COOPERATIVE PATENT CLASSIFICATION

MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

ENGINEERING IN GENERAL

STORING OR DISTRIBUTING GASES OR LIQUIDS

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)

WARNING
In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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 - B63: 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; liquefied gas stoves F24C 3/00])

1/002 . [Storage in barges or on ships]

1/005 . (Storage of gas or gaseous mixture at high pressure and at high density condition, e.g. in the single state phase)

1/007 . [Underground or underwater storage]

1/02 . involving reinforcing arrangements ([F17C 1/14, F17C 1/16 take precedence])

1/04 . . Protecting sheathings

1/06 . . . built-up from wound-on bands or filamentary material, e.g. wires

1/08 . . . Integral reinforcements, e.g. ribs

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)

1/12 . with provision for thermal insulation ([F17C 1/14, F17C 1/16 take precedence]; thermal insulation in general F16L 59/00)

1/14 . constructed of aluminium; constructed of non-magnetic steel

1/16 . constructed of plastics materials { (shaping of plastics B29C)

3/00 Vessels not under pressure

3/005 . (Underground or underwater containers or vessels (storing in natural or artificial cavities in the earth in general B65G 5/00))

3/02 . with provision for thermal insulation (thermal insulation in general F16L 59/00 [: refrigerators F25D; insulation specially adapted for cryogenic vessels F17C 13/00: tank vehicles B60P 3/22: railway tank wagons B61D 5/00])

3/022 . . [Land-based bulk storage containers (civil engineering aspects E04H 7/00)]

3/025 . . [Bulk storage in barges or on ships (constructive aspects B63B 25/16)]

3/027 . . . [Wallpanels for so-called membrane tanks]

3/04 . . by insulating layers (F17C 3/08 takes precedence)

3/06 . . . on the inner surface, i.e. in contact with the stored fluid

3/08 . . by vacuum spaces, e.g. Dewar flask (for household use A47J 41/02)

3/085 . . . [Cryostats]

3/10 . . by liquid-circulating or vapour-circulating jackets

3/12 . . with provision for protection against corrosion, e.g. due to gaseous acid (protection against corrosion in general C23F)

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.

5/002 . [Automated filling apparatus]

5/005 . . [for gas bottles, such as on a continuous belt or on a merry-go-round]

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)]
Methods and apparatus for filling vessels not under pressure with liquefied or solidified gases

Methods and apparatus for discharging liquefied, solidified, or compressed gases from pressure vessels, not covered by another subclass

Methods and apparatus for discharging liquefied or solidified gases from vessels not under pressure

Use of gas-solvents or gas-sorbents in vessels

Details of vessels or of the filling or discharging of vessels

Vessel construction, in particular geometry, arrangement or size

Arrangement or mounting of devices for preventing or minimising the effect of explosion (flame traps A62C 4/00) ; Other safety measures

