	Vessel walls form part of another structure
F17C 2205/0123	..	characterised by number of vessels
F17C 2205/0126	...	One vessel
F17C 2205/013	...	Two or more vessels
F17C 2205/0134	....	characterised by the presence of fluid connection between vessels
F17C 2205/0138	.....	bundled in series
F17C 2205/0142	.....	bundled in parallel
F17C 2205/0146	.....	with details of the manifold
F17C 2205/0149	....	Vessel mounted inside another one
F17C 2205/0153	..	Details of mounting arrangements
F17C 2205/0157	...	for transport
F17C 2205/0161	....	with wheels
F17C 2205/0165	....	with handgrip
F17C 2205/0169	...	stackable
F17C 2205/0173	...	lockable
F17C 2205/0176	...	with ventilation
F17C 2205/018	...	Supporting feet
F17C 2205/0184	...	Attachments to the ground, e.g. mooring or anchoring
F17C 2205/0188	...	Hanging up devices
F17C 2205/0192	...	with external bearing means
F17C 2205/0196	...	with shock absorbing means
F17C 2205/03	.	Fluid connections, filters, valves, closure means or other attachments

F17C 2205/0302	..	Fittings, valves, filters, or components in connection with the gas storage device
F17C 2205/0305	...	Bosses, e.g. boss collars
F17C 2205/0308	...	Protective caps
F17C 2205/0311	...	Closure means
F17C 2205/0314	....	breakable, e.g. with burst discs
F17C 2205/0317	....	fusing or melting
F17C 2205/032	....	pierceable
F17C 2205/0323	...	Valves
F17C 2205/0326	....	electrically actuated
F17C 2205/0329	....	manually actuated
F17C 2205/0332	....	Safety valves or pressure relief valves
F17C 2205/0335	....	Check-valves or non-return valves
F17C 2205/0338	...	Pressure regulators
F17C 2205/0341	...	Filters
F17C 2205/0344	....	Sinter type
F17C 2205/0347	....	Active charcoal type
F17C 2205/035	...	Flow reducers
F17C 2205/0352	...	Pipes
F17C 2205/0355	....	Insulation thereof
F17C 2205/0358	....	coaxial
F17C 2205/0361	....	corrugated
F17C 2205/0364	....	flexible or articulated, e.g. a hose
F17C 2205/0367	....	Arrangements in parallel
F17C 2205/037	...	Quick connecting means, e.g. couplings
F17C 2205/0373	....	Adapters
F17C 2205/0376	...	Dispensing pistols
F17C 2205/0379	...	Manholes or access openings for human beings
F17C 2205/0382	...	Constructional details of valves, regulators
F17C 2205/0385	....	in blocks or units
F17C 2205/0388	..	Arrangement of valves, regulators, filters
F17C 2205/0391	...	inside the pressure vessel
F17C 2205/0394	...	in direct contact with the pressure vessel
F17C 2205/0397	....	on both sides of the pressure vessel
F17C 2205/05	.	Vessel or content identifications, e.g. labels
F17C 2205/051	..	by coating
F17C 2205/052	..	by stickers
F17C 2205/054	..	by bar codes
F17C 2205/055	..	by magnetic means
F17C 2205/057	..	by chips
F17C 2205/058	..	by Radio Frequency Identification

**F17C 2209/00 Vessel construction, in particular methods of manufacturing**



F17C 2209/21	. Shaping processes
F17C 2209/2109	.. Moulding
F17C 2209/2118	... by injection
F17C 2209/2127	... by blowing
F17C 2209/2136	... using wax moulds
F17C 2209/2145	... by rotation
F17C 2209/2154	.. Winding
F17C 2209/2163	... with a mandrel
F17C 2209/2172	.. Polishing
F17C 2209/2181	.. Metal working processes, e.g. deep drawing, stamping or cutting
F17C 2209/219	.. Working processes for non metal materials, e.g. extruding
F17C 2209/22	. Assembling processes
F17C 2209/221	.. Welding
F17C 2209/222	... by friction
F17C 2209/224	.. Press-fitting; Shrink-fitting
F17C 2209/225	.. Spraying
F17C 2209/227	.. by adhesive means
F17C 2209/228	.. by screws, bolts or rivets
F17C 2209/23	. Manufacturing of particular parts or at special locations
F17C 2209/232	.. of walls
F17C 2209/234	.. of closing end pieces, e.g. caps
F17C 2209/236	... Apparatus therefore
F17C 2209/238	.. Filling of insulants

