SECTION C — CHEMISTRY; METALLURGY

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

C10B DESTRUCTIVE DISTILLATION OF CARBONACEOUS MATERIALS FOR PRODUCTION OF GAS, COKE, TAR, OR SIMILAR MATERIALS (cracking oils C10G; underground gasification of minerals E21B 43/295) **[5]**

Subclass index

RETORTS; COKE OVENS
- Retorts....1/00
- Coke ovens....3/00-15/00
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CARBONISING OR COKING PROCESSES
- By destructive distillation....47/00-53/00
- Coking mineral oils or the like....55/00
- Other processes....57/00

FEATURES OF DESTRUCTIVE DISTILLATION PROCESSES IN GENERAL....7/00, 13/00, 37/00, 39/00, 57/00

Retorts or coke ovens

1/00 Retorts
1/02 • Stationary retorts
1/04 • • Vertical retorts
1/06 • • Horizontal retorts
1/08 • • Inclined retorts
1/10 • Rotary retorts

3/00 Coke ovens with vertical chambers
3/02 • with heat-exchange devices

5/00 Coke ovens with horizontal chambers
5/02 • with vertical heating flues
5/04 • • with cross-over inter-connections
5/06 • with horizontal heating flues
5/08 • with horizontal and vertical heating flues
5/10 • with heat-exchange devices
5/12 • • with regenerators
5/14 • • • situated in the longitudinal direction of the chambers
5/16 • • • • with separated flues
5/18 • • • situated in the longitudinal direction of the oven battery
5/20 • • with recuperators

7/00 Coke ovens with mechanical conveying means for the raw material inside the oven
7/02 • with rotary scraping devices
7/04 • with shaking or vibrating devices
7/06 • with endless conveying devices
7/08 • • in vertical direction
7/10 • with conveyor-screws
7/12 • with tilting or rocking means
7/14 • with trucks, containers, or trays

9/00 Beehive ovens

11/00 Coke ovens with inclined chambers

13/00 Coke ovens with means for bringing and keeping the charge under mechanical pressure

15/00 Other coke ovens
15/02 • with floor heating

Heating of coke ovens

17/00 Preheating of coke ovens

19/00 Heating of coke ovens by electrical means

21/00 Heating of coke ovens with combustible gases
21/02 • with lean gas
21/04 • with rich gas
21/06 • in coke ovens suitable for the use of lean gas or rich gas
21/08 • by applying special heating gases
21/10 • Regulating or controlling the combustion
21/12 • • Burners
21/14 • • Devices for reversing the draught

21/16 • • by controlling or varying the openings between the heating flues and the regenerator flues
21/18 • • Recirculating the flue gases
21/20 • Methods of heating ovens of the chamber oven type
21/22 • • by introducing the heating gas and air at various levels
21/24 • • • at the top and the bottom of the vertical heating flues
21/26 • • by introducing the heating gas and air at the top of the vertical flues only

23/00 Other methods of heating coke ovens

25/00 Doors or closures for coke ovens
25/02 • Doors; Door frames
25/04 • • for ovens with vertical chambers
25/06 • • for ovens with horizontal chambers
25/08 • • Closing or opening the doors
25/10 • • • for ovens with vertical chambers
25/12 • • • for ovens with horizontal chambers
25/14 • • • Devices for lifting doors
25/16 • • Sealing; Means for sealing
25/18 • • Cooling
25/20 • Lids or closures for charging holes
25/22 • • for ovens with vertical chambers
25/24 • • for ovens with horizontal chambers

27/00 Arrangements for withdrawal of the distillation gases
27/02 • with outlets arranged at different levels in the chamber
27/04 • during the charging operation of the oven
27/06 • Conduit details, e.g. valves

29/00 Other details of coke ovens
29/02 • Brickwork, e.g. casings, linings, walls
29/04 • Controlling or preventing expansion or contraction
29/06 • Preventing or repairing leakages of the brickwork
29/08 • Bracing or foundation of the ovens

Devices for charging or discharging coke ovens; Mechanical treatments of coal charges

31/00 Charging devices for coke ovens
31/02 • for charging vertically
31/04 • • coke ovens with horizontal chambers
31/06 • for charging horizontally
31/08 • • coke ovens with horizontal chambers
31/10 • • • with one compact charge
31/12 • for liquid materials

33/00 Discharging devices for coke ovens; Coke guides
33/02 • Extracting coke with built-in devices, e.g. gears, screws
33/04 • Pulling-out devices
33/06 • • for horizontal chambers
33/08 • Pushers, e.g. rams
33/10 • • for horizontal chambers
33/12 • Discharge valves
33/14 • Coke guides

35/00 Combined charging and discharging devices for coke ovens

37/00 Mechanical treatments of coal charges in the oven
37/02 • Levelling charges, e.g. with bars
37/04 • Compressing charges (during coking C10B 47/12)
37/06 • Forming holes in charges

39/00 Cooling or quenching coke
39/02 • Dry cooling outside the oven
39/04 • Wet quenching
39/06 • • in the oven
39/08 • • Coke-quenching towers
39/10 • combined with agitating means, e.g. rotating tables or drums
39/12 • combined with conveying means
39/14 • Cars
39/16 • combined with sorting
39/18 • Coke ramps

41/00 Safety devices, e.g. signalling or controlling devices for use in the discharge of coke
41/02 • for discharging coke
41/04 • • by electrical means
41/06 • • by pneumatic or hydraulic means
41/08 • for the withdrawal of the distillation gases

43/00 Preventing or removing incrustations
43/02 • Removing incrustations
43/04 • • by mechanical means
43/06 • • • from conduits, valves or the like
43/08 • • with liquids
43/10 • • by burning out
43/12 • • • Burners
43/14 • Preventing incrustations

45/00 Other details
45/02 • Devices for producing compact unified coal charges outside the oven

Carbonising or coking processes

47/00 Destructive distillation of solid carbonaceous materials with indirect heating, e.g. by external combustion
47/02 • with stationary charge
47/04 • • in shaft furnaces
47/06 • • in retorts
47/08 • • in beehive ovens
47/10 • • in coke ovens of the chamber type
47/12 • • in which the charge is subjected to mechanical pressure during coking
47/14 • • with the aid of hot liquids, e.g. molten salts
47/16 • • with indirect heating means both inside and outside the retorts
47/18 • with moving charge
47/20 • • according to the "moving bed" technique (C10B 47/26 takes precedence)
47/22 • • in dispersed form (C10B 47/26 takes precedence)
47/24 • • • according to the "fluidised bed" technique
47/26 • • with the aid of hot liquids, e.g. molten salts
47/28 • Other processes
47/30 • • in rotary ovens or retorts
47/32 • • in ovens with mechanical conveying means
47/34 • • • with rotary scraping devices
47/36 • • • • in multi-stage ovens

47/38 • • • with shaking or vibrating devices
47/40 • • • with endless conveying devices
47/42 • • • • in vertical direction
47/44 • • • with conveyor-screws
47/46 • • • with trucks, containers, or trays
47/48 • • • with tilting or rocking means

49/00 Destructive distillation of solid carbonaceous materials by direct heating with heat-carrying agents including the partial combustion of the solid material to be treated
49/02 • with hot gases or vapours, e.g. hot gases obtained by partial combustion of the charge
49/04 • • while moving the solid material to be treated
49/06 • • • according to the "moving bed" technique
49/08 • • • in dispersed form
49/10 • • • • according to the "fluidised bed" technique
49/12 • • • • by mixing tangentially, e.g. in vortex chambers
49/14 • with hot liquids, e.g. molten metals
49/16 • with moving solid heat-carriers in divided form
49/18 • • according to the "moving bed" technique
49/20 • • in dispersed form
49/22 • • • according to the "fluidised bed" technique

51/00 Destructive distillation of solid carbonaceous materials by combined direct and indirect heating

53/00 Destructive distillation, specially adapted for particular solid raw materials or solid raw materials in special form (wet carbonising of peat C10F)
53/02 • of cellulose-containing material (production of pyroligneous acid C10C 5/00)
53/04 • of powdered coal
53/06 • of oil shale or bituminous rocks
53/07 • of synthetic polymeric materials, e.g. tyres (recovery or working-up of waste materials of organic macromolecular compounds or compositions based thereon by dry-heat treatment for obtaining partially depolymerised materials C08J 11/10; production of liquid hydrocarbon mixtures from rubber or rubber waste C10G 1/10) **[2006.01]**
53/08 • in the form of briquettes, lumps or the like

55/00 Coking mineral oils, bitumen, tar or the like, or mixtures thereof, with solid carbonaceous materials (cracking oils C10G)
55/02 • with solid materials
55/04 • • with moving solid materials
55/06 • • • according to the "moving bed" technique
55/08 • • • in dispersed form
55/10 • • • • according to the "fluidised bed" technique

57/00 Other carbonising or coking processes; Features of destructive distillation processes in general
57/02 • Multi-step carbonising or coking processes
57/04 • using charges of special composition
57/06 • • containing additives
57/08 • Non-mechanical pretreatment of the charge
57/10 • • Drying
57/12 • Applying additives during coking
57/14 • Features of low-temperature carbonising processes
57/16 • Features of high-temperature carbonising processes
57/18 • Modifying the properties of the distillation gases in the oven

C10C WORKING-UP TAR, PITCH, ASPHALT, BITUMEN; PYROLIGNEOUS ACID

1/00 Working-up tar (obtaining hydrocarbon oils C10G) **[4]**
1/02 • Removal of water (by distillation C10C 1/06)
1/04 • by distillation
1/06 • • Removal of water
1/08 • • Winning of aromatic fractions
1/10 • • • benzene fraction
1/12 • • • naphthalene fraction
1/14 • • Winning of tar oils from tar
1/16 • • Winning of pitch
1/18 • by extraction with selective solvents
1/19 • by thermal treatment not involving distillation **[4]**
1/20 • Refining by chemical means

3/00 Working-up pitch, asphalt, bitumen
3/02 • by chemical means
3/04 • • by blowing or oxidising
3/06 • by distillation
3/08 • by selective extraction
3/10 • Melting
3/12 • • Devices therefor
3/14 • Solidifying; Disintegrating, e.g. granulating
3/16 • • by direct contact with liquids
3/18 • Removing in solid form from reaction vessels, containers and the like, e.g. by cutting out, by pressing

5/00 Production of pyroligneous acid (carbonisation of wood C10B)

C10F DRYING OR WORKING-UP OF PEAT [5]

5/00 Drying or de-watering peat
5/02 • in the field; Auxiliary means therefor
5/04 • by using presses, bandpresses, rolls, or centrifuges (moulding C10F 7/04)
5/06 • combined with a carbonisation step for producing turfcoal

7/00 Working-up peat (extracting wax from peat C10G)
7/02 • Disintegrating peat (obtaining fibres from peat D01B 1/50)
7/04 • by moulding
7/06 • • Briquetting
7/08 • by extrusion combined with cutting

C10G CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, e.g. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas C01B; cracking or pyrolysis of hydrocarbon gases to individual hydrocarbons or mixtures thereof of definite or specified constitution C07C; cracking to cokes C10B)**; RECOVERY OF HYDROCARBON OILS FROM OIL-SHALE, OIL-SAND, OR GASES; REFINING MIXTURES MAINLY CONSISTING OF HYDROCARBONS; REFORMING OF NAPHTHA; MINERAL WAXES [6]**

Note(s)

1. In this subclass:
   - groups C10G 9/00-C10G 49/00 are limited to one-step processes;
   - combined or multi-step processes are covered by groups C10G 51/00-C10G 69/00;
   - refining or recovery of mineral waxes is covered by group C10G 73/00.
2. In this subclass, the following terms or expressions are used with the meanings indicated:
   - "in the presence of hydrogen" or "in the absence of hydrogen" mean treatments in which hydrogen, in free form or as hydrogen generating compounds, is added, or not added, respectively;
   - "hydrotreatment" is used for conversion processes as defined in group C10G 45/00 or group C10G 47/00;
   - "hydrocarbon oils" covers mixtures of hydrocarbons such as tar oils or mineral oils.
3. In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place.

