

# CPC COOPERATIVE PATENT CLASSIFICATION

**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 specific 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** (inhibiting corrosion or incrustation in general [C23F](#))

## NOTES

- 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](#)
- 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.
- In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place.

## WARNING

The following IPC groups are not used in the CPC system. Subject matter covered by these groups is classified in the following CPC groups:

[C10G 73/23](#)

covered by

[C10G 73/06](#)

<b>1/00</b>	<b>Production of liquid hydrocarbon mixtures from oil-shale, oil-sand, or non-melting solid carbonaceous or similar materials, e.g. wood, coal</b> (mechanical winning of oil from oil-shales, oil-sand, or the like <a href="#">B03B</a> )	2/332	. . . . . {of the iron-group}
		2/333	. . . . . {of the platinum-group}
		2/334	. . . . . {containing molecular sieve catalysts}
		2/34	. . . {Apparatus, reactors}
1/002	. {in combination with oil conversion- or refining processes}	2/341	. . . . . {with stationary catalyst bed}
1/004	. {Inhibiting of corrosion}	2/342	. . . . . {with moving solid catalysts}
1/006	. {Combinations of processes provided in groups <a href="#">C10G 1/02</a> - <a href="#">C10G 1/08</a> }	2/343	. . . . . {according to the "moving-bed" method}
		2/344	. . . . . {according to the "fluidised-bed" technique}
1/008	. {Controlling or regulating of liquefaction processes (controlling or regulation in general <a href="#">G05</a> )}	2/35	. . {with the use of another activation, e.g. radiation, vibration, electrical or electromagnetic means}
1/02	. by distillation (destructive distillation of oil-shale <a href="#">C10B 53/06</a> )	2/40	. {from carbon monoxide with water vapor}
1/04	. by extraction	2/50	. {from carbon dioxide with hydrogen}
1/042	. . {by the use of hydrogen-donor solvents}	<b>3/00</b>	<b>Production of liquid hydrocarbon mixtures from oxygen-containing or organic materials, e.g. fatty oils, fatty acids</b> (production from non-melting solid oxygen-containing carbonaceous materials <a href="#">C10G 1/00</a> ; preparation of individual hydrocarbons or mixtures thereof of definite or specified contribution <a href="#">C07C</a> )
1/045	. . {Separation of insoluble materials}		
1/047	. . {Hot water or cold water extraction processes}		
1/06	. by destructive hydrogenation		
1/065	. . {in the presence of a solvent}		
1/08	. with moving catalysts		
1/083	. . {in the presence of a solvent}		
1/086	. . {Characterised by the catalyst used}		
1/10	. from rubber or rubber waste		
<b>2/00</b>	<b>Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon</b>		
2/30	. {from carbon monoxide with hydrogen}		
2/31	. . {thermal, non catalytic conversion}		
2/32	. . {with the use of catalysts}	3/40	. {Thermal non-catalytic treatment}
2/33	. . . {characterised by the catalyst used}	3/42	. {Catalytic treatment}
2/331	. . . . {containing group VIII-metals}	3/44	. . {characterised by the catalyst used}

## WARNING

Groups [C10G 3/40](#)-[C10G 3/62](#) are incomplete pending reclassification of documents from group [C10G 3/00](#).

Groups [C10G 3/40](#)-[C10G 3/62](#) and [C10G 3/00](#) should be considered in order to perform a complete search.

- 3/45 . . . {containing iron group metals or compounds thereof}
- 3/46 . . . . {in combination with chromium, molybdenum, tungsten metals or compounds thereof}
- 3/47 . . . {containing platinum group metals or compounds thereof}
- 3/48 . . . {further characterised by the catalyst support}
- 3/49 . . . . {containing crystalline aluminosilicates, e.g. molecular sieves}
- 3/50 . {in the presence of hydrogen, hydrogen donors or hydrogen generating compounds}
- 3/52 . . {Hydrogen in a special composition or from a special source}
- 3/54 . {characterised by the catalytic bed}
- 3/55 . . {with moving solid particles, e.g. moving beds}
- 3/56 . . . {suspended in the oil, e.g. slurries, ebullated beds}
- 3/57 . . . {according to the fluidised bed technique}
- 3/60 . {Controlling or regulating the process (controlling or regulating in general G05)}
- 3/62 . {Catalyst regeneration (regeneration or reactivation of catalysts in general B01J 38/00)}
- 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 (distillation in general B01D)**
  - 7/003 . {distillation of lubricating oils}
  - 7/006 . {of waste oils other than lubricating oils, e.g. PCB's containing oils}
  - 7/02 . Stabilising gasoline by removing gases by fractioning
  - 7/04 . Dewatering
  - 7/06 . Vacuum distillation
  - 7/08 . Azeotropic or extractive distillation (refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents C10G 21/00)
  - 7/10 . Inhibiting corrosion during distillation
  - 7/12 . Controlling or regulating (controlling or regulating in general G05)

