

# CPC COOPERATIVE PATENT CLASSIFICATION

## C CHEMISTRY; METALLURGY (NOTES omitted)

### CHEMISTRY

#### C10 PETROLEUM, GAS OR COKE INDUSTRIES; TECHNICAL GASES CONTAINING CARBON MONOXIDE; FUELS; LUBRICANTS; PEAT

#### C10J PRODUCTION OF PRODUCER GAS, WATER-GAS, SYNTHESIS GAS FROM SOLID CARBONACEOUS MATERIAL, OR MIXTURES CONTAINING THESE GASES ([synthesis gas from liquid or gaseous hydrocarbons C01B](#); [underground gasification of minerals E21B 43/295](#)); CARBURETTING AIR OR OTHER GASES

##### 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.

<b>1/00</b>	<b>Production of fuel gases by carburetting air or other gases without pyrolysis (<a href="#">for internal-combustion engines F02</a>)</b>	3/16	. . . simultaneously reacting oxygen and water with the carbonaceous material
1/02	. Carburetting air	3/18	. . . using electricity
1/04	. . Controlling supply of air	3/20	. . Apparatus; Plants
1/06	. . with materials which are liquid at ordinary temperatures	3/22	. . . Arrangements or dispositions of valves or flues
1/08	. . . by passage of air through or over the surface of the liquid	3/24	. . . . to permit flow of gases or vapours other than upwardly through the fuel bed
1/10	. . . . with the liquid absorbed on carriers	3/26	. . . . . downwardly
1/12	. . . by atomisation of the liquid	3/28	. . . . fully automatic
1/14	. . . Controlling the supply of liquid in accordance with the air supply	3/30	. . . Fuel charging devices
1/16	. . with solid hydrocarbons	3/32	. . . Devices for distributing fuel evenly over the bed or for stirring up the fuel bed
1/18	. . in rotary carburettors	3/34	. . . Grates; Mechanical ash-removing devices
1/20	. Carburetting gases other than air	3/36	. . . . Fixed grates
1/207	. Carburetting by pyrolysis of solid carbonaceous material in a fuel bed ( <a href="#">C10J 3/66 takes precedence</a> )	3/38	. . . . . with stirring beams
1/213	. Carburetting by pyrolysis of solid carbonaceous material in a carburettor	3/40	. . . . Movable grates
1/22	. Adding materials to prevent vapour deposition	3/42	. . . . . Rotary grates
1/24	. Controlling humidity of the air or gas to be carburetted	3/44	. . . adapted for use on vehicles
1/26	. using raised temperatures or pressures	3/46	. Gasification of granular or pulverulent flues in suspension
1/28	. Odorising air gas		
<b>3/00</b>	<b>Production of combustible gases containing carbon monoxide from solid carbonaceous fuels (<a href="#">destructive distillation processes C10B</a>)</b>		
3/002	. {Horizontal gasifiers, e.g. belt-type gasifiers}	3/463	. . {in stationary fluidised beds}
3/005	. {Rotary drum or kiln gasifiers}	3/466	. . {Entrained flow processes}
3/007	. {Screw type gasifiers}	3/48	. . Apparatus; Plants
3/02	. Fixed-bed gasification of lump fuel	3/482	. . . {Gasifiers with stationary fluidised bed}
3/04	. . Cyclic processes, e.g. alternate blast and run	3/485	. . . {Entrained flow gasifiers}
3/06	. . Continuous processes	3/487	. . . . {Swirling or cyclonic gasifiers}
3/08	. . . with ash-removal in liquid state	3/50	. . . Fuel charging devices
3/10	. . . using external heating	3/503	. . . . {for gasifiers with stationary fluidised bed}
3/12	. . . using solid heat-carriers	3/506	. . . . {for entrained flow gasifiers}
3/14	. . . using gaseous heat-carriers	3/52	. . . Ash-removing devices
		3/523	. . . . {for gasifiers with stationary fluidised bed}
		3/526	. . . . {for entrained flow gasifiers}