Subclass index

PRODUCTION OF LIQUID HYDROCARBON MIXTURES.....1/00-5/00, 50/00
DISTILLATION OF HYDROCARBON OILS.....7/00
CRACKING.....9/00-15/00, 47/00
REFINING HYDROCARBON OILS
by treatment with acids, with alkalis.....17/00, 19/00
by extraction with solvents or adsorptive solids.....21/00, 25/00
by reaction with hydrogen, by oxidation or by other chemical reaction.....27/00, 29/00, 45/00, 49/00
Other processes.....31/00, 32/00, 33/00
REFORMING.....35/00, 59/00-63/00
MULTI-STEP PROCESSES.....51/00-69/00
OTHER PROCESSES.....70/00, 71/00
TREATING MINERAL WAXES.....73/00
INHIBITING CORROSION.....75/00
SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....99/00

1/00 Production of liquid hydrocarbon mixtures from oil shale, oil-sand, or non-melting solid carbonaceous or similar materials, e.g. wood, coal (mechanical winning of oil from oil-shales, oil-sand, or the like B03B)

1/02 • by distillation
1/04 • by extraction
1/06 • by destructive hydrogenation
1/08 • • with moving catalysts
1/10 • from rubber or rubber waste

2/00 Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon [5]

3/00 Production of liquid hydrocarbon mixtures from oxygen-containing organic materials, e.g. fatty oils, fatty acids (production from non-melting solid oxygen-containing carbonaceous materials C10G 1/00)

5/00 Recovery of liquid hydrocarbon mixtures from gases, e.g. natural gas

5/02 • with solid adsorbents
5/04 • with liquid absorbents
5/06 • by cooling or compressing

7/00 Distillation of hydrocarbon oils

7/02 • Stabilising gasoline by removing gases by fractioning
7/04 • De-watering
7/06 • Vacuum distillation **[3]**
7/08 • Azeotropic or extractive distillation (refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents C10G 21/00) **[3]**
7/10 • Inhibiting corrosion during distillation **[3]**
7/12 • Controlling or regulating **[3]**

Cracking in the absence of hydrogen

9/00 Thermal non-catalytic cracking, in the absence of hydrogen, of hydrocarbon oils

9/02 • in retorts
9/04 • • Retorts
9/06 • by pressure distillation
9/08 • • Apparatus therefor
9/12 • • • Removing incrustation
9/14 • in pipes or coils with or without auxiliary means, e.g. digesters, soaking drums, expansion means
9/16 • • Preventing or removing incrustation
9/18 • • Apparatus
9/20 • • • Tube furnaces
9/24 • by heating with electrical means
9/26 • with discontinuously preheated non-moving solid material, e.g. blast and run
9/28 • with preheated moving solid material
9/30 • • according to the "moving bed" technique
9/32 • • according to the "fluidised bed" technique

9/34 • by direct contact with inert preheated fluids, e.g. with molten metals or salts
9/36 • • with heated gases or vapours
9/38 • • • produced by partial combustion of the material to be cracked or by combustion of another hydrocarbon **[2]**
9/40 • by indirect contact with preheated fluid other than hot combustion gases
9/42 • by passing the material to be cracked in thin streams or as spray on or near continuously heated surfaces

11/00 Catalytic cracking, in the absence of hydrogen, of hydrocarbon oils (cracking in direct contact with molten metals or salts C10G 9/34)
11/02 • characterised by the catalyst used
11/04 • • Oxides
11/05 • • • Crystalline alumino-silicates, e.g. molecular sieves **[3]**
11/06 • • Sulfides
11/08 • • Halides
11/10 • with stationary catalyst bed
11/12 • with discontinuously preheated non-moving solid catalysts, e.g. blast and run
11/14 • with preheated moving solid catalysts
11/16 • • according to the "moving bed" technique
11/18 • • according to the "fluidised bed" technique
11/20 • by direct contact with inert heated gases or vapours
11/22 • • produced by partial combustion of the material to be cracked

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15/00 Cracking of hydrocarbon oils by electric means, electromagnetic or mechanical vibrations, by particle radiation or with gases superheated in electric arcs
15/08 • by electric means or by electromagnetic or mechanical vibrations **[3]**
15/10 • by particle radiation **[3]**
15/12 • with gases superheated in an electric arc, e.g. plasma **[3]**

Refining in the absence of hydrogen

17/00 Refining of hydrocarbon oils, in the absence of hydrogen, with acids, acid-forming compounds, or acid-containing liquids, e.g. acid sludge
17/02 • with acids or acid-containing liquids, e.g. acid sludge
17/04 • • Liquid-liquid treatment forming two immiscible phases
17/06 • • • using acids derived from sulfur or acid sludge thereof
17/07 • • • using halogen acids or oxyacids of halogen (acids generating halogen C10G 27/02) **[3]**
17/08 • with acid-forming oxides (refining with CO_2 or SO_2 as a selective solvent C10G 21/06)
17/085 • • with oleum **[3]**
17/09 • with acid salts **[3]**
17/095 • with "solid acids", e.g. phosphoric acid deposited on a carrier **[3]**
17/10 • Recovery of used refining agent

19/00 Refining hydrocarbon oils, in the absence of hydrogen, by alkaline treatment
19/02 • with aqueous alkaline solutions
19/04 • • containing solubilisers, e.g. solutisers
19/06 • • with plumbites or plumbates
19/067 • with molten alkaline material **[3]**
19/073 • with solid alkaline material **[3]**
19/08 • Recovery of used refining agent

21/00 Refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents (C10G 17/00, C10G 19/00 take precedence)
21/02 • with two or more solvents, which are introduced or withdrawn separately
21/04 • • by introducing simultaneously at least two immiscible solvents counter-current to each other
21/06 • characterised by the solvent used
21/08 • • Inorganic compounds only
21/10 • • • Sulfur dioxide
21/12 • • Organic compounds only
21/14 • • • Hydrocarbons
21/16 • • • Oxygen-containing compounds
21/18 • • • Halogen-containing compounds
21/20 • • • Nitrogen-containing compounds
21/22 • • • Compounds containing sulfur, selenium, or tellurium
21/24 • • • Phosphorus-containing compounds
21/26 • • • Silicon-containing compounds
21/27 • • • Organic compounds not provided for in a single one of groups C10G 21/14-C10G 21/26 **[3]**
21/28 • Recovery of used solvent
21/30 • Controlling or regulating **[3]**

25/00 Refining of hydrocarbon oils, in the absence of hydrogen, with solid sorbents

Note(s) [2006.01]

When classifying in this group, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned.

25/02 • with ion-exchange material
25/03 • • with crystalline alumino-silicates, e.g. molecular sieves **[3]**
25/05 • • • Removal of non-hydrocarbon compounds, e.g. sulfur compounds **[3]**
25/06 • with moving sorbents or sorbents dispersed in the oil
25/08 • • according to the "moving bed" technique
25/09 • • according to the "fluidised bed" technique **[3]**
25/11 • • Distillation in the presence of moving sorbents **[3]**
25/12 • Recovery of used adsorbent

27/00 Refining of hydrocarbon oils, in the absence of hydrogen, by oxidation
27/02 • with halogen or compounds generating halogen; Hypochlorous acid or salts thereof
27/04 • with oxygen or compounds generating oxygen
27/06 • • in the presence of alkaline solutions
27/08 • • in the presence of copper chloride
27/10 • • in the presence of metal-containing organic complexes, e.g. chelates, or cationic ion-exchange resins **[3]**
27/12 • • with oxygen-generating compounds, e.g. per-compounds, chromic acid, chromates (plumbites or plumbates C10G 19/06) **[3]**
27/14 • • with ozone-containing gases **[3]**

29/00 Refining of hydrocarbon oils, in the absence of hydrogen, with other chemicals
29/02 • Non-metals
29/04 • Metals, or metals deposited on a carrier

29/06 • Metal salts, or metal salts deposited on a carrier
29/08 • • containing the metal in the lower valency
29/10 • • Sulfides
29/12 • • Halides **[3]**
29/16 • Metal oxides
29/20 • Organic compounds not containing metal atoms
29/22 • • containing oxygen as the only hetero atom
29/24 • • • Aldehydes or ketones
29/26 • • Halogenated hydrocarbons
29/28 • • containing sulfur as the only hetero atom, e.g. mercaptans, or sulfur and oxygen as the only hetero atoms

31/00 Refining of hydrocarbon oils, in the absence of hydrogen, by methods not otherwise provided for (by distillation C10G 7/00) **[2]**
31/06 • by heating, cooling, or pressure treatment
31/08 • by treating with water
31/09 • by filtration **[3]**
31/10 • with the aid of centrifugal force
31/11 • by dialysis **[3]**

32/00 Refining of hydrocarbon oils by electric or magnetic means, by irradiation, or by using microorganisms [3]
32/02 • by electric or magnetic means **[3]**
32/04 • by particle radiation **[3]**

33/00 De-watering or demulsification of hydrocarbon oils (by distillation C10G 7/04)
33/02 • with electrical or magnetic means
33/04 • with chemical means
33/06 • with mechanical means, e.g. by filtration
33/08 • Controlling or regulating **[3]**

35/00 Reforming naphtha

Note(s)

In this group, the following term is used with the meaning indicated:

- "reforming" means the treatment of naphtha in order to improve the octane number or its aromatic content.