#### Cracking in the absence of hydrogen

- 9/00 Thermal non-catalytic cracking, in the absence of hydrogen, of hydrocarbon oils**
  - 9/002 . {Cooling of cracked gases}
  - 9/005 . {Coking (in order to produce liquid products mainly)}
  - 9/007 . {Visbreaking}
  - 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
  - 9/203 . . . . {chemical composition of the tubes}

- 9/206 . . . . {controlling or regulating the 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" method
- 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
- 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 aluminosilicates, e.g. molecular sieves
  - 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" method
  - 11/18 . . according to the "fluidised-bed" technique
  - 11/182 . . . {Regeneration}
  - 11/185 . . . {Energy recovery from regenerator effluent gases (using steam turbines, see F01K 23/064; using gas turbines, see F01K 25/14; the combined use of gas and steam turbines, see F01K 3/185)}
  - 11/187 . . . {Controlling or regulating (controlling or regulating in general G05)}
  - 11/20 . by direct contact with inert heated gases or vapours
  - 11/22 . . produced by partial combustion of the material to be cracked

#### **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
- 15/10 . by particle radiation
- 15/12 . with gases superheated in an electric arc, e.g. plasma

#### 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	25/05	. . . Removal of non-hydrocarbon compounds, e.g. sulfur compounds
17/07	. . . using halogen acids or oxyacids of halogen (acids generating halogen C10G 27/02)	25/06	. with moving sorbents or sorbents dispersed in the oil
17/08	. with acid-forming oxides (refining with CO <sub>2</sub> or SO <sub>2</sub> as a selective solvent C10G 21/06)	25/08	. . according to the "moving bed" method
17/085	. . with oleum	25/09	. . according to the "fluidised bed" technique
17/09	. with acid salts	25/11	. . Distillation in the presence of moving sorbents
17/095	. with "solid acids", e.g. phosphoric acid deposited on a carrier	25/12	. Recovery of used adsorbent
17/10	. recovery of used refining agents	<b>27/00</b>	<b>Refining of hydrocarbon oils in the absence of hydrogen, by oxidation</b>
<b>19/00</b>	<b>Refining hydrocarbon oils in the absence of hydrogen, by alkaline treatment</b>	27/02	. with halogen or compounds generating halogen; hypochlorous acid or salts thereof
19/02	. with aqueous alkaline solutions	27/04	. with oxygen or compounds generating oxygen
19/04	. . containing solubilisers, e.g. solutisers	27/06	. . in the presence of alkaline solutions
19/06	. . with plumbites or plumbates	27/08	. . in the presence of copper chloride
19/067	. with molten alkaline material	27/10	. . in the presence of metal-containing organic complexes, e.g. chelates, or cationic ion-exchange resins
19/073	. with solid alkaline material	27/12	. . with oxygen-generating compounds, e.g. per-compounds, chromic acid, chromates (plumbites or plumbates C10G 19/06)
19/08	. Recovery of used refining agents	27/14	. . with ozone-containing gases
<b>21/00</b>	<b>Refining of hydrocarbon oils in the absence of hydrogen, by extraction with selective solvents (C10G 17/00, C10G 19/00 take precedence; dewaxing oils C10G 73/02)</b>	<b>29/00</b>	<b>Refining of hydrocarbon oils in the absence of hydrogen, with other chemicals</b>
21/003	. {Solvent de-asphalting}	29/02	. Non-metals
21/006	. {of waste oils, e.g. PCB's containing oils}	29/04	. Metals, or metals deposited on a carrier
21/02	. with two or more solvents, which are introduced or withdrawn separately	29/06	. Metal salts, or metal salts deposited on a carrier
21/04	. . by introducing simultaneously at least two immiscible solvents counter-current to each other	29/08	. . containing the metal in the lower valency
21/06	. characterised by the solvent used	29/10	. . Sulfides
21/08	. . Inorganic compounds only	29/12	. . Halides
21/10	. . . Sulfur dioxide	29/16	. Metal oxides
21/12	. . Organic compounds only	29/20	. Organic compounds not containing metal atoms
21/14	. . . Hydrocarbons	29/205	. . {by reaction with hydrocarbons added to the hydrocarbon oil}
21/16	. . . Oxygen-containing compounds	29/22	. . containing oxygen as the only hetero atom
21/18	. . . Halogen-containing compounds	29/24	. . . aldehydes or ketones
21/20	. . . Nitrogen-containing compounds	29/26	. . halogenated hydrocarbons
21/22	. . . Compounds containing sulfur, selenium, or tellurium	29/28	. . containing sulfur as the only hetero atom, e.g. mercaptans, or sulfur and oxygen as the only hetero atoms
21/24	. . . Phosphorus-containing compounds	<b>31/00</b>	<b>Refining of hydrocarbon oils in the absence of hydrogen, by methods not otherwise provided for (by distillation C10G 7/00)</b>
21/26	. . . Silicon-containing compounds	31/06	. by heating, cooling, or pressure treatment
21/27	. . . Organic compounds not provided for in a single one of groups C10G 21/14 - C10G 21/26	31/08	. by treating with water
21/28	. Recovery of used solvent	31/09	. by filtration
21/30	. Controlling or regulating (controlling or regulating in general G05)	31/10	. with the aid of centrifugal force
<b>25/00</b>	<b>Refining of hydrocarbon oils in the absence of hydrogen, with solid sorbents</b>	31/11	. by dialysis
	<b>NOTE</b>	<b>32/00</b>	<b>Refining of hydrocarbons oils by electric or magnetic means, by irradiation or by using microorganisms</b>
	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.	32/02	. by electric or magnetic means
25/003	. {Specific sorbent material, not covered by C10G 25/02 or C10G 25/03}	32/04	. by particle radiation
25/006	. {of waste oils, e.g. PCB's containing oils}	<b>33/00</b>	<b>Dewatering or demulsification of hydrocarbon oils (by distillation C10G 7/04)</b>
25/02	. with ion-exchange material	33/02	. with electrical or magnetic means
25/03	. . with crystalline aluminosilicates, e.g. molecular sieves	33/04	. with chemical means
		33/06	. with mechanical means, e.g. by filtration
		33/08	. Controlling or regulating (controlling or regulating in general G05)