##### WARNING

Groups [C10J 3/463](#), [C10J 3/466](#), [C10J 3/482](#), [C10J 3/485](#), [C10J 3/503](#), [C10J 3/506](#), [C10J 3/523](#) and [C10J 3/526](#) are not complete pending a reorganisation. See also [C10J 3/46](#)

3/54	. . Gasification of granular or pulverulent fuels by the Winkler technique, i.e. by fluidisation	2300/0923	. . . . Sludge, e.g. from water treatment plant
3/56	. . . Apparatus; Plants	2300/0926	. . . Slurries comprising bio-oil or bio-coke, i.e. charcoal, obtained, e.g. by fast pyrolysis of biomass
3/57	. Gasification using molten salts or metals ( <a href="#">C10J 3/02</a> , <a href="#">C10J 3/46 take precedence</a> )	2300/093	. . . Coal
3/58	. combined with pre-distillation of the fuel	2300/0933	. . . . Coal fines for producing water gas
3/60	. . Processes	2300/0936	. . . . Coal fines for producing producer gas
3/62	. . . with separate withdrawal of the distillation products	2300/094	. . . Char
3/64	. . . with decomposition of the distillation products	2300/0943	. . . Coke
3/66	. . . . by introducing them into the gasification zone	2300/0946	. . . Waste, e.g. MSW, tires, glass, tar sand, peat, paper, lignite, oil shale
3/72	. Other features	2300/095	. . . Exhaust gas from an external process for purification
3/721	. . {Multistage gasification, e.g. plural parallel or serial gasification stages}	2300/0953	. . Gasifying agents
3/723	. . {Controlling or regulating the gasification process}	2300/0956	. . . Air or oxygen enriched air
3/725	. . {Redox processes}	2300/0959	. . . Oxygen
3/726	. . {Start-up}	2300/0963	. . . Ozone
3/728	. . {Shut down}	2300/0966	. . . Hydrogen
3/74	. . Construction of shells or jackets	2300/0969	. . . Carbon dioxide
3/76	. . . Water jackets; Steam boiler-jackets	2300/0973	. . . Water
3/78	. . High-pressure apparatus	2300/0976	. . . . as steam
3/80	. . with arrangements for preheating the blast or the water vapour	2300/0979	. . . . as supercritical steam
3/82	. . Gas withdrawal means	2300/0983	. . Additives
3/84	. . . with means for removing dust or tar from the gas	2300/0986	. . . Catalysts
3/845	. . . . {Quench rings}	2300/0989	. . . Hydrocarbons as additives to gasifying agents to improve caloric properties
3/86	. . combined with waste-heat boilers	2300/0993	. . . Inert particles, e.g. as heat exchange medium in a fluidized or moving bed, heat carriers, sand
<b>2200/00</b>	<b>Details of gasification apparatus</b>	2300/0996	. . . Calcium-containing inorganic materials, e.g. lime
2200/06	. Catalysts as integral part of gasifiers ( <a href="#">catalysts added to the feed C10J 2300/0986</a> )	2300/12	. Heating the gasifier
2200/09	. Mechanical details of gasifiers not otherwise provided for, e.g. sealing means	2300/1207	. . using pyrolysis gas as fuel
2200/12	. Electrodes present in the gasifier	2300/1215	. . using synthesis gas as fuel
2200/15	. Details of feeding means	2300/1223	. . by burners
2200/152	. . Nozzles or lances for introducing gas, liquids or suspensions	2300/123	. . by electromagnetic waves, e.g. microwaves
2200/154	. . Pushing devices, e.g. pistons	2300/1238	. . . by plasma
2200/156	. . Sluices, e.g. mechanical sluices for preventing escape of gas through the feed inlet	2300/1246	. . by external or indirect heating
2200/158	. . Screws	2300/1253	. . by injecting hot gas
2200/31	. Mobile gasifiers, e.g. for use in cars, ships or containers	2300/1261	. . by pulse burners
2200/33	. Laboratory scale gasifiers	2300/1269	. . by radiating device, e.g. radiant tubes
2200/36	. Moving parts inside the gasification reactor not otherwise provided for ( <a href="#">devices for distributing fuel evenly over a fixed bed C10J 3/32</a> )	2300/1276	. . . by electricity, e.g. resistor heating
2200/39	. Gasifiers designed as centrifuge	2300/1284	. . by renewable energy, e.g. solar energy, photovoltaic cells, wind
<b>2300/00</b>	<b>Details of gasification processes</b>	2300/1292	. . . mSolar energy
2300/06	. Modeling or simulation of processes	2300/16	. Integration of gasification processes with another plant or parts within the plant
2300/09	. Details of the feed, e.g. feeding of spent catalyst, inert gas or halogens	2300/1603	. . with gas treatment ( <a href="#">gas cleaning C10K 1/00</a> )
2300/0903	. . Feed preparation	2300/1606	. . . Combustion processes
2300/0906	. . . Physical processes, e.g. shredding, comminuting, chopping, sorting	2300/1609	. . . Post-reduction, e.g. on a red-white-hot coke or coal bed
2300/0909	. . . Drying	2300/1612	. . . CO <sub>2</sub> -separation and sequestration, i.e. long time storage
2300/0913	. . Carbonaceous raw material	2300/1615	. . . Stripping
2300/0916	. . . Biomass	2300/1618	. . . Modification of synthesis gas composition, e.g. to meet some criteria
2300/092	. . . . Wood, cellulose	2300/1621	. . . Compression of synthesis gas
		2300/1625	. . with solids treatment
		2300/1628	. . . Ash post-treatment
		2300/1631	. . . . Ash recycling
		2300/1634	. . . . Ash vitrification
		2300/1637	. . . Char combustion
		2300/164	. . with conversion of synthesis gas