35/02 • Thermal reforming
35/04 • Catalytic reforming
35/06 • • characterised by the catalyst used
35/085 • • • containing platinum group metals or compounds thereof **[3]**
35/09 • • • • Bimetallic catalysts in which at least one of the metals is a platinum-group metal **[3]**
35/095 • • • containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
35/10 • • with moving catalysts
35/12 • • • according to the "moving bed" technique
35/14 • • • according to the "fluidised bed" technique
35/16 • with electric, electromagnetic, or mechanical vibrations; by particle radiation
35/22 • Starting-up reforming operations **[3]**
35/24 • Controlling or regulating of reforming operations **[3]**

Hydrotreatment processes

45/00 Refining of hydrocarbon oils using hydrogen or hydrogen-generating compounds [3]

Note(s)

Treatment of hydrocarbon oils in the presence of hydrogen-generating compounds not provided for in a single one of groups C10G 45/02, C10G 45/32, C10G 45/44, or C10G 45/58 is covered by group C10G 49/00.

45/02 • to eliminate hetero atoms without changing the skeleton of the hydrocarbon involved and without cracking into lower boiling hydrocarbons; Hydrofinishing **[3]**
45/04 • • characterised by the catalyst used **[3]**
45/06 • • • containing nickel or cobalt metal, or compounds thereof **[3]**
45/08 • • • • in combination with chromium, molybdenum, or tungsten metals, or compounds thereof **[3]**
45/10 • • • containing platinum group metals or compounds thereof **[3]**
45/12 • • • containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
45/14 • • with moving solid particles **[3]**
45/16 • • • suspended in the oil, e.g. slurries **[3]**
45/18 • • • according to the "moving bed" technique **[3]**
45/20 • • • according to the "fluidised bed" technique **[3]**
45/22 • • with hydrogen dissolved or suspended in the oil **[3]**
45/24 • • with hydrogen-generating compounds **[3]**
45/26 • • • Steam or water **[3]**
45/28 • • • Organic compounds; Autofining **[3]**
45/30 • • • • characterised by the catalyst used **[3]**
45/32 • Selective hydrogenation of the diolefin or acetylene compounds **[3]**
45/34 • • characterised by the catalyst used **[3]**
45/36 • • • containing nickel or cobalt metal, or compounds thereof **[3]**
45/38 • • • • in combination with chromium, molybdenum or tungsten metals, or compounds thereof **[3]**
45/40 • • • containing platinum group metals or compounds thereof **[3]**
45/42 • • with moving solid particles **[3]**
45/44 • Hydrogenation of the aromatic hydrocarbons **[3]**
45/46 • • characterised by the catalyst used **[3]**
45/48 • • • containing nickel or cobalt metal, or compounds thereof **[3]**
45/50 • • • • in combination with chromium, molybdenum or tungsten metal, or compounds thereof **[3]**
45/52 • • • containing platinum group metals or compounds thereof **[3]**
45/54 • • • containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
45/56 • • with moving solid particles **[3]**
45/58 • to change the structural skeleton of some of the hydrocarbon content without cracking the other hydrocarbons present, e.g. lowering pour point; Selective hydrocracking of normal paraffins (C10G 32/00 takes precedence; improving or increasing the octane number or aromatic content of naphtha C10G 35/00) **[3]**
45/60 • • characterised by the catalyst used **[3]**
45/62 • • • containing platinum group metals or compounds thereof **[3]**
45/64 • • • containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
45/66 • • with moving solid particles **[3]**

45/68 • • Aromatisation of hydrocarbon oil fractions **[3]**
45/70 • • • with catalysts containing platinum group metals or compounds thereof **[3]**
45/72 • Controlling or regulating **[3]**

47/00 Cracking of hydrocarbon oils, in the presence of hydrogen or hydrogen-generating compounds, to obtain lower boiling fractions (C10G 15/00 takes precedence; destructive hydrogenation of non-melting solid carbonaceous or similar materials C10G 1/06) **[3]**
47/02 • characterised by the catalyst used **[3]**
47/04 • • Oxides **[3]**
47/06 • • Sulfides **[3]**
47/08 • • Halides **[3]**
47/10 • • with catalysts deposited on a carrier **[3]**
47/12 • • • Inorganic carriers **[3]**
47/14 • • • • the catalyst containing platinum group metals or compounds thereof **[3]**
47/16 • • • • Crystalline alumino-silicate carriers **[3]**
47/18 • • • • • the catalyst containing platinum group metals or compounds thereof **[3]**
47/20 • • • • • the catalyst containing other metals or compounds thereof **[3]**
47/22 • Non-catalytic cracking in the presence of hydrogen **[3]**
47/24 • with moving solid particles **[3]**
47/26 • • suspended in the oil, e.g. slurries **[3]**
47/28 • • according to the "moving bed" technique **[3]**
47/30 • • according to the "fluidised bed" technique **[3]**
47/32 • in the presence of hydrogen-generating compounds **[3]**
47/34 • • Organic compounds, e.g. hydrogenated hydrocarbons **[3]**
47/36 • Controlling or regulating **[3]**

49/00 Treatment of hydrocarbon oils, in the presence of hydrogen or hydrogen-generating compounds, not provided for in a single one of groups C10G 45/02, C10G 45/32, C10G 45/44, C10G 45/58, or C10G 47/00 [3]
49/02 • characterised by the catalyst used **[3]**
49/04 • • containing nickel, cobalt, chromium, molybdenum, or tungsten metals, or compounds thereof **[3]**
49/06 • • containing platinum group metals or compounds thereof **[3]**
49/08 • • containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
49/10 • with moving solid particles **[3]**
49/12 • • suspended in the oil, e.g. slurries **[3]**
49/14 • • according to the "moving bed" technique **[3]**
49/16 • • according to the "fluidised bed" technique **[3]**
49/18 • in the presence of hydrogen-generating compounds, e.g. ammonia, water, hydrogen sulfide **[3]**
49/20 • • Organic compounds **[3]**
49/22 • Separation of effluents **[3]**
49/24 • Starting-up hydrotreatment operations **[3]**
49/26 • Controlling or regulating **[3]**

50/00 Production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation [6]
50/02 • of hydrocarbon oils for lubricating purposes **[6]**

Multi-step processes

Note(s)

Groups C10G 51/00-C10G 69/00cover only those combined treating operations where the interest is directed to the relationship between the steps.

51/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by two or more cracking processes only [3]
51/02 • plural serial stages only **[3]**
51/04 • • including only thermal and catalytic cracking steps **[3]**
51/06 • plural parallel stages only **[3]**

53/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by two or more refining processes [3]
53/02 • plural serial stages only **[3]**
53/04 • • including at least one extraction step **[3]**
53/06 • • • including only extraction steps, e.g. deasphalting by solvent treatment followed by extraction of aromatics **[3]**
53/08 • • including at least one sorption step **[3]**
53/10 • • including at least one acid-treatment step **[3]**
53/12 • • including at least one alkaline-treatment step **[3]**
53/14 • • including at least one oxidation step **[3]**
53/16 • plural parallel stages only **[3]**

55/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by at least one refining process and at least one cracking process [3]
55/02 • plural serial stages only **[3]**
55/04 • • including at least one thermal cracking step **[3]**
55/06 • • including at least one catalytic cracking step **[3]**
55/08 • plural parallel stages only **[3]**

57/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by at least one cracking process or refining process and at least one other conversion process [3]
57/02 • with polymerisation **[3]**

59/00 Treatment of naphtha by two or more reforming processes only or by at least one reforming process and at least one process which does not substantially change the boiling range of the naphtha [3]
59/02 • plural serial stages only **[3]**
59/04 • • including at least one catalytic and at least one non-catalytic reforming step **[3]**
59/06 • plural parallel stages only **[3]**

61/00 Treatment of naphtha by at least one reforming process and at least one process of refining in the absence of hydrogen [3]
61/02 • plural serial stages only **[3]**
61/04 • • the refining step being an extraction **[3]**
61/06 • • the refining step being a sorption process **[3]**
61/08 • plural parallel stages only **[3]**
61/10 • processes also including other conversion steps **[3]**

63/00 Treatment of naphtha by at least one reforming process and at least one other conversion process (C10G 59/00, C10G 61/00 take precedence) **[3]**
63/02 • plural serial stages only **[3]**
63/04 • • including at least one cracking step **[3]**
63/06 • plural parallel stages only **[3]**
63/08 • • including at least one cracking step **[3]**

65/00 Treatment of hydrocarbon oils by two or more hydrotreatment processes only [3]
65/02 • plural serial stages only **[3]**
65/04 • • including only refining steps **[3]**
65/06 • • • at least one step being a selective hydrogenation of the diolefins **[3]**
65/08 • • • at least one step being a hydrogenation of the aromatic hydrocarbons **[3]**
65/10 • • including only cracking steps **[3]**
65/12 • • including cracking steps and other hydrotreatment steps **[3]**
65/14 • plural parallel stages only **[3]**
65/16 • • including only refining steps **[3]**
65/18 • • including only cracking steps **[3]**

67/00 Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one process for refining in the absence of hydrogen only [3]
67/02 • plural serial stages only **[3]**
67/04 • • including solvent extraction as the refining step in the absence of hydrogen **[3]**
67/06 • • including a sorption process as the refining step in the absence of hydrogen **[3]**
67/08 • • including acid treatment as the refining step in the absence of hydrogen **[3]**
67/10 • • including alkaline treatment as the refining step in the absence of hydrogen **[3]**
67/12 • • including oxidation as the refining step in the absence of hydrogen **[3]**
67/14 • • including at least two different refining steps in the absence of hydrogen **[3]**
67/16 • plural parallel stages only **[3]**

69/00 Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one other conversion process (C10G 67/00 takes precedence) **[3]**
69/02 • plural serial stages only **[3]**
69/04 • • including at least one step of catalytic cracking in the absence of hydrogen **[3]**
69/06 • • including at least one step of thermal cracking in the absence of hydrogen **[3]**
69/08 • • including at least one step of reforming naphtha **[3]**
69/10 • • • hydrocracking of higher boiling fractions into naphtha and reforming the naphtha obtained **[3]**
69/12 • • including at least one polymerisation or alkylation step **[3]**
69/14 • plural parallel stages only **[3]**

70/00 Working-up undefined normally gaseous mixtures obtained by processes covered by groups C10G 9/00, C10G 11/00, C10G 15/00, C10G 47/00, C10G 51/00 [5]

70/02 • by hydrogenation **[5]**
70/04 • by physical processes **[5]**
70/06 • • by gas-liquid contact **[5]**

71/00 Treatment by methods not otherwise provided for of hydrocarbon oils or fatty oils for lubricating purposes [3]
71/02 • Thickening by voltolising (chemical modification of drying-oils by voltolising C09F 7/04) **[3]**