**35/00 Reforming naphtha****NOTE**

By reforming is meant 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
- 35/065 . . . {containing crystalline zeolitic molecular sieves, other than aluminosilicates}
- 35/085 . . . containing platinum group metals or compounds thereof
- 35/09 . . . bimetallic catalysts in which at least one of the metals is a platinum group metal
- 35/095 . . . containing crystalline alumino-silicates, e.g. molecular sieves {[C10G 35/065](#) takes precedence}
- 35/10 . . with moving catalysts
- 35/12 . . . according to the "moving-bed" method
- 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
- 35/24 . Controlling or regulating of reforming operations ([controlling or regulating in general G05](#))

**Hydrotreatment processes (reforming of naphtha [C10G 35/00](#))****45/00 Refining of hydrocarbon oils using hydrogen or hydrogen-generating compounds****NOTE**

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 provided for in 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
- 45/04 . . characterised by the catalyst used
- 45/06 . . . containing nickel or cobalt metal, or compounds thereof
- 45/08 . . . . in combination with chromium, molybdenum, or tungsten metals, or compounds thereof
- 45/10 . . . containing platinum group metals or compounds thereof
- 45/12 . . . containing crystalline alumino-silicates, e.g. molecular sieves
- 45/14 . . with moving solid particles
- 45/16 . . . suspended in the oil, e.g. slurries
- 45/18 . . . according to the "moving-bed" technique
- 45/20 . . . according to the "fluidised-bed" technique
- 45/22 . . with hydrogen dissolved or suspended in the oil
- 45/24 . . with hydrogen-generating compounds
- 45/26 . . . Steam or water
- 45/28 . . . Organic compounds; Autofining
- 45/30 . . . . characterised by the catalyst used
- 45/32 . Selective hydrogenation of the diolefin or acetylene compounds

- 45/34 . . characterised by the catalyst used
- 45/36 . . . containing nickel or cobalt metal, or compounds thereof
- 45/38 . . . . in combination with chromium, molybdenum or tungsten metals, or compounds thereof
- 45/40 . . . containing platinum group metals or compounds thereof
- 45/42 . . with moving solid particles
- 45/44 . Hydrogenation of the aromatic hydrocarbons
- 45/46 . . characterised by the catalyst used
- 45/48 . . . containing nickel or cobalt metal, or compounds thereof
- 45/50 . . . . in combination with chromium, molybdenum or tungsten metal, or compounds thereof
- 45/52 . . . containing platinum group metals or compounds thereof
- 45/54 . . . containing crystalline alumino-silicates, e.g. molecular sieves
- 45/56 . . with moving solid particles
- 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](#))
- 45/60 . . characterised by the catalyst used
- 45/62 . . . containing platinum group metals or compounds thereof
- 45/64 . . . containing crystalline alumino-silicates, e.g. molecular sieves
- 45/66 . . with moving solid particles
- 45/68 . . Aromatisation of hydrocarbon oil fractions ([of naphtha C10G 35/00](#))
- 45/70 . . . with catalysts containing platinum group metals or compounds thereof
- 45/72 . Controlling or regulating ([controlling or regulating in general G05](#))