**Guidance heading:****F17C 2221/00      Handled fluid, in particular type of fluid**

F17C 2221/01	. Pure fluids
F17C 2221/011	.. Oxygen
F17C 2221/012	.. Hydrogen
F17C 2221/013	.. Carbene dioxide
F17C 2221/014	.. Nitrogen
F17C 2221/015	.. Carbon monoxide
F17C 2221/016	.. Noble gases (Ar, Kr, Xe)
F17C 2221/017	... Helium
F17C 2221/018	.. Acetylene
F17C 2221/03	. Mixtures
F17C 2221/031	.. Air

F17C 2221/032	..	Hydrocarbons
F17C 2221/033	...	Methane, e.g. natural gas, CNG, LNG, GNL, GNC, PLNG
F17C 2221/035	...	Propane butane, e.g. LPG, GPL
F17C 2221/036	...	Hydrates
F17C 2221/037	..	Containing pollutant, e.g. H <sub>2</sub> S, Cl
F17C 2221/038	..	Refrigerants
F17C 2221/05	.	Ultrapure fluid
F17C 2221/07	.	Hyperpolarised gases
F17C 2221/08	.	Ergols, e.g. hydrazine

**Guidance heading: Fluid contained in the vessel; Filling and discharging the fluid**

**F17C 2223/00      Handled fluid before transfer, i.e. state of fluid when stored in the vessel or before transfer from the vessel**

F17C 2223/01	.	characterised by the phase
F17C 2223/0107	..	Single phase
F17C 2223/0115	...	dense or supercritical, i.e. at high pressure and high density
F17C 2223/0123	...	gaseous, e.g. CNG, GNC
F17C 2223/013	...	liquid
F17C 2223/0138	...	solid
F17C 2223/0146	..	Two-phase
F17C 2223/0153	...	Liquefied gas, e.g. LPG, GPL
F17C 2223/0161	....	cryogenic, e.g. LNG, GNL, PLNG
F17C 2223/0169	....	subcooled
F17C 2223/0176	...	Solids and gas
F17C 2223/0184	...	Liquids and solids
F17C 2223/0192	..	Three-phase, e.g. CO <sub>2</sub> at triple point
F17C 2223/03	.	characterised by the pressure level
F17C 2223/031	..	Not under pressure, i.e. containing liquids or solids only
F17C 2223/033	..	Small pressure, e.g. for liquefied gas
F17C 2223/035	..	High pressure (>10 bar)
F17C 2223/036	..	Very high pressure (>80 bar)
F17C 2223/038	..	Subatmospheric pressure
F17C 2223/04	.	characterised by other properties of handled fluid before transfer
F17C 2223/041	..	Stratification
F17C 2223/042	..	Localisation of the removal point
F17C 2223/043	...	in the gas
F17C 2223/045	....	with a dip tube

- F17C 2223/046 . . . in the liquid
- F17C 2223/047 . . . . with a dip tube
- F17C 2223/048 . . . in the solid

#### **F17C 2225/00      Handled fluid after transfer, i.e. state of fluid after transfer from the vessel**

- F17C 2225/01 . characterised by the phase
- F17C 2225/0107 .. Single phase
- F17C 2225/0115 . . . dense or supercritical, i.e. at high pressure and high density
- F17C 2225/0123 . . . gaseous, e.g. CNG, GNC
- F17C 2225/013 . . . liquid
- F17C 2225/0138 . . . solid
- F17C 2225/0146 .. Two-phase
- F17C 2225/0153 . . . Liquefied gas, e.g. LPG, GPL
- F17C 2225/0161 . . . . cryogenic, e.g. LNG, GNL, PLNG
- F17C 2225/0169 . . . . subcooled
- F17C 2225/0176 . . . Solids and gas
- F17C 2225/0184 . . . Liquids and solids
- F17C 2225/0192 .. Three-phase, e.g. CO2 at triple point
- F17C 2225/03 . characterised by the pressure level
- F17C 2225/031 .. Not under pressure, i.e. containing liquids or solids only
- F17C 2225/033 .. Small pressure, e.g. for liquefied gas
- F17C 2225/035 .. High pressure, i.e. between 10 and 80 bars
- F17C 2225/036 .. Very high pressure, i.e. above 80 bars
- F17C 2225/038 .. Subatmospheric pressure
- F17C 2225/04 . characterised by other properties of handled fluid after transfer
- F17C 2225/041 .. Stratification
- F17C 2225/042 .. Localisation of the filling point
- F17C 2225/043 . . . in the gas
- F17C 2225/044 . . . . at several points, e.g. with a device for recondensing gas
- F17C 2225/045 . . . . with a dip tube
- F17C 2225/046 . . . in the liquid
- F17C 2225/047 . . . . with a dip tube
- F17C 2225/048 . . . in the solid