73/00 Recovery or refining of mineral waxes, e.g. montan wax (compositions essentially based on waxes C08L 91/00) **[3]**
73/02 • Recovery of petroleum waxes from hydrocarbon oils; De-waxing of hydrocarbon oils **[3]**
73/04 • • with the use of filter aids **[3]**
73/06 • • with the use of solvents **[3]**
73/08 • • • Organic compounds **[3]**
73/10 • • • • Hydrocarbons **[3]**
73/12 • • • • Oxygen-containing compounds **[3]**
73/14 • • • • Halogen-containing compounds **[3]**
73/16 • • • • Nitrogen-containing compounds **[3]**
73/18 • • • • containing sulfur, selenium or tellurium **[3]**
73/20 • • • • containing phosphorus **[3]**
73/22 • • • • Mixtures of organic compounds **[3]**
73/23 • • • Recovery of used solvents **[6]**
73/24 • • by formation of adducts **[3]**
73/26 • • by flotation **[3]**
73/28 • • by centrifugal force **[3]**
73/30 • • with electric means **[3]**
73/32 • • Methods of cooling during de-waxing **[3]**
73/34 • • Controlling or regulating **[3]**
73/36 • Recovery of petroleum waxes from other compositions containing oil in minor proportions, from concentrates or from residues; De-oiling, sweating **[3]**
73/38 • Chemical modification of petroleum waxes **[3]**
73/40 • Physical treatment of waxes or modified waxes, e.g. granulation, dispersion, emulsion, irradiation **[3]**
73/42 • Refining of petroleum waxes **[3]**
73/44 • • in the presence of hydrogen or hydrogen-generating compounds **[3]**

75/00 Inhibiting corrosion or fouling in apparatus for treatment or conversion of hydrocarbon oils, in general (C10G 7/10, C10G 9/16 take precedence) **[6]**
75/02 • by addition of corrosion inhibitors **[6]**
75/04 • by addition of antifouling agents **[6]**

99/00 Subject matter not provided for in other groups of this subclass [2006.01]

C10H PRODUCTION OF ACETYLENE BY WET METHODS [5]

Subclass index

GENERATORS
With non-automatic water feed.....1/00
With automatic water feed.....3/00, 5/00
Kipp's or Dobereiner's type.....7/00, 9/00
Other types.....11/00-19/00
Details.....21/00

1/00 Acetylene gas generators with dropwise, gravity, non-automatic water feed

1/02 • Valves
1/04 • • Screw valves
1/06 • • Cocks
1/08 • Other means for controlling the water feed
1/10 • Water feed from above through a central or lateral pipe
1/12 • Water feed from above through porous materials

3/00 Acetylene gas generators with automatic water feed regulation by means independent of the gas-holder

3/02 • with membranes
3/04 • with floats
3/06 • with pistons

5/00 Acetylene gas generators with automatic water feed regulation by the gas-holder

5/02 • with overflow for the water
5/04 • by drop-by-drop water valves connected with the gas-holder
5/06 • • by drop-by-drop water cocks connected with the gas-holder
5/08 • with gas-holder-connected water valves or cocks according to the submersion system

7/00 Acetylene gas generators with water feed by Kipp's principle

7/02 • with water feed from below
7/04 • with water feed from above

9/00 Acetylene gas generators according to Dobereiner's principle with fixed carbide bell

9/02 • with water feed from below through porous materials (by capillary feed)
9/04 • with gas cock actuated by the gas-holder
9/06 • with the depth of the gas outlet pipe regulated by the gas-holder
9/08 • with movable gas-holder
9/10 • by wetting the carbide only at the bottom

11/00 Acetylene gas generators with submersion of the carbide in water

11/02 • inside the gas-holder
11/04 • with sealing and reaction water separated from each other

13/00 Acetylene gas generators with combined dipping and drop-by-drop system

15/00 Acetylene gas generators with carbide feed, with or without regulation by the gas pressure

15/02 • with non-automatic carbide feed
15/04 • • Closure means at the filling-hopper
15/06 • with automatic carbide feed by valves
15/08 • • by flap or slide valves
15/10 • • by float valves
15/12 • • by measuring valves, including pocket-wheels
15/14 • with feed worm or feed conveyors
15/16 • with feed drums
15/18 • with movable feed disc and fixed carbide-receptacle
15/20 • with carbide feed by cartridges or other packets
15/22 • with carbide feed of pulverous carbide from receptacles or through the gas-holder
15/24 • with carbide feed by pistons

17/00 High-pressure acetylene gas generators

19/00 Other acetylene gas generators

19/02 • Rotary carbide receptacles

21/00 Details of acetylene generators; Accessory equipment for, or features of, the wet production of acetylene

21/02 • Packages of carbide for use in generators, e.g. cartridges
21/04 • • Placing packages in the generator
21/06 • • • Opening devices for packages in the generator
21/08 • Safety devices for acetylene generators
21/10 • Carbide compositions
21/12 • Gas-tight sealing means, e.g. liquid seals in generators
21/14 • Ventilation means; Cooling devices
21/16 • Removing sludge from generators

C10J PRODUCTION OF GASES CONTAINING CARBON MONOXIDE AND HYDROGEN FROM SOLID CARBONACEOUS MATERIALS BY PARTIAL OXIDATION PROCESSES INVOLVING OXYGEN OR STEAM (underground gasification of minerals E21B 43/295); CARBURETTING AIR OR OTHER GASES [5]

1/00 Production of fuel gases by carburetting air or other gases (for internal-combustion engines F02M)

1/02 • Carburetting air
1/04 • • Controlling supply of air
1/06 • • with materials which are liquid at ordinary temperatures
1/08 • • • by passage of air through or over the surface of the liquid
1/10 • • • • with the liquid absorbed on carriers
1/12 • • • by atomisation of the liquid
1/14 • • • Controlling the supply of liquid in accordance with the air supply
1/16 • • with solid hydrocarbons (C10J 1/207, C10J 1/213 take precedence)
1/18 • • in rotary carburettors
1/20 • Carburetting gases other than air
1/207 • Carburetting by pyrolysis of solid carbonaceous material in a fuel bed (C10J 3/66 takes precedence) **[2012.01]**
1/213 • Carburetting by pyrolysis of solid carbonaceous material in a carburettor **[2012.01]**
1/22 • Adding materials to prevent vapour deposition
1/24 • Controlling humidity of the air or gas to be carburetted
1/26 • using raised temperatures or pressures (C10J 1/207, C10J 1/213 take precedence)
1/28 • Odorising air gas

3/00 Production of gases containing carbon monoxide and hydrogen, e.g. synthesis gas or town gas, from solid carbonaceous materials by partial oxidation processes involving oxygen or steam

3/02 • Fixed-bed gasification of lump fuel
3/04 • • Cyclic processes, e.g. alternate blast and run
3/06 • • Continuous processes
3/08 • • • with ash-removal in liquid state
3/10 • • • using external heating
3/12 • • • using solid heat-carriers
3/14 • • • using gaseous heat-carriers
3/16 • • • simultaneously reacting oxygen and water with the carbonaceous material
3/18 • • • using electricity
3/20 • • Apparatus; Plants
3/22 • • • Arrangements or dispositions of valves or flues
3/24 • • • • to permit flow of gases or vapours other than upwardly through the fuel bed
3/26 • • • • • downwardly
3/28 • • • • fully automatic
3/30 • • • Fuel charging devices
3/32 • • • Devices for distributing fuel evenly over the bed for stirring-up the fuel bed
3/34 • • • Grates; Mechanical ash-removing devices
3/36 • • • • Fixed grates
3/38 • • • • • with stirring beams
3/40 • • • • Movable grates
3/42 • • • • • Rotary grates
3/44 • • • adapted for use on vehicles
3/46 • Gasification of granular or pulverulent fuels in suspension
3/48 • • Apparatus; Plants
3/50 • • • Fuel charging devices
3/52 • • • Ash-removing devices
3/54 • • Gasification of granular or pulverulent fuels by the Winkler technique, i.e. by fluidisation
3/56 • • • Apparatus; Plants
3/57 • Gasification using molten salts or metals (C10J 3/02, C10J 3/46 take precedence) **[4]**
3/58 • combined with pre-distillation of the fuel
3/60 • • Processes
3/62 • • • with separate withdrawal of the distillation products
3/64 • • • with decomposition of the distillation products
3/66 • • • • by introducing them into the gasification zone
3/72 • Other features
3/74 • • Construction of shells or jackets
3/76 • • • Water jackets; Steam boiler jackets
3/78 • • High-pressure apparatus
3/80 • • with arrangements for preheating the blast or the water vapour
3/82 • • Gas withdrawal means
3/84 • • • with means for removing dust or tar from the gas
3/86 • • combined with waste-heat boilers

C10K PURIFYING OR MODIFYING THE CHEMICAL COMPOSITION OF COMBUSTIBLE GASES CONTAINING CARBON MONOXIDE

1/00 Purifying combustible gases containing carbon monoxide (isolation of hydrogen from mixtures containing hydrogen and carbon monoxide C01B 3/50)

1/02 • Dust removal
1/04 • by cooling to condense non-gaseous materials
1/06 • • combined with spraying with water
1/08 • by washing with liquids; Reviving the used wash liquors
1/10 • • with aqueous liquids
1/12 • • • alkaline-reacting
1/14 • • • • organic
1/16 • • with non-aqueous liquids
1/18 • • • hydrocarbon oils
1/20 • by treating with solids; Regenerating spent purifying masses
1/22 • • Apparatus, e.g. dry box purifiers
1/24 • • • Supporting means for the purifying material
1/26 • • Regeneration of the purifying material
1/28 • • Controlling the gas flow through the purifiers
1/30 • • with moving purifying masses
1/32 • with selectively absorptive solids, e.g. active carbon
1/34 • by catalytic conversion of impurities to more readily removable materials

3/00 Modifying the chemical composition of combustible gases containing carbon monoxide to produce an improved fuel, e.g. one of different calorific value, which may be free from carbon monoxide

3/02 • by catalytic treatment
3/04 • • reducing the carbon monoxide content
3/06 • by mixing with gases

C10L FUELS NOT OTHERWISE PROVIDED FOR; NATURAL GAS; SYNTHETIC NATURAL GAS OBTAINED BY PROCESSES NOT COVERED BY SUBCLASSES C10G OR C10K; LIQUEFIED PETROLEUM GAS; USE OF ADDITIVES TO FUELS OR FIRES; FIRE-LIGHTERS **[5]**

1/00 Liquid carbonaceous fuels

1/02 • essentially based on components consisting of carbon, hydrogen, and oxygen only
1/04 • essentially based on blends of hydrocarbons
1/06 • • for spark ignition
1/08 • • for compression ignition
1/10 • containing additives

Note(s)

1. In groups C10L 1/12-C10L 1/14, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.
2. If an additive is a mixture of compounds, classification is made for each compound of interest.