**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](#))**

- 47/02 . characterised by the catalyst used
- 47/04 . . Oxides
- 47/06 . . Sulfides
- 47/08 . . Halides
- 47/10 . . with catalysts deposited on a carrier
- 47/12 . . . Inorganic carriers
- 47/14 . . . . the catalyst containing platinum group metals or compounds thereof
- 47/16 . . . . Crystalline alumino-silicate carriers
- 47/18 . . . . . the catalyst containing platinum group metals or compounds thereof
- 47/20 . . . . . the catalyst containing other metals or compounds thereof
- 47/22 . Non-catalytic cracking in the presence of hydrogen
- 47/24 . with moving solid particles
- 47/26 . . suspended in the oil, e.g. slurries
- 47/28 . . according to the "moving-bed" technique
- 47/30 . . according to the "fluidised-bed" technique
- 47/32 . in the presence of hydrogen-generating compounds



47/34	. . Organic compounds, e.g. hydrogenated hydrocarbons	53/06	. . . including only extraction steps, e.g. deasphalting by solvent treatment followed by extraction of aromatics ( <a href="#">refining in one step with two or more solvents which are introduced or withdrawn separately C10G 21/02</a> )
47/36	. Controlling or regulating ( <a href="#">controlling or regulating in general G05</a> )		
<b>49/00</b>	<b>Treatment of hydrocarbon oils in the presence of hydrogen or hydrogen-generating compounds, not provided for in a single one of the groups <a href="#">C10G 45/02</a>, <a href="#">C10G 45/32</a>, <a href="#">C10G 45/44</a>, <a href="#">C10G 45/58</a> or <a href="#">C10G 47/00</a></b>	53/08	. . including at least one sorption step
49/002	. {Apparatus for fixed bed hydrotreatment processes}	53/10	. . including at least one acid-treatment step
49/005	. {Inhibiting corrosion in hydrotreatment processes}	53/12	. . including at least one alkaline treatment step
49/007	. {in the presence of hydrogen from a special source or of a special composition or having been purified by a special treatment}	53/14	. . including at least one oxidation step
49/02	. characterised by the catalyst used	53/16	. plural parallel stages only
49/04	. . containing nickel, cobalt, chromium, molybdenum, or tungsten metals, or compounds thereof	<b>55/00</b>	<b>Treatment of hydrocarbon oils in the absence of hydrogen, by at least one refining process and at least one cracking process</b>
49/06	. . containing platinum group metals or compounds thereof	55/02	. plural serial stages only
49/08	. . containing crystalline aluminosilicates, e.g. molecular sieves	55/04	. . including at least one thermal cracking step
49/10	. with moving solid particles	55/06	. . including at least one catalytic cracking step
49/12	. . suspended in the oil, e.g. slurries	55/08	. plural parallel stages only
49/14	. . according to the "moving-bed" technique	<b>57/00</b>	<b>Treatment of hydrocarbon oils in the absence of the hydrogen, by at least one cracking process or refining process and at least one other conversion process</b>
49/16	. . according to the "fluidised-bed" technique	57/005	. {with alkylation}
49/18	. in the presence of hydrogen-generating compounds, e.g. ammonia, water, hydrogen sulfide	57/02	. with polymerisation
49/20	. . Organic compounds	<b>59/00</b>	<b>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</b>
49/22	. Separation of effluents	59/02	. plural serial stages only
49/24	. Starting-up hydrotreatment operations	59/04	. . including at least one catalytic and at least one non-catalytic reforming step
49/26	. Controlling or regulating ( <a href="#">controlling or regulating in general G05</a> )	59/06	. plural parallel stages only
<b>50/00</b>	<b>Production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation (preparation of individual hydrocarbons or mixtures thereof of definite or specified constitution C07C)</b>	<b>61/00</b>	<b>Treatment of naphtha by at least one reforming process and at least one process of refining in the absence of hydrogen</b>
50/02	. of hydrocarbon oils for lubricating purposes	61/02	. plural serial stages only
<b>Multi-step processes</b>		61/04	. . the refining step being an extraction
<b>NOTE</b>		61/06	. . the refining step being a sorption process
Groups <a href="#">C10G 51/00</a> - <a href="#">C10G 69/00</a> cover only those combined treating operations where the interest is directed to the relationship between the steps.		61/08	. plural parallel stages only
		61/10	. processes also including other conversion steps
<b>51/00</b>	<b>Treatment of hydrocarbon oils in the absence of hydrogen, by two or more cracking processes only</b>	<b>63/00</b>	<b>Treatment of naphtha by at least one reforming process and at least one other conversion process (<a href="#">C10G 59/00</a>, <a href="#">C10G 61/00</a> take precedence)</b>
51/02	. plural serial stages only	63/02	. plural serial stages only
51/023	. . {only thermal cracking steps}	63/04	. . including at least one cracking step
51/026	. . {only catalytic cracking steps}	63/06	. plural parallel stages only
51/04	. . including only thermal and catalytic cracking steps	63/08	. . including at least one cracking step
51/06	. plural parallel stages only	<b>65/00</b>	<b>Treatment of hydrocarbon oils by two or more hydrotreatment processes only</b>
<b>53/00</b>	<b>Treatment of hydrocarbon oils in the absence of hydrogen, by two or more refining processes</b>	65/02	. plural serial stages only
53/02	. plural serial stages only	65/04	. . including only refining steps
53/04	. . including at least one extraction step	65/043	. . . {at least one step being a change in the structural skeleton}
		65/046	. . . {at least one step being an aromatisation step}
		65/06	. . . at least one step being a selective hydrogenation of the diolefins
		65/08	. . . at least one step being a hydrogenation of the aromatic hydrocarbons
		65/10	. . including only cracking steps