#### **F17C 2227/00      Transfer of fluids, i.e. method or means for transferring the fluid; Heat exchange with the fluid**

- F17C 2227/01 . Propulsion of the fluid
- F17C 2227/0107 .. by pressurising the ullage
- F17C 2227/0114 .. with vacuum injectors, e.g. venturi

F17C 2227/0121	..	by gravity
F17C 2227/0128	..	with pumps or compressors
F17C 2227/0135	...	Pumps
F17C 2227/0142	....	with specified pump type, e.g. piston or impulsive type
F17C 2227/015	....	with cooling of the pump
F17C 2227/0157	...	Compressors
F17C 2227/0164	....	with specified compressor type, e.g. piston or impulsive type
F17C 2227/0171	...	Arrangement
F17C 2227/0178	....	in the vessel
F17C 2227/0185	....	comprising several pumps or compressors
F17C 2227/0192	..	by using a working fluid
F17C 2227/03	.	Heat exchange with the fluid
F17C 2227/0302	..	by heating
F17C 2227/0304	...	using an electric heater
F17C 2227/0306	...	using the same fluid
F17C 2227/0309	...	using another fluid
F17C 2227/0311	....	Air heating
F17C 2227/0313	.....	by forced circulation, e.g. using a fan
F17C 2227/0316	....	Water heating
F17C 2227/0318	.....	using seawater
F17C 2227/032	.....	using geothermal water
F17C 2227/0323	....	in a closed loop
F17C 2227/0325	...	by expansion using "Joule-Thompson" effect
F17C 2227/0327	...	with recovery of heat
F17C 2227/033	...	using solar energy
F17C 2227/0332	...	by burning a combustible
F17C 2227/0334	...	by radiation means
F17C 2227/0337	..	by cooling
F17C 2227/0339	...	using the same fluid
F17C 2227/0341	...	using another fluid
F17C 2227/0344	....	Air cooling
F17C 2227/0346	.....	by forced circulation, e.g. using a fan
F17C 2227/0348	....	Water cooling
F17C 2227/0351	.....	using seawater
F17C 2227/0353	....	using cryocooler
F17C 2227/0355	....	in a closed loop
F17C 2227/0358	...	by expansion
F17C 2227/036	....	"Joule-Thompson" effect
F17C 2227/0362	....	in a turbine
F17C 2227/0365	...	with recovery of heat
F17C 2227/0367	..	Localisation of heat exchange

F17C 2227/0369 . . . in or on a vessel  
 F17C 2227/0372 . . . . in the gas  
 F17C 2227/0374 . . . . in the liquid  
 F17C 2227/0376 . . . . in wall contact  
 F17C 2227/0379 . . . . . inside the vessel  
 F17C 2227/0381 . . . . . integrated in the wall  
 F17C 2227/0383 . . . . . outside the vessel  
 F17C 2227/0386 . . . . . with a jacket  
 F17C 2227/0388 . . . separate  
 F17C 2227/039 . . . . on the pipes  
 F17C 2227/0393 . . . . using a vaporiser  
 F17C 2227/0395 . . . . using a submerged heat exchanger  
 F17C 2227/0397 . . . characterised by fins

F17C 2227/04 . Methods for emptying or filling  
 F17C 2227/041 . . vessel by vessel  
 F17C 2227/042 . . . with change-over from one vessel to another  
 F17C 2227/043 . . by pressure cascade  
 F17C 2227/044 . . by purging  
 F17C 2227/045 . . by vacuum  
 F17C 2227/046 . . by even emptying or filling  
 F17C 2227/047 . . by repeating a process cycle  
 F17C 2227/048 . . by maintaining residual pressure

#### **F17C 2250/00      Accessories; Control means; Indicating, measuring or monitoring of parameters**

F17C 2250/01 . Intermediate tanks  
  
 F17C 2250/03 . Control means  
 F17C 2250/032 . . using computers  
 F17C 2250/034 . . using wireless transmissions  
 F17C 2250/036 . . using alarms  
 F17C 2250/038 . . using cameras  
  