3. A metal salt or an ammonium salt of a compound is classified as that compound, e.g. a chromium sulfonate is classified as a sulfonate in group C10L 1/24 and not in group C10L 1/30.

1/12 • • Inorganic compounds
1/14 • • Organic compounds
1/16 • • • Hydrocarbons
1/18 • • • containing oxygen
1/182 • • • • containing hydroxy groups; Salts thereof **[2006.01]**
1/183 • • • • • at least one hydroxy group bound to an aromatic carbon atom **[2006.01]**
1/185 • • • • Ethers; Acetals; Ketals; Aldehydes; Ketones **[2006.01]**
1/188 • • • • Carboxylic acids; Salts thereof **[2006.01]**
1/189 • • • • • having at least one carboxyl group bound to an aromatic carbon atom **[2006.01]**
1/19 • • • • Esters **[2006.01]**
1/192 • • • • Macromolecular compounds **[2006.01]**
1/195 • • • • • obtained by reactions involving only carbon-to-carbon unsaturated bonds **[2006.01]**
1/196 • • • • • • derived from monomers containing a carbon-to-carbon unsaturated bond and a carboxyl group or salts, anhydrides or esters thereof **[2006.01]**
1/197 • • • • • • derived from monomers containing a carbon-to-carbon unsaturated bond and an acyloxy group of a saturated carboxylic or carbonic acid **[2006.01]**
1/198 • • • • • obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds **[2006.01]**
1/20 • • • containing halogen
1/22 • • • containing nitrogen
1/222 • • • • containing at least one carbon-to-nitrogen single bond **[2006.01]**
1/223 • • • • • having at least one amino group bound to an aromatic carbon atom **[2006.01]**
1/224 • • • • • Amides; Imides **[2006.01]**
1/226 • • • • containing at least one nitrogen-to-nitrogen bond, e.g. azo compounds, azides, hydrazines **[2006.01]**
1/228 • • • • containing at least one carbon-to-nitrogen double bond, e.g. guanidines, hydrazones, semicarbazones, imines; containing at least one carbon-to-nitrogen triple bond, e.g. nitriles **[2006.01]**
1/23 • • • • containing at least one nitrogen-to-oxygen bond, e.g. nitro-compounds, nitrates, nitrites **[2006.01]**
1/232 • • • • containing nitrogen in a heterocyclic ring **[2006.01]**
1/233 • • • • • containing nitrogen and oxygen in the ring, e.g. oxazoles **[2006.01]**
1/234 • • • • Macromolecular compounds **[2006.01]**
1/236 • • • • • obtained by reactions involving only carbon-to-carbon unsaturated bonds **[2006.01]**
1/238 • • • • • obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds **[2006.01]**
1/2383 • • • • • • Polyamines or polyimines, or derivatives thereof **[2006.01]**
1/2387 • • • • • • • Polyoxyalkyleneamines **[2006.01]**
1/24 • • • containing sulfur, selenium or tellurium
1/26 • • • containing phosphorus
1/28 • • • containing silicon
1/30 • • • containing elements not mentioned in groups C10L 1/16-C10L 1/28
1/32 • consisting of coal-oil suspensions or aqueous emulsions

3/00 Gaseous fuels; Natural gas; Synthetic natural gas obtained by processes not covered by subclasses C10G, C10K; Liquefied petroleum gas [5]
3/02 • Compositions containing acetylene
3/04 • • Absorbing compositions, e.g. solvents
3/06 • Natural gas; Synthetic natural gas obtained by processes not covered by C10G, C10K 3/02 or C10K 3/04 **[5]**
3/08 • • Production of synthetic natural gas **[5]**
3/10 • • Working-up natural gas or synthetic natural gas **[5]**
3/12 • Liquefied petroleum gas **[5]**

5/00 Solid fuels (produced by solidifying fluid fuels C10L 7/00; peat briquettes C10F 7/06)
5/02 • Briquettes consisting mainly of carbonaceous materials of mineral origin (peat briquettes C10F)
5/04 • • Raw material to be used; Pretreatment thereof
5/06 • • Briquetting processes
5/08 • • • without the aid of extraneous binders
5/10 • • • with the aid of binders, e.g. pretreated binders
5/12 • • • • with inorganic binders
5/14 • • • • with organic binders
5/16 • • • • • with bituminous binders, e.g. tar, pitch
5/18 • • • • • with naphthalene
5/20 • • • • • with sulfite lye
5/22 • • • • Methods of applying the binder to the other compounding ingredients; Apparatus therefor
5/24 • • Combating dust during briquetting; Safety devices against explosion
5/26 • • After-treatment of the briquettes
5/28 • • • Heating the briquettes; Coking the binders
5/30 • • • Cooling the briquettes
5/32 • • • Coating
5/34 • • Other details of the briquettes
5/36 • • • Shape
5/38 • • • • Briquettes consisting of different layers
5/40 • essentially based on materials of non-mineral origin
5/42 • • on animal substances or products obtained therefrom
5/44 • • on vegetable substances
5/46 • • on sewage, house, or town refuse
5/48 • • on industrial residues or waste materials (C10L 5/42, C10L 5/44 take precedence) **[4]**

7/00 Fuels produced by solidifying fluid fuels
7/02 • liquid fuels
7/04 • • alcohol

8/00 Fuels not provided for in other groups of this subclass [2006.01]

9/00 Treating solid fuels to improve their combustion
9/02 • by chemical means
9/04 • • by hydrogenating
9/06 • • by oxidation
9/08 • by heat treatment, e.g. calcining
9/10 • by using additives
9/12 • • Oxidation means, e.g. oxygen-generating compounds

10/00 **Use of additives to fuels or fires for particular purposes** (using binders for briquetting solid fuels C10L 5/10; using additives to improve the combustion of solid fuels C10L 9/10) **[1, 2006.01]**

10/02 • for reducing smoke development

10/04 • for minimising corrosion or incrustation

10/06 • for facilitating soot removal

10/08 • for improving lubricity; for reducing wear **[2006.01]**

10/10 • for improving the octane number **[2006.01]**

10/12 • for improving the cetane number **[2006.01]**

10/14 • for improving low temperature properties **[2006.01]**

10/16 • • Pour-point depressants **[2006.01]**

10/18 • use of detergents or dispersants for purposes not provided for in groups C10L 10/02-C10L 10/16 **[2006.01]**

11/00 **Fire-lighters**

11/02 • based on refractory porous bodies

11/04 • consisting of combustible material (matches C06F)

11/06 • of a special shape

11/08 • Apparatus for the manufacture thereof

C10M **LUBRICATING COMPOSITIONS** (well drilling compositions C09K 8/02)**; USE OF CHEMICAL SUBSTANCES EITHER ALONE OR AS LUBRICATING INGREDIENTS IN A LUBRICATING COMPOSITION** (mould release, i.e. separating, agents for metals B22C 3/00, for plastics or substances in a plastic state, in general B29C 33/56, for glass C03B 40/02; textile lubricating compositions D06M 11/00, D06M 13/00, D06M 15/00; immersion oils for microscopy G02B 21/33) **[4]**

Note(s)

1. In this subclass, the following terms or expressions are used with the meanings indicated:
   - "lubricant" or "lubricating composition" includes cutting oils, hydraulic fluids, metal drawing compositions, flushing oils, slushing oils, or the like;
   - "aliphatic" includes "cycloaliphatic".
2. In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. Thus, a compound having an aromatic ring is classified as aromatic regardless of whether the substituent(s) of interest are on the ring or on an aliphatic part of the molecule.
3. In this subclass:
   a. metal or ammonium salts of a compound are classified as that compound;
   b. salts or adducts formed between two or more organic compounds are classified according to all compounds forming the salt or adduct, if of interest;
   c. a specified compound, e.g. phenols, acids, substituted by a macromolecular hydrocarbon radical is classified as that compound;
   d. base-materials or thickeners or additives consisting of a mixture for which no specific main group is provided are classified in the most indented group covering all essential constituents of the mixture, for example,
      - a base-material mixture of ketone and amide group C10M 105/00;
      - a base-material mixture of ketone and ether group C10M 105/08;
      - an additive mixture of long and short chain esters group C10M 129/00;
      - an additive mixture of short chain aliphatic and aromatic carboxylic acids group C10M 129/26;
   e. except for aqueous lubricating compositions containing more than 10% water, which are classified separately, classification is made according to the type of ingredient or mixture of types of ingredient (base-material, thickener or additive) which characterises the composition.
      Attention is drawn to the fact that a mixture of essential ingredients characterised by only one of its components, rather than by the mixture as a whole, is not classified as a mixture, e.g., a lubricating composition consisting of:
      - a known base-material and a new additive is classified only in the "additive" part of the classification scheme;
      - a known base-material with both a thickener and a further additive as essential ingredients, which may be individually known or not, is classified as a mixture of thickener and additive;
      - a known base-material with a combination of additives as essential ingredients, which may be individually known or not, is classified in the appropriate place for the additive mixture.
4. Any part of a composition which is not identified by the classification according to Notes (2) or (3) above, and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place. The part can be either a single ingredient or a composition in itself.
5. Any part of a composition which is not identified by the classification according to Notes (2) to (4) above, and which is considered to represent information of interest for search, may also be classified in the last appropriate place. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information".
6. In this subclass, it is desirable to add the indexing codes of subclass C10N.