Vessel construction using filling material in contact with their contents

Reinforcing or suspension means

Reinforcing means
2203/012 . . . on or in the wall, e.g. ribs
2203/013 . . . in the vessel, e.g. columns
2203/014 . . . Suspension means
2203/015 . . . Bars
2203/016 . . . Cords
2203/017 . . . Magnetic means
2203/018 . . . by attachment at the neck
2203/03 . . . Thermal insulations
2203/0304 . . . by solid means
2203/0308 . . . Radiation shield
2203/0312 . . . cooled by external means
2203/0316 . . . cooled by vapourised gas from the interior
2203/032 . . . Multi-sheet layers
2203/0325 . . . Aerogel
2203/0329 . . . Foam
2203/0333 . . . Polyurethane
2203/0337 . . . Granular
2203/0341 . . . Perlite
2203/0345 . . . Fibres
2203/035 . . . Glass wool
2203/0354 . . . Wood
2203/0358 . . . in form of panels
2203/0362 . . . by liquid means
2203/0366 . . . Cryogen
2203/037 . . . Water
2203/0375 . . . by gas
2203/0379 . . . Inert
2203/0383 . . . Air
2203/0387 . . . Cryogen
2203/0391 . . . by vacuum
2203/0395 . . . Getter
2203/06 . . . Materials for walls or layers thereof; Properties or structures of walls or their materials
2203/0602 . . . Wall structures; Special features thereof
2203/0604 . . . Liners
2203/0607 . . . Coatings
2203/0609 . . . Straps, bands or ribbons
2203/0612 . . . Wall structures
2203/0614 . . . Single wall
2203/0617 . . . with one layer
2203/0619 . . . with two layers
2203/0621 . . . with three layers
2203/0624 . . . with four or more layers
2203/0626 . . . Multiple walls
2203/0629 . . . Two walls
2203/0631 . . . Three or more walls
2203/0634 . . . Materials for walls or layers thereof
2203/0636 . . . Metals
2203/0639 . . . Steels
2203/0641 . . . Non-magnetic steels
2203/0643 . . . Stainless steels
2203/0646 . . . Aluminium
2203/0648 . . . Alloys or compositions of metals
2203/0651 . . . Invar
2203/0653 . . . Lead
2203/0656 . . . in form of filaments
2203/0658 . . . Synthetics
2203/066 . . . Plastics
2203/0663 . . . in form of fibers or filaments
2203/0665 . . . radially wound
2203/0668 . . . axially wound
2203/067 . . . helically wound
2203/0673 . . . Polymers
2203/0675 . . . with details of composition
2203/0678 . . . Concrete
2203/068 . . . Special properties of materials for vessel walls
2203/0682 . . . with liquid or gas layer
2203/0685 . . . flexible
2203/0687 . . . superconducting
2203/069 . . . Break point in the wall
2203/0692 . . . transparent
2203/0695 . . . pre-constrained
2203/0697 . . . comprising nanoparticles
2205/00 . . . Vessel construction, in particular mounting arrangements, attachments or identifications means
2205/01 . . . Mounting arrangements
2205/0103 . . . Exterior arrangements
2205/0107 . . . Frames
2205/0111 . . . Boxes
2205/0115 . . . Dismountable protective hulls
2205/0119 . . . Vessel walls form part of another structure
2205/0123 . . . characterised by number of vessels
2205/0126 . . . One vessel
2205/013 . . . Two or more vessels
2205/0134 . . . characterised by the presence of fluid connection between vessels
2205/0138 . . . bundled in series
2205/0142 . . . bundled in parallel
2205/0146 . . . with details of the manifold
2205/0149 . . . Vessel mounted inside another one
2205/0153 . . . Details of mounting arrangements
2205/0157 . . . for transport
2205/0161 . . . with wheels
2205/0165 . . . with handgrip
2205/0169 . . . stackable
2205/0173 . . . lockable
2205/0176 . . . with ventilation
2205/018 . . . Supporting feet
2205/0184 . . . Attachments to the ground, e.g. mooring or anchoring
2205/0188 . . . Hanging up devices
2205/0192 . . . with external bearing means
2205/0196 . . . with shock absorbing means
2205/02 . . . Fluid connections, filters, valves, closure means or other attachments
2205/0302 . . . Fittings, valves, filters, or components in connection with the gas storage device
2205/0305 . . . Bosses, e.g. boss collars
2205/0308 . . . Protective caps
2205/0311 . . . Closure means
2205/0314 . . . breakable, e.g. with burst discs
2205/0317 . . . fusing or melting
2205/032 . . . pierceable
2205/0323 . . . Valves
2205/0326 . . . electrically actuated
2205/0329 . . . manually actuated
2205/0332 . . . Safety valves or pressure relief valves
2205/0335 . . . Check-valves or non-return valves
2205/0338 . . . Pressure regulators
2205/0341 . . . Filters
2205/0344 . . . Sinter type
2221/00 Handled fluid, in particular type of fluid
2221/01 Pure fluids
2221/011 Oxygen
2221/012 Hydrogen
2221/013 Carbone dioxide
2221/014 Nitrogen
2221/015 Carbon monoxide
2221/016 Noble gases (Ar, Kr, Xe)

2221/017 Helium
2221/018 Acetylene
2221/03 Mixtures
2221/031 Air
2221/032 Hydrocarbons
2221/033 Methane, e.g. natural gas, CNG, LNG, GNL, GNC, PLNG
2221/035 Propane butane, e.g. LPG, GPL
2221/036 Hydrates
2221/037 Containing pollutant, e.g. H2S, Cl
2221/038 Refrigerants
2221/05 Ultrapure fluid
2221/07 Hyperpolarised gases
2221/08 Ergols, e.g. hydrazine

Fluid contained in the vessel: Filling and discharging the fluid

2223/00 Handled fluid before transfer, i.e. state of fluid when stored in the vessel or before transfer from the vessel
2223/01 characterised by the phase
2223/0107 Single phase
2223/0115 dense or supercritical, i.e. at high pressure and high density
2223/0123 gaseous, e.g. CNG, GNC
2223/013 liquid
2223/0138 solid
2223/0146 Two-phase
2223/0153 Liquefied gas, e.g. LPG, GPL
2223/0161 cryogenic, e.g. LNG, GNL, PLNG
2223/0169 subcooled
2223/0176 Solids and gas
2223/0184 Liquids and solids
2223/0192 Three-phase, e.g. CO2 at triple point
2223/03 characterised by the pressure level
2223/031 Not under pressure, i.e. containing liquids or solids only
2223/033 Small pressure, e.g. for liquefied gas
2223/035 High pressure (>10 bar)
2223/036 Very high pressure (>80 bar)
2223/038 Subatmospheric pressure
2223/04 characterised by other properties of handled fluid before transfer
2223/041 Stratification
2223/042 Localisation of the removal point
2223/043 in the gas
2223/045 with a dip tube
2223/046 in the liquid
2223/047 with a dip tube
2223/048 in the solid