 F17C 2250/04 . Indicating or measuring of parameters as input values  
 F17C 2250/0404 . . Parameters indicated or measured  
 F17C 2250/0408 . . . Level of content in the vessel  
 F17C 2250/0413 . . . . with floats  
 F17C 2250/0417 . . . . with electrical means  
 F17C 2250/0421 . . . Mass or weight of the content of the vessel  
 F17C 2250/0426 . . . Volume  
 F17C 2250/043 . . . Pressure  
 F17C 2250/0434 . . . . Pressure difference

F17C 2250/0439	...	Temperature
F17C 2250/0443	...	Flow or movement of content
F17C 2250/0447	...	Composition; Humidity
F17C 2250/0452	....	Concentration of a product
F17C 2250/0456	....	Calorific or heating value
F17C 2250/046	....	Humidity
F17C 2250/0465	...	Vibrations, e.g. of acoustic type
F17C 2250/0469	...	Constraints, e.g. by gauges
F17C 2250/0473	...	Time or time periods
F17C 2250/0478	...	Position or presence
F17C 2250/0482	...	Acceleration
F17C 2250/0486	..	Indicating or measuring characterised by the location
F17C 2250/0491	...	Parameters measured at or inside the vessel
F17C 2250/0495	...	the indicated parameter is a converted measured parameter
F17C 2250/06	.	Controlling or regulating of parameters as output values
F17C 2250/0605	..	Parameters
F17C 2250/061	...	Level of content in the vessel
F17C 2250/0615	...	Mass or weight of the content of the vessel
F17C 2250/0621	...	Volume
F17C 2250/0626	...	Pressure
F17C 2250/0631	...	Temperature
F17C 2250/0636	...	Flow or movement of content
F17C 2250/0642	...	Composition; Humidity
F17C 2250/0647	....	Concentration of a product
F17C 2250/0652	....	Calorific or heating value
F17C 2250/0657	....	Humidity
F17C 2250/0663	...	Vibrations, e.g. of acoustic type
F17C 2250/0668	...	Constraints, e.g. by jauges
F17C 2250/0673	...	Time or time periods
F17C 2250/0678	...	Position or presence
F17C 2250/0684	...	Acceleration
F17C 2250/0689	..	Methods for controlling or regulating
F17C 2250/0694	...	with calculations
F17C 2250/07	.	Actions triggered by measured parameters
F17C 2250/072	..	Action when predefined value is reached
F17C 2250/075	...	when full
F17C 2250/077	...	when empty

**Guidance heading:**

**F17C 2260/00**      **Purposes of gas storage and gas handling**

- F17C 2260/01 . Improving mechanical properties or manufacturing
- F17C 2260/011 .. Improving strength
- F17C 2260/012 .. Reducing weight
- F17C 2260/013 .. Reducing manufacturing time or effort
- F17C 2260/015 .. Facilitating maintenance
- F17C 2260/016 .. Preventing slosh
- F17C 2260/017 .. by calculation
- F17C 2260/018 .. Adapting dimensions
- F17C 2260/02 . Improving properties related to fluid or fluid transfer
- F17C 2260/021 .. Avoiding over pressurising
- F17C 2260/022 .. Avoiding overfilling
- F17C 2260/023 .. Avoiding overheating
- F17C 2260/024 .. Improving metering
- F17C 2260/025 .. Reducing transfer time
- F17C 2260/026 .. by calculation
- F17C 2260/027 .. Making transfer independent of vessel orientation
- F17C 2260/028 .. Avoiding unauthorised transfer
- F17C 2260/03 . Dealing with losses
- F17C 2260/031 .. due to heat transfer
- F17C 2260/032 ... Avoiding freezing or defrosting
- F17C 2260/033 ... by enhancing insulation
- F17C 2260/035 .. of fluid
- F17C 2260/036 ... Avoiding leaks
- F17C 2260/037 ... Handling leaked fluid
- F17C 2260/038 ... Detecting leaked fluid
- F17C 2260/04 . Reducing risks and environmental impact
- F17C 2260/042 .. Reducing risk of explosion
- F17C 2260/044 .. Avoiding pollution or contamination
- F17C 2260/046 .. Enhancing energy recovery
- F17C 2260/048 .. Refurbishing
- F17C 2260/05 . Improving chemical properties
- F17C 2260/053 .. Reducing corrosion
- F17C 2260/056 .. Improving fluid characteristics

**Guidance heading: Purposes or effects**

**F17C 2265/00 Effects achieved by gas storage or gas handling**

- F17C 2265/01 . Purifying the fluid

- F17C 2265/012 . . by filtering
- F17C 2265/015 . . by separating
- F17C 2265/017 . . . different phases of a same fluid
  