Subclass index

BASE-MATERIALS
Mineral or fatty oils....101/00
Inorganic materials....103/00
Non-macromolecular organic compounds....105/00
Macromolecular compounds....107/00
Compounds of unknown or incompletely defined constitution....109/00
Mixtures....111/00, 169/00
THICKENERS
Inorganic materials....113/00
Non-macromolecular organic compounds....115/00, 117/00
Macromolecular compounds....119/00

Compounds of unknown or incompletely defined constitution....121/00
Mixtures....123/00, 169/00
ADDITIVES
Inorganic materials....125/00
Non-macromolecular organic compounds....127/00-139/00
Macromolecular compounds....143/00-155/00
Compounds of unknown or incompletely defined constitution....159/00
Mixtures....141/00, 157/00, 161/00-169/00
COMPOSITIONS CHARACTERISED BY PHYSICAL PROPERTIES....171/00
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PREPARATION OR AFTER TREATMENT....177/00

Base-materials [4]

101/00 **Lubricating compositions characterised by the base-material being a mineral or fatty oil** (containing more than 10% water C10M 173/00) **[4]**
101/02 • Petroleum fractions **[4]**
101/04 • Fatty oil fractions **[4]**

103/00 **Lubricating compositions characterised by the base-material being an inorganic material** (containing more than 10% water C10M 173/00) **[4]**
103/02 • Carbon; Graphite **[4]**
103/04 • Metals; Alloys **[4]**
103/06 • Metal compounds **[4]**

105/00 **Lubricating compositions characterised by the base-material being a non-macromolecular organic compound [4]**
105/02 • Well-defined hydrocarbons (petroleum fractions C10M 101/02) **[4]**
105/04 • • aliphatic **[4]**
105/06 • • aromatic **[4]**
105/08 • containing oxygen **[4]**
105/10 • • having hydroxy groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
105/12 • • • monohydroxy **[4]**
105/14 • • • polyhydroxy **[4]**
105/16 • • having hydroxy groups bound to a carbon atom of a six-membered aromatic ring **[4]**
105/18 • • Ethers, e.g. epoxides **[4]**
105/20 • • Aldehydes; Ketones **[4]**
105/22 • • Carboxylic acids or their salts **[4]**
105/24 • • • having only one carboxyl group bound to an acyclic carbon atom, cycloaliphatic carbon atom or hydrogen **[4]**
105/26 • • • having more than one carboxyl group bound to an acyclic carbon atom or cycloaliphatic carbon atom **[4]**
105/28 • • • having only one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**
105/30 • • • having more than one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**
105/32 • • Esters **[4]**
105/34 • • • of monocarboxylic acids **[4]**
105/36 • • • of polycarboxylic acids **[4]**
105/38 • • • of polyhydroxy compounds **[4]**
105/40 • • • containing free hydroxy or carboxyl groups **[4]**
105/42 • • • Complex esters, i.e. compounds containing at least three esterified carboxyl groups and derived from the combination of at least three different types of the following five types of compound: monohydroxy compounds, polyhydroxy compounds, monocarboxylic acids, polycarboxylic acids and hydroxy carboxylic acids **[4]**
105/44 • • • • derived from the combination of monocarboxylic acids, dicarboxylic acids and dihydroxy compounds only and having no free hydroxy or carboxyl groups **[4]**
105/46 • • • • derived from the combination of monohydroxy compounds, dihydroxy compounds and dicarboxylic acids only and having no free hydroxy or carboxyl groups **[4]**
105/48 • • • of carbonic acid **[4]**
105/50 • containing halogen **[4]**
105/52 • • containing carbon, hydrogen and halogen only **[4]**
105/54 • • containing carbon, hydrogen, halogen and oxygen **[4]**
105/56 • containing nitrogen **[4]**
105/58 • • Amines, e.g. polyalkylene polyamines, quaternary amines (polyalkylene polyamines with eleven or more monomer units C10M 107/44) **[4]**
105/60 • • • having amino groups bound to an acyclic or cycloaliphatic carbon atom **[4]**
105/62 • • • • containing hydroxy groups **[4]**
105/64 • • • having amino groups bound to a carbon atom of a six-membered aromatic ring **[4]**
105/66 • • • • containing hydroxy groups **[4]**
105/68 • • Amides; Imides **[4]**
105/70 • • as ring hetero atom **[4]**
105/72 • containing sulfur, selenium or tellurium **[4]**
105/74 • containing phosphorus **[4]**
105/76 • containing silicon **[4]**
105/78 • containing boron **[4]**
105/80 • containing atoms of elements not provided for in groups C10M 105/02-C10M 105/78 **[4]**

107/00 **Lubricating compositions characterised by the base-material being a macromolecular compound [4]**
107/02 • Hydrocarbon polymers; Hydrocarbon polymers modified by oxidation **[4]**
107/04 • • Polyethene **[4]**
107/06 • • containing propene **[4]**
107/08 • • containing butene **[4]**
107/10 • • containing aliphatic monomer having more than 4 carbon atoms **[4]**
107/12 • • containing aromatic monomer, e.g. styrene **[4]**

107/14 • • containing conjugated diene **[4]**
107/16 • • containing non-conjugated diene **[4]**
107/18 • • Hydrocarbon polymers modified by oxidation **[4]**
107/20 • containing oxygen (C10M 107/18 takes precedence) **[4]**
107/22 • • Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/24 • • • containing monomers having an unsaturated radical bound to an alcohol, aldehydo, ketonic, ether, ketal or acetal radical **[4]**
107/26 • • • containing monomers having an unsaturated radical bound to an acyloxy radical of a saturated carboxylic or carbonic acid **[4]**
107/28 • • • containing monomers having an unsaturated radical bound to a carboxyl radical, e.g. acrylate **[4]**
107/30 • • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/32 • • • Condensation polymers of aldehydes or ketones; Polyesters; Polyethers **[4]**
107/34 • • • • Polyoxyalkylenes **[4]**
107/36 • • Polysaccharides, e.g. cellulose **[4]**
107/38 • containing halogen **[4]**
107/40 • containing nitrogen **[4]**
107/42 • • Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/44 • • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/46 • containing sulfur **[4]**
107/48 • containing phosphorus **[4]**
107/50 • containing silicon **[4]**
107/52 • containing boron **[4]**
107/54 • containing atoms of elements not provided for in groups C10M 107/02-C10M 107/52 **[4]**

109/00 Lubricating compositions characterised by the base-material being a compound of unknown or incompletely defined constitution (C10M 101/00 takes precedence) **[4]**

109/02 • Reaction products **[4]**

Note(s) [2006.01]

When classifying in this group, any reactant of a reaction product which is considered to represent information of interest for search, may also be classified in the last appropriate place in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information".

111/00 Lubricating compositions characterised by the base-material being a mixture of two or more compounds covered by more than one of the main groups C10M 101/00-C10M 109/00, each of these compounds being essential [4]

111/02 • at least one of them being a non-macromolecular organic compound **[4]**
111/04 • at least one of them being a macromolecular organic compound **[4]**
111/06 • at least one of them being a compound of the type covered by group C10M 109/00 **[4]**

Thickeners [4]

Note(s)

In groups C10M 113/00-C10M 123/00, the following term is used with the meaning indicated:

- "thickener" is an agent which solidifies other liquid components to form a grease (solid lubricants consisting of solid components C10M 101/00-C10M 111/00).

113/00 Lubricating compositions characterised by the thickener being an inorganic material [4]

113/02 • Carbon; Graphite **[4]**
113/04 • Sulfur **[4]**
113/06 • Metals; Alloys **[4]**
113/08 • Metal compounds **[4]**
113/10 • Clays; Micas **[4]**
113/12 • Silica **[4]**
113/14 • Glass **[4]**
113/16 • Inorganic material treated with organic compounds, e.g. coated **[4]**

115/00 Lubricating compositions characterised by the thickener being a non-macromolecular organic compound other than a carboxylic acid or salt thereof [4]

115/02 • Hydrocarbons (petroleum fractions C10M 121/02) **[4]**
115/04 • containing oxygen **[4]**
115/06 • containing halogen **[4]**
115/08 • containing nitrogen **[4]**
115/10 • containing sulfur **[4]**
115/12 • containing phosphorus **[4]**

117/00 Lubricating compositions characterised by the thickener being a non-macromolecular carboxylic acid or salt thereof [4]

117/02 • having only one carboxyl group bound to an acyclic carbon atom, cycloaliphatic carbon atom or hydrogen **[4]**
117/04 • • containing hydroxy groups **[4]**
117/06 • having more than one carboxyl group bound to an acyclic carbon atom or cycloaliphatic carbon atom **[4]**
117/08 • having only one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**
117/10 • having more than one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**

119/00 Lubricating compositions characterised by the thickener being a macromolecular compound [4]

119/02 • Hydrocarbons polymers; Hydrocarbon polymers modified by oxidation **[4]**
119/04 • containing oxygen (hydrocarbon polymers modified by oxidation C10M 119/02) **[4]**
119/06 • • Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
119/08 • • • containing monomers having an unsaturated radical bound to an alcohol, aldehydo, ketonic, ether, ketal or acetal radical **[4]**
119/10 • • • containing monomers having an unsaturated radical bound to an acyloxy radical of a saturated carboxylic or carbonic acid **[4]**
119/12 • • • containing monomers having an unsaturated radical bound to a carboxyl radical, e.g. acrylate **[4]**

119/14 • • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
119/16 • • • Condensation polymers of aldehydes or ketones; Polyesters; Polyethers **[4]**
119/18 • • • • Polyoxyalkylenes **[4]**
119/20 • • Polysaccharides, e.g. cellulose **[4]**
119/22 • containing halogen **[4]**
119/24 • containing nitrogen **[4]**
119/26 • containing sulfur **[4]**
119/28 • containing phosphorus **[4]**
119/30 • containing atoms of elements not provided for in groups C10M 119/02-C10M 119/28 **[4]**

121/00 Lubricating compositions characterised by the thickener being a compound of unknown or incompletely defined constitution [4]
121/02 • Petroleum fractions, e.g. tars **[4]**
121/04 • Reaction products **[4]**

Note(s) [2006.01]

When classifying in this group, any reactant of a reaction product which is considered to represent information of interest for search, may also be classified in the last appropriate place in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information".

123/00 Lubricating compositions characterised by the thickener being a mixture of two or more compounds covered by more than one of the main groups C10M 113/00-C10M 121/00, each of these compounds being essential (inorganic materials coated with organic compounds C10M 113/16) **[4]**
123/02 • at least one of them being a non-macromolecular compound **[4]**
123/04 • at least one of them being a macromolecular compound **[4]**
123/06 • at least one of them being a compound of the type covered by group C10M 121/00 **[4]**

Additives [4]

125/00 Lubricating compositions characterised by the additive being an inorganic material [4]
125/02 • Carbon; Graphite **[4]**
125/04 • Metals; Alloys **[4]**
125/06 • Sulfur **[4]**
125/08 • Metal carbides or hydrides **[4]**
125/10 • Metal oxides, hydroxides, carbonates or bicarbonates **[4]**
125/12 • Metal carbonyls **[4]**
125/14 • Water (aqueous lubricating compositions containing more than 10% water C10M 173/00) **[4]**
125/16 • Hydrogen peroxide; Oxygenated water **[4]**
125/18 • Compounds containing halogen **[4]**
125/20 • Compounds containing nitrogen **[4]**
125/22 • Compounds containing sulfur, selenium or tellurium **[4]**
125/24 • Compounds containing phosphorus, arsenic or antimony **[4]**
125/26 • Compounds containing silicon or boron, e.g. silica, sand **[4]**
125/28 • • Glass **[4]**
125/30 • • Clay **[4]**

127/00 Lubricating compositions characterised by the additive being a non-macromolecular hydrocarbon (petroleum fractions C10M 159/04) **[4]**
127/02 • well-defined aliphatic **[4]**
127/04 • well-defined aromatic **[4]**
127/06 • Alkylated aromatic hydrocarbons **[4]**

