

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](#))

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 7/00](#))}
- 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 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](#))}

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 m³)
- F17C 2201/054 . . medium (>1 m³)
- F17C 2201/056 . . Small (<1 m³)
- F17C 2201/058 . . portable (<30 l)
- F17C 2201/06 . Vessel construction using filling material in contact with the handled fluid

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

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 . . Carbone 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. H₂S, Cl
- F17C 2221/038 . . Refrigerants
- F17C 2221/05 . Ultrapure fluid
- F17C 2221/07 . Hyperpolarised gases
- F17C 2221/08 . Ergols, e.g. hydrazine

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. CO₂ 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

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

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
F17C 2270/07	. for household use
F17C 2270/0709	. . Camping gas
F17C 2270/0718	. . Aerosols
F17C 2270/0727	. . Thermos flasks
F17C 2270/0736	. . Capsules, e.g. CO ₂
F17C 2270/0745	. . Gas bottles
F17C 2270/0754	. . Fire extinguishers
F17C 2270/0763	. . Fuel cells
F17C 2270/0772	. . Inflation devices, e.g. for rescue vests or tyres
F17C 2270/0781	. . Diving equipments
F17C 2270/079	. . Respiration devices for rescuing