2225/00 Handled fluid after transfer, i.e. state of fluid after transfer from the vessel
2225/01 characterised by the phase
2225/0107 Single phase
2225/0115 dense or supercritical, i.e. at high pressure and high density
2225/0123 gaseous, e.g. CNG, GNC
2225/013 liquid
2225/0138 solid
2225/0146 Two-phase
2225/0153 Liquefied gas, e.g. LPG, GPL
2225/0153 cryogenic, e.g. LNG, GNL, PLNG
Fluid contained in the vessel; Filling and discharging the fluid

Transfer of fluids, i.e. method or means for transferring the fluid; Heat exchange with the fluid

- 2227/01 Propulsion of the fluid
- 2227/0176 by pressurising the ullage
- 2227/0114 with vacuum injectors, e.g. venturi
- 2227/0121 by gravity
- 2227/0128 with pumps or compressors
- 2227/0135 Pumps
- 2227/0142 with specified pump type, e.g. piston or impulsive type
- 2227/015 cooling of the pump
- 2227/0157 Compressors
- 2227/0164 with specified compressor type, e.g. piston or impulsive type
- 2227/0171 Arrangement
- 2227/0178 in the vessel
- 2227/0185 comprising several pumps or compressors
- 2227/0192 by using a working fluid
- 2227/0193 Heat exchange with the fluid
- 2227/0302 by heating
- 2227/0304 using an electric heater
- 2227/0306 using the same fluid
- 2227/0309 using another fluid
- 2227/0311 Air heating
- 2227/0313 by forced circulation, e.g. using a fan
- 2227/0316 Water heating
- 2227/0318 using seawater
- 2227/0322 using geothermal water
- 2227/0323 in a closed loop
- 2227/0325 by expansion using "Joule-Thompson" effect
- 2227/0327 with recovery of heat
- 2227/0333 using solar energy
- 2227/0332 by burning a combustible
- 2227/0334 by radiation means
- 2227/0337 by cooling
- 2227/0339 using the same fluid
- 2227/0341 using another fluid
- 2227/0344 Air cooling

- 2227/0346 by forced circulation, e.g. using a fan
- 2227/0348 Water cooling
- 2227/0351 using seawater
- 2227/0353 using cryocooler
- 2227/0355 in a closed loop
- 2227/0358 by expansion
- 2227/036 "Joule-Thompson" effect
- 2227/0362 in a turbine
- 2227/0365 with recovery of heat
- 2227/0367 Localisation of heat exchange
- 2227/0369 in or on a vessel
- 2227/0372 in the gas
- 2227/0374 in the liquid
- 2227/0376 in wall contact
- 2227/0379 inside the vessel
- 2227/0381 integrated in the wall
- 2227/0383 outside the vessel
- 2227/0386 with a jacket
- 2227/0388 separate
- 2227/0389 on the pipes
- 2227/0389 using a vaporiser
- 2227/0395 using a submersed heat exchanger
- 2227/0397 characterised by fins
- 2227/04 Methods for emptying or filling
- 2227/041 vessel by vessel
- 2227/042 with change-over from one vessel to another
- 2227/043 by pressure cascade
- 2227/044 by purging
- 2227/045 by vacuum
- 2227/046 by even emptying or filling
- 2227/047 by repeating a process cycle
- 2227/048 by maintaining residual pressure

Accessories; Control means; Indicating, measuring or monitoring of parameters

- 2225/0483 Intermediate tanks
- 2225/0503 Control means
- 2225/0504 using computers
- 2225/0534 using wireless transmissions
- 2225/0536 using alarms
- 2225/0538 using cameras
- 2225/04 Indicating or measuring of parameters as input values
- 2225/044 Parameters indicated or measured
- 2225/0408 Level of content in the vessel
- 2225/0413 with floats
- 2225/0417 with electrical means
- 2225/0421 Mass or weight of the content of the vessel
- 2225/0426 Volume
- 2225/043 Pressure
- 2225/0434 Pressure difference
- 2225/0439 Temperature
- 2225/0443 Flow or movement of content
- 2225/0447 Composition; Humidity
- 2225/0452 Concentration of a product
- 2225/0456 Calorific or heating value
- 2225/046 Humidity
- 2225/0465 Vibrations, e.g. of acoustic type
- 2225/0469 Constraints, e.g. by gauges
- 2225/0473 Time or time periods
- 2225/0478 Position or presence
- 2225/0482 Acceleration
Fluid contained in the vessel; Filling and discharging the fluid