- F17C 2265/02 . Mixing fluids
- F17C 2265/022 . . identical fluid
- F17C 2265/025 . . different fluids
- F17C 2265/027 . . . with odorizing
  
- F17C 2265/03 . Treating the boil-off
- F17C 2265/031 . . by discharge
- F17C 2265/032 . . by recovery
- F17C 2265/033 . . . with cooling
- F17C 2265/034 . . . . with condensing the gas phase
- F17C 2265/035 . . . . with subcooling the liquid phase
- F17C 2265/036 . . . with heating
- F17C 2265/037 . . . with pressurising
- F17C 2265/038 . . . with expanding
  
- F17C 2265/04 . using an independent energy source, e.g. battery
  
- F17C 2265/05 . Regasification
  
- F17C 2265/06 . Fluid distribution
- F17C 2265/061 . . for supply of supplying vehicles
- F17C 2265/063 . . for supply of refueling stations
- F17C 2265/065 . . for refueling vehicle fuel tanks
- F17C 2265/066 . . for feeding engines for propulsion
- F17C 2265/068 . . Distribution pipeline networks
  
- F17C 2265/07 . Generating electrical power as side effect

## **F17C 2270/00 Applications**

- F17C 2270/01 . for fluid transport or storage
- F17C 2270/0102 . . on or in the water
- F17C 2270/0105 . . . Ships
- F17C 2270/0107 . . . . Wall panels
- F17C 2270/011 . . . Barges
- F17C 2270/0113 . . . . floating
- F17C 2270/0115 . . . . immersed
- F17C 2270/0118 . . . Offshore
- F17C 2270/0121 . . . . Platforms
- F17C 2270/0123 . . . . Terminals



F17C 2270/0126	....	Buoys
F17C 2270/0128	....	Storage in depth
F17C 2270/0131	...	Submarines
F17C 2270/0134	..	placed above the ground
F17C 2270/0136	...	Terminals
F17C 2270/0139	...	Fuel stations
F17C 2270/0142	..	placed underground
F17C 2270/0144	...	Type of cavity
F17C 2270/0147	....	by burying vessels
F17C 2270/0149	....	by digging cavities
F17C 2270/0152	.....	Salt caverns
F17C 2270/0155	....	by using natural cavities
F17C 2270/0157	...	Location of cavity
F17C 2270/016	....	onshore
F17C 2270/0163	....	offshore
F17C 2270/0165	..	on the road
F17C 2270/0168	...	by vehicles
F17C 2270/0171	....	Trucks
F17C 2270/0173	....	Railways
F17C 2270/0176	....	Buses
F17C 2270/0178	....	Cars
F17C 2270/0181	...	Airbags
F17C 2270/0184	...	Fuel cells
F17C 2270/0186	..	in the air or in space
F17C 2270/0189	...	Planes
F17C 2270/0192	...	Hot air balloons
F17C 2270/0194	...	for use under microgravity conditions, e.g. space
F17C 2270/0197	...	Rockets
F17C 2270/02	.	for medical applications
F17C 2270/025	..	Breathing
F17C 2270/05	.	for industrial use
F17C 2270/0509	..	"Dewar" vessels
F17C 2270/0518	..	Semiconductors
F17C 2270/0527	..	Supra-conductors
F17C 2270/0536	...	Magnetic resonance imaging
F17C 2270/0545	..	Tools
F17C 2270/0554	..	Hydraulic applications
F17C 2270/0563	..	Pneumatic applications
F17C 2270/0572	..	Isostatic presses
F17C 2270/0581	..	Power plants
F17C 2270/059	..	Mass bottling, e.g. merry belts

<a href="#">F17C 2270/07</a>	. for household use
<a href="#">F17C 2270/0709</a>	.. Camping gas
<a href="#">F17C 2270/0718</a>	.. Aerosols
<a href="#">F17C 2270/0727</a>	.. Thermos flasks
<a href="#">F17C 2270/0736</a>	.. Capsules, e.g. CO2
<a href="#">F17C 2270/0745</a>	.. Gas bottles
<a href="#">F17C 2270/0754</a>	.. Fire extinguishers
<a href="#">F17C 2270/0763</a>	.. Fuel cells
<a href="#">F17C 2270/0772</a>	.. Inflation devices, e.g. for rescue vests or tyres
<a href="#">F17C 2270/0781</a>	.. Diving equipments
<a href="#">F17C 2270/079</a>	.. Respiration devices for rescuing