129/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing oxygen [4]
129/02 • having a carbon chain of less than 30 atoms **[4]**
129/04 • • Hydroxy compounds **[4]**
129/06 • • • having hydroxy groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
129/08 • • • • containing at least 2 hydroxy groups **[4]**
129/10 • • • having hydroxy groups bound to a carbon atom of a six-membered aromatic ring **[4]**
129/12 • • • • with condensed rings **[4]**
129/14 • • • • containing at least 2 hydroxy groups **[4]**
129/16 • • Ethers **[4]**
129/18 • • • Epoxides **[4]**
129/20 • • • Cyclic ethers having 4 or more ring atoms, e.g. furans, dioxolanes **[4]**
129/22 • • Peroxides; Ozonides **[4]**
129/24 • • Aldehydes; Ketones **[4]**
129/26 • • Carboxylic acids; Salts thereof **[4]**
129/28 • • • having carboxyl groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
129/30 • • • • having 7 or less carbon atoms **[4]**
129/32 • • • • • • monocarboxylic **[4]**
129/34 • • • • • • polycarboxylic **[4]**
129/36 • • • • • • containing hydroxy groups **[4]**
129/38 • • • • having 8 or more carbon atoms **[4]**
129/40 • • • • • • monocarboxylic **[4]**
129/42 • • • • • • polycarboxylic **[4]**
129/44 • • • • • • containing hydroxy groups **[4]**
129/46 • • • • cycloaliphatic **[4]**
129/48 • • • having carboxyl groups bound to a carbon atom of a six-membered aromatic ring **[4]**
129/50 • • • • monocarboxylic **[4]**
129/52 • • • • polycarboxylic **[4]**
129/54 • • • • containing hydroxy groups **[4]**
129/56 • • • Acids of unknown or incompletely defined constitution **[4]**
129/58 • • • • Naphthenic acids **[4]**
129/60 • • • • Tall oil acids **[4]**
129/62 • • • • Rosin acids **[4]**
129/64 • • • Acids obtained from polymerised unsaturated acids **[4]**
129/66 • • Epoxidised acids or esters **[4]**
129/68 • • Esters (epoxidised C10M 129/66) **[4]**
129/70 • • • of monocarboxylic acids **[4]**
129/72 • • • of polycarboxylic acids **[4]**
129/74 • • • of polyhydroxy compounds **[4]**
129/76 • • • containing free hydroxy or carboxyl groups **[4]**
129/78 • • • Complex esters, i.e. compounds containing at least three esterified carboxyl groups and derived from the combination of at least three different types of the following five types of compound: monohydroxy compounds, polyhydroxy compounds, monocarboxylic acids, polycarboxylic acids, hydroxy carboxylic acids **[4]**

129/80 • • • • derived from the combination of monocarboxylic acids, dicarboxylic acids and dihydroxy compounds only and having no free hydroxy or carboxyl groups **[4]**
129/82 • • • • derived from the combination of monohydroxy compounds, dihydroxy compounds and dicarboxylic acids only and having no free hydroxy or carboxyl groups **[4]**
129/84 • • • of carbonic acid **[4]**
129/86 • having a carbon chain of 30 or more atoms **[4]**
129/88 • • Hydroxy compounds **[4]**
129/90 • • • having hydroxy groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
129/91 • • • having hydroxy groups bound to a carbon atom of a six-membered aromatic ring **[4]**
129/92 • • Carboxylic acids **[4]**
129/93 • • • having carboxyl groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
129/94 • • • having carboxyl groups bound to a carbon atom of a six-membered aromatic ring **[4]**
129/95 • • Esters **[4]**

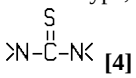
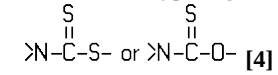
131/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing halogen [4]

131/02 • containing carbon, hydrogen and halogen only **[4]**
131/04 • • aliphatic **[4]**
131/06 • • aromatic **[4]**
131/08 • containing carbon, hydrogen, halogen and oxygen **[4]**
131/10 • • Alcohols; Ethers; Aldehydes; Ketones **[4]**
131/12 • • Acids; Salts or esters thereof **[4]**
131/14 • Halogenated waxes **[4]**

133/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing nitrogen [4]

133/02 • having a carbon chain of less than 30 atoms **[4]**
133/04 • • Amines, e.g. polyalkylene polyamines; Quaternary amines (polyalkylene polyamines with eleven or more monomer units C10M 149/22) **[4]**
133/06 • • • having amino groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
133/08 • • • • containing hydroxy groups **[4]**
133/10 • • • • cycloaliphatic **[4]**
133/12 • • • having amino groups bound to a carbon atom of a six-membered aromatic ring **[4]**
133/14 • • • • containing hydroxy groups **[4]**
133/16 • • Amides; Imides **[4]**
133/18 • • • of carbonic or haloformic acids **[4]**
133/20 • • • • Ureas; Semicarbazides; Allophanates **[4]**
133/22 • • containing a carbon-to-nitrogen double bond, e.g. guanidines, hydrazones, semicarbazones **[4]**
133/24 • • Nitriles **[4]**
133/26 • • containing a nitrogen-to-nitrogen double bond **[4]**
133/28 • • • Azo compounds **[4]**
133/30 • • containing a nitrogen-to-oxygen bond **[4]**
133/32 • • • containing a nitro group **[4]**
133/34 • • • containing a nitroso group **[4]**
133/36 • • • Hydroxylamines **[4]**
133/38 • • Heterocyclic nitrogen compounds **[4]**
133/40 • • • Six-membered ring containing nitrogen and carbon only **[4]**
133/42 • • • • Triazines **[4]**
133/44 • • • Five-membered ring containing nitrogen and carbon only **[4]**
133/46 • • • • Imidazoles **[4]**
133/48 • • • the ring containing both nitrogen and oxygen **[4]**
133/50 • • • • Morpholines **[4]**
133/52 • having a carbon chain of 30 or more atoms **[4]**
133/54 • • Amines **[4]**
133/56 • • Amides; Imides **[4]**
133/58 • • Heterocyclic compounds **[4]**

135/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing sulfur, selenium or tellurium [4]

135/02 • Sulfurised compounds **[4]**
135/04 • • Hydrocarbons **[4]**
135/06 • • Esters, e.g. fats **[4]**
135/08 • containing a sulfur-to-oxygen bond **[4]**
135/10 • • Sulfonic acids or derivatives thereof **[4]**
135/12 • Thio-acids; Thiocyanates; Derivatives thereof **[4]**
135/14 • • having a carbon-to-sulfur double bond **[4]**
135/16 • • • thiourea type, i.e. containing the group  **[4]**
135/18 • • • thiocarbamic type, e.g. containing the groups  **[4]**
135/20 • Thiols; Sulfides; Polysulfides **[4]**
135/22 • • containing sulfur atoms bound to acyclic or cycloaliphatic carbon atoms **[4]**
135/24 • • • containing hydroxy groups; Derivatives thereof **[4]**
135/26 • • • containing carboxyl groups; Derivatives thereof **[4]**
135/28 • • containing sulfur atoms bound to a carbon atom of a six-membered aromatic ring **[4]**
135/30 • • • containing hydroxy groups; Derivatives thereof **[4]**
135/32 • Heterocyclic sulfur, selenium or tellurium compounds **[4]**
135/34 • • the ring containing sulfur and carbon only **[4]**
135/36 • • the ring containing sulfur and carbon with nitrogen or oxygen **[4]**

137/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing phosphorus [4]

137/02 • having no phosphorus-to-carbon bond **[4]**
137/04 • • Phosphate esters **[4]**
137/06 • • • Metal salts **[4]**
137/08 • • • Ammonium or amine salts **[4]**
137/10 • • • Thio derivatives **[4]**
137/12 • having a phosphorus-to-carbon bond **[4]**
137/14 • • containing sulfur **[4]**
137/16 • having a phosphorus-to-nitrogen bond **[4]**

139/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing atoms of elements not provided for in groups C10M 127/00-C10M 137/00 [4]

139/02 • Esters of silicon acids **[4]**
139/04 • having a silicon-to-carbon bond, e.g. silanes **[4]**
139/06 • having a metal-to-carbon bond (metal complexes of unknown constitution C10M 159/18) **[4]**

141/00 Lubricating compositions characterised by the additive being a mixture of two or more compounds covered by more than one of the main groups C10M 125/00-C10M 139/00, each of these compounds being essential [4]

141/02 • at least one of them being an organic oxygen-containing compound **[4]**

141/04 • at least one of them being an organic halogen-containing compound **[4]**

141/06 • at least one of them being an organic nitrogen-containing compound **[4]**

141/08 • at least one of them being an organic sulfur-, selenium- or tellurium-containing compound **[4]**

141/10 • at least one of them being an organic phosphorus-containing compound **[4]**

141/12 • at least one of them being an organic compound containing atoms of elements not provided for in groups C10M 141/02-C10M 141/10 **[4]**

143/00 Lubricating composition characterised by the additive being a macromolecular hydrocarbon or such hydrocarbon modified by oxidation [4]

143/02 • Polyethene **[4]**

143/04 • containing propene **[4]**

143/06 • containing butene **[4]**

143/08 • containing aliphatic monomer having more than 4 carbon atoms **[4]**

143/10 • containing aromatic monomer, e.g. styrene **[4]**

143/12 • containing conjugated diene **[4]**

143/14 • containing non-conjugated diene **[4]**

143/16 • containing cycloaliphatic monomer **[4]**

143/18 • Oxidised hydrocarbons, i.e. oxidised subsequent to macromolecular formation **[4]**

145/00 Lubricating compositions characterised by the additive being a macromolecular compound containing oxygen (oxidised hydrocarbons C10M 143/18) **[4]**

145/02 • Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

145/04 • • containing monomers having an unsaturated radical bound to an alcohol, aldehydo, ketonic, ether, ketal or acetal radical **[4]**

145/06 • • containing monomers having an unsaturated radical bound to an acyloxy radical of a saturated carboxylic or carbonic acid **[4]**

145/08 • • • Vinyl esters of a saturated carboxylic or carbonic acid **[4]**

145/10 • • containing monomers having an unsaturated radical bound to a carboxyl radical, e.g. acrylate **[4]**

145/12 • • • monocarboxylic **[4]**

145/14 • • • • Acrylate; Methacrylate **[4]**

145/16 • • • polycarboxylic **[4]**

145/18 • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

145/20 • • Condensation polymers of aldehydes or ketones **[4]**

145/22 • • Polyesters **[4]**

145/24 • • Polyethers **[4]**

145/26 • • • Polyoxyalkylenes **[4]**

145/28 • • • • of alkylene oxides containing 2 carbon atoms only **[4]**

145/30 • • • • of alkylene oxides containing 3 carbon atoms only **[4]**

145/32 • • • • of alkylene oxides containing 4 or more carbon atoms **[4]**

145/34 • • • • of two or more specified different types **[4]**

145/36 • • • • etherified **[4]**

145/38 • • • • esterified **[4]**

145/40 • Polysaccharides, e.g. cellulose **[4]**

147/00 Lubricating compositions characterised by the additive being a macromolecular compound containing halogen [4]