**Purposes or effects**

2260/00  Effects achieved by gas storage or gas handling
2260/01  Purifying the fluid
2260/02  by filtering
2260/03  by separating
2260/04  different phases of a same fluid
2260/05  Mixing fluids
2260/06  identical fluid
2260/07  different fluids
2260/08  with odorizing
2260/09  Treating the boil-off
2260/10  by discharge
2260/11  by recovery
2260/12  with cooling
2260/13  with condensing the gas phase
2260/14  with subcooling the liquid phase
2260/15  with heating
2260/16  with pressurising
2260/17  with expanding
2260/18  using an independent energy source, e.g. battery
2260/19  Regasification
2260/20  Fluid distribution
2260/21  for supply of supplying vehicles
2260/22  for supply of refueling stations
2260/23  for refueling vehicle fuel tanks
2260/24  for feeding engines for propulsion
2260/25  Distribution pipeline networks
2260/26  Generating electrical power as side effect

**Applications**

2270/00  for fluid transport or storage
2270/001  on or in the water
2270/005  Ships
2270/007  Wall panels
2270/011  Barges
2270/013  floating
2270/015  immersed
2270/018  Offshore
2270/021  Platforms
2270/023  Terminals
2270/026  Buoys
2270/028  Storage in depth
2270/031  Submarines
2270/034  placed above the ground
2270/036  Terminals
2270/039  Fuel stations
2270/042  placed underground
2270/044  Type of cavity
2270/047  by burying vessels
2270/049  by digging cavities
2270/052  Salt caverns
2270/055  by using natural cavities
2270/057  Location of cavity
2270/06  onshore
2270/063  offshore

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

2260/01  Improving mechanical properties or manufacturing
2260/02  Improving strength
2260/03  Reducing weight
2260/04  Reducing manufacturing time or effort
2260/05  Facilitating maintenance
2260/06  Preventing slosh
2260/07  by calculation
2260/08  Adapting dimensions
2260/09  Action when predefined value is reached
2260/10  when full
2260/11  when empty

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**2260/00  Improving mechanical properties or manufacturing**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  Reducing weight**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  Reducing manufacturing time or effort**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  Facilitating maintenance**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  Preventing slosh**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  by calculation**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  Adapting dimensions**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  Action when predefined value is reached**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  when full**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty

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**2260/00  when empty**

2260/01  Improving strength
2260/02  Reducing weight
2260/03  Reducing manufacturing time or effort
2260/04  Facilitating maintenance
2260/05  Preventing slosh
2260/06  by calculation
2260/07  Adapting dimensions
2260/08  Action when predefined value is reached
2260/09  when full
2260/10  when empty
Purposes or effects

2270/0165 . . on the road
2270/0168 . . . by vehicles
2270/0171 . . . . Trucks
2270/0173 . . . . Railways
2270/0176 . . . . Buses
2270/0178 . . . . Cars
2270/0181 . . . . Airbags
2270/0184 . . . . Fuel cells
2270/0186 . . . . in the air or in space
2270/0189 . . . . Planes
2270/0192 . . . . Hot air balloons
2270/0194 . . . . for use under microgravity conditions, e.g. space

2270/0197 . . . . Rockets
2270/02 . . for medical applications
2270/025 . . Breathing
2270/05 . . for industrial use
2270/0509 . . "Dewar" vessels
2270/0518 . . Semiconductors
2270/0527 . . Superconductors
2270/0536 . . . . Magnetic resonance imaging
2270/0545 . . . . Tools
2270/0554 . . . . Hydraulic applications
2270/0563 . . . . Pneumatic applications
2270/0572 . . . . Isostatic presses
2270/0581 . . . . Power plants
2270/059 . . . . Mass bottling, e.g. merry belts
2270/07 . . for household use
2270/0709 . . . . Camping gas
2270/0718 . . . . Aerosols
2270/0727 . . . . Thermos flasks
2270/0736 . . . . Capsules, e.g. CO$_2$
2270/0745 . . . . Gas bottles
2270/0754 . . . . Fire extinguishers
2270/0763 . . . . Fuel cells
2270/0772 . . . . Inflation devices, e.g. for rescue vests or tyres
2270/0781 . . . . Diving equipments
2270/079 . . . . Respiration devices for rescuing