- 2300/1643 . . . Conversion of synthesis gas to energy
- 2300/1646 . . . . integrated with a fuel cell ([gasification of solids in fuel cells H01M 8/0643](#))
- 2300/165 . . . . integrated with a gas turbine or gas motor ([gas turbine plants provided with a gas producer F02C 3/28](#); [engines using solid fuels F02B 43/08](#))
- 2300/1653 . . . . integrated in a gasification combined cycle [IGCC] ([engines driven by heat coming from a gasification or pyrolysis unit F01K 23/067](#))
- 2300/1656 . . . Conversion of synthesis gas to chemicals
- 2300/1659 . . . . to liquid hydrocarbons ([Fischer-Tropsch process C10G 2/00](#))
- 2300/1662 . . . . to methane (SNG) ([production of synthetic natural gas C10L 3/08](#))
- 2300/1665 . . . . to alcohols, e.g. methanol or ethanol ([preparation of alcohols in general C07C 29/00](#))
- 2300/1668 . . . . to urea ([preparation of urea C07C 273/00](#));  
to ammonia ([preparation of ammonia C01C 1/0405](#))
- 2300/1671 . . with the production of electricity
- 2300/1675 . . . making use of a steam turbine
- 2300/1678 . . with air separation ([separating gases using rectification of air F25J 3/04521](#))
- 2300/1681 . . with biological plants, e.g. involving bacteria, algae, fungi
- 2300/1684 . . with electrolysis of water
- 2300/1687 . . with steam generation
- 2300/169 . . with water treatments ([treatment of water in general or water purification C02F](#))
- 2300/1693 . . with storage facilities for intermediate, feed and/or product
- 2300/1696 . . with phase separation, e.g. after condensation
- 2300/18 . Details of the gasification process, e.g. loops, autothermal operation
- 2300/1807 . . Recycle loops, e.g. gas, solids, heating medium, water
- 2300/1815 . . . for carbon dioxide
- 2300/1823 . . . for synthesis gas
- 2300/183 . . Non-continuous or semi-continuous processes ([cyclic processes in fixed bed gasification C10J 3/04](#))
- 2300/1838 . . Autothermal gasification by injection of oxygen or steam
- 2300/1846 . . Partial oxidation, i.e. injection of air or oxygen only
- 2300/1853 . . Steam reforming, i.e. injection of steam only
- 2300/1861 . . Heat exchange between at least two process streams
- 2300/1869 . . . with one stream being air, oxygen or ozone
- 2300/1876 . . . with one stream being combustion gas
- 2300/1884 . . . with one stream being synthesis gas
- 2300/1892 . . . with one stream being water/steam