147/02 • Monomer containing carbon, hydrogen and halogen only **[4]**

147/04 • Monomer containing carbon, hydrogen, halogen and oxygen **[4]**

149/00 Lubricating compositions characterised by the additive being a macromolecular compound containing nitrogen [4]

149/02 • Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

149/04 • • containing monomers having an unsaturated radical bound to an amino group **[4]**

149/06 • • containing monomers having an unsaturated radical bound to an amido or imido group **[4]**

149/08 • • containing monomers having an unsaturated radical bound to a nitrile group **[4]**

149/10 • • containing monomers having an unsaturated radical bound to a nitrogen-containing hetero ring **[4]**

149/12 • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

149/14 • • a condensation reaction being involved **[4]**

149/16 • • • between the nitrogen-containing monomer and an aldehyde or ketone **[4]**

149/18 • • • Polyamides **[4]**

149/20 • • • Polyureas **[4]**

149/22 • • • Polyamines **[4]**

151/00 Lubricating compositions characterised by the additive being a macromolecular compound containing sulfur, selenium or tellurium [4]

151/02 • Macromolecular compounds obtained by reactions involving only carbon-to-carbon unsaturated bonds **[4]**

151/04 • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

153/00 Lubricating compositions characterised by the additive being a macromolecular compound containing phosphorus [4]

153/02 • Macromolecular compounds obtained by reactions involving only carbon-to-carbon unsaturated bonds **[4]**

153/04 • Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

155/00 Lubricating compositions characterised by the additive being a macromolecular compound containing atoms of elements not provided for in groups C10M 143/00-C10M 153/00 [4]

155/02 • Monomer containing silicon **[4]**

155/04 • Monomer containing boron **[4]**

157/00 Lubricating compositions characterised by the additive being a mixture of two or more macromolecular compounds covered by more than one of the main groups C10M 143/00-C10M 155/00, each of these compounds being essential [4]

157/02 • at least one of them being a halogen-containing compound **[4]**

157/04 • at least one of them being a nitrogen-containing compound **[4]**

157/06 • at least one of them being a sulfur-, selenium- or tellurium-containing compound **[4]**

157/08 • at least one of them being a phosphorus-containing compound **[4]**

157/10 • at least one of them being a compound containing atoms of elements not provided for in groups C10M 157/02-C10M 157/08 **[4]**

159/00 Lubricating compositions characterised by the additive being of unknown or incompletely defined constitution (carboxylic acids with less than 30 carbon atoms in the chain, of unknown or incompletely defined constitution C10M 129/56) **[4]**

159/02 • Natural products **[4]**

159/04 • • Petroleum fractions, e.g. tars, solvents **[4]**

159/06 • • Waxes, e.g. ozocerite, ceresine, petrolatum, slack-wax **[4]**

159/08 • • Fatty oils **[4]**

159/10 • • Rubber **[4]**

159/12 • Reaction products **[4]**

Note(s) [2006.01]

When classifying in this group, any reactant of a reaction product which is considered to represent information of interest for search, may also be classified in the last appropriate place in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information".

159/14 • • obtained by Friedel-Crafts condensation **[4]**

159/16 • • obtained by Mannich reactions **[4]**

159/18 • • Complexes with metals **[4]**

159/20 • • Reaction mixtures having an excess of neutralising base, e.g. so-called overbasic or highly basic products **[4]**

159/22 • • • containing phenol radicals **[4]**

159/24 • • • containing sulfonic radicals **[4]**

161/00 Lubricating compositions characterised by the additive being a mixture of a macromolecular compound and a non-macromolecular compound, each of these compounds being essential [4]

163/00 Lubricating compositions characterised by the additive being a mixture of a compound of unknown or incompletely defined constitution and a non-macromolecular compound, each of these compounds being essential [4]

165/00 Lubricating compositions characterised by the additive being a mixture of a macromolecular compound and a compound of unknown or incompletely defined constitution, each of these compounds being essential [4]

167/00 Lubricating compositions characterised by the additive being a mixture of a macromolecular compound, a non-macromolecular compound and a compound of unknown or incompletely defined constitution, each of these compounds being essential [4]

Mixtures of base-materials, thickeners and additives [4]

169/00 Lubricating compositions characterised by containing as components a mixture of at least two types of ingredient selected from base-materials, thickeners or additives, covered by the preceding groups, each of these compounds being essential [4]

169/02 • Mixtures of base-materials and thickeners **[4]**

169/04 • Mixtures of base-materials and additives **[4]**

169/06 • Mixtures of thickeners and additives **[4]**

Compositions characterised by physical properties [4]

171/00 Lubricating compositions characterised by purely physical criteria, e.g. containing as base-material, thickener or additive, ingredients which are characterised exclusively by their numerically specified physical properties, i.e. containing ingredients which are physically well defined but for which the chemical nature is either unspecified or only very vaguely indicated (chemically defined ingredients C10M 101/00-C10M 169/00; petroleum fractions C10M 101/02, C10M 121/02, C10M 159/04) **[4]**

171/02 • Specified values of viscosity or viscosity index **[4]**

171/04 • Specified molecular weight or molecular weight distribution **[4]**

171/06 • Particles of special shape or size **[4]**

Aqueous lubricating compositions [4]

173/00 Lubricating compositions containing more than 10% water [4]

173/02 • not containing mineral or fatty oils **[4]**

Working-up [4]

175/00 Working-up used lubricants to recover useful products [4]

175/02 • mineral-oil based **[4]**

175/04 • aqueous emulsion based **[4]**

175/06 • by ultrafiltration or osmosis **[4]**

Preparation or after-treatment [4]

177/00 Special methods of preparation of lubricating compositions; Chemical modification by after-treatment of components or of the whole of a lubricating composition, not covered by other classes [4]

C10N INDEXING SCHEME ASSOCIATED WITH SUBCLASS C10M [4]

Note(s)

1. This subclass constitutes an indexing scheme associated with subclass C10M, relating to:
   - metals and the metal of a compound (C10N 10/00);
   - the properties of the lubricant composition or constituents thereof (C10N 20/00, C10N 30/00);
   - the use or application of the lubricant composition (C10N 40/00);
   - the form in which the lubricant composition is applied (C10N 50/00);
   - chemical modification by after-treatment of lubricant constituents (C10N 60/00);
   - special methods of preparation (C10N 70/00);
   - special pretreatment of the material to be lubricated (C10N 80/00).
2. In this subclass, the following terms or expressions are used with the meanings indicated:
   - "lubricant" or "lubricating composition" includes cutting oils, hydraulic fluids, metal drawing compositions, flushing oils, slushing oils, or the like;
   - "aliphatic" includes "cycloaliphatic".

10/00 Metal present as such or in compounds [4]

Note(s)

1. In this group, metals should be indexed according to their group of the Periodic Table.
2. Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers.

10/02 • Groups 1 or 11 **[4]**
10/04 • Groups 2 or 12 **[4]**
10/06 • Groups 3 or 13 **[4]**
10/08 • Groups 4 or 14 **[4]**
10/10 • Groups 5 or 15 **[4]**
10/12 • Groups 6 or 16 **[4]**
10/14 • Group 7 **[4]**
10/16 • Groups 8, 9 or 10 **[4]**

20/00 Specified physical properties of component of lubricating compositions [4]

20/02 • Viscosity; Viscosity index **[4]**
20/04 • Molecular weight; Molecular weight distribution **[4]**
20/06 • Particles of special shape or size **[4]**

30/00 Specified physical or chemical property which is improved by the additive characterising the lubricating composition, e.g. multifunctional additives [4]

30/02 • Pour-point; Viscosity index **[4]**
30/04 • Detergent or dispersant property **[4]**
30/06 • Oiliness; Film-strength; Anti-wear; Resistance to extreme pressure **[4]**
30/08 • Resistance to extreme temperature **[4]**
30/10 • Inhibition of oxidation, e.g. anti-oxidants **[4]**
30/12 • Inhibition of corrosion, e.g. anti-rust agents, anti-corrosives **[4]**
30/14 • Metal deactivation **[4]**
30/16 • Antiseptic; Biocidal **[4]**
30/18 • Anti-foaming property **[4]**
30/20 • Colour, e.g. dyes **[4]**

40/00 Specified use or application for which the lubricating composition is intended [4]

40/02 • Bearings **[4]**
40/04 • Oil-bath; Gear-boxes; Automatic transmissions; Traction drives **[4]**
40/06 • Instruments or other precision apparatus, e.g. damping fluids **[4]**
40/08 • Hydraulic fluids, e.g. brake-fluids **[4]**
40/10 • Running-in oil **[4]**
40/12 • Gas-turbines **[4]**
40/13 • • Aircraft turbines **[5]**
40/14 • Electric or magnetic purposes **[4]**
40/16 • • dielectric; Insulating oil **[4]**
40/18 • • in connection with recordings on magnetic tape or disc **[4]**
40/20 • Metal working **[4]**
40/22 • • with essential removal of material **[4]**
40/24 • • without essential removal of material; Punching metal **[4]**
40/25 • Internal-combustion engines **[5]**
40/26 • • Two-stroke **[4, 5]**
40/28 • • Rotary **[4, 5]**
40/30 • Refrigerator lubricant **[5]**
40/32 • Wire, rope or cable lubricants **[5]**
40/34 • Lubricating-sealants **[5]**
40/36 • Release agents **[5]**

50/00 Form in which the lubricant is applied to the material being lubricated [4]

50/02 • dissolved or suspended in a carrier which subsequently evaporates to leave a lubricant coating **[4]**
50/04 • Aerosol **[4]**
50/06 • Gaseous phase, at least during working conditions **[4]**
50/08 • solid **[4]**
50/10 • semi-solid; greasy **[4]**

60/00 Chemical after-treatment of the constituents of the lubricating composition [4]

60/02 • Reduction, e.g. hydrogenation **[4]**
60/04 • Oxidation, e.g. ozonisation **[4]**
60/06 • by epoxides **[4]**

60/08 • Halogenation **[4]**
60/10 • by sulfur or a compound containing sulfur **[4]**
60/12 • by phosphorus or a compound containing phosphorus, e.g. P_xS_y **[4]**
60/14 • by boron or a compound containing boron **[4]**

70/00 Special methods of preparation [4]

80/00 Special pretreatment of the material to be lubricated, e.g. phosphatising or chromatising of a metal [4]