65/12	. . including cracking steps and other hydrotreatment steps	70/041	. . {by distillation}
65/14	. plural parallel stages only	70/042	. . . {with the use of auxiliary compounds}
65/16	. . including only refining steps	70/043	. . {by fractional condensation}
65/18	. . including only cracking steps	70/044	. . {by crystallisation}
<b>67/00</b>	<b>Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one process for refining in the absence of hydrogen only</b>	70/045	. . {using membranes, e.g. selective permeation}
67/02	. plural serial stages only	70/046	. . {by adsorption, i.e. with the use of solids}
67/04	. . including solvent extraction as the refining step in the absence of hydrogen	70/047	. . . {by molecular sieve technique}
67/0409	. . . {Extraction of unsaturated hydrocarbons}	70/048	. . {by liquid-liquid extraction}
67/0418	. . . . {The hydrotreatment being a hydrotreatment}	70/06	. . by gas-liquid contact
67/0427	. . . . {The hydrotreatment being a selective hydrogenation of diolefins or acetylenes}	<b>71/00</b>	<b>Treatment by methods not otherwise provided for of hydrocarbon oils or fatty oils for lubricating purposes (by Fischer-Tropsch <a href="#">C07C 1/00</a>; lubricating compositions <a href="#">C10M</a>)</b>
67/0436	. . . . {The hydrotreatment being an aromatic saturation}	71/02	. Thickening by voltolising (chemical modification of drying oils by voltolising <a href="#">C09F 7/04</a> )
67/0445	. . . . {The hydrotreatment being a hydrocracking}	<b>73/00</b>	<b>Recovery or refining of mineral waxes, e.g. montan wax (compositions essentially based on waxes <a href="#">C08L 91/00</a>)</b>
67/0454	. . . {Solvent desasphalting}	73/02	. Recovery of petroleum waxes from hydrocarbon oils; Dewaxing of hydrocarbon oils
67/0463	. . . . {The hydrotreatment being a hydrotreatment}	73/025	. . {by filtration}
67/0472	. . . . {The hydrotreatment being a selective hydrogenation of diolefins or acetylenes}	73/04	. . with the use of filter aids
67/0481	. . . . {The hydrotreatment being an aromatics saturation}	73/06	. . with the use of solvents
67/049	. . . . {The hydrotreatment being a hydrocracking}	73/08	. . . Organic compounds
67/06	. . including a sorption process as the refining step in the absence of hydrogen	73/10	. . . . Hydrocarbons
67/08	. . including acid treatment as the refining step in the absence of hydrogen	73/12	. . . . Oxygen-containing compounds
67/10	. . including alkaline treatment as the refining step in the absence of hydrogen	73/14	. . . . Halogen-containing compounds
67/12	. . including oxidation as the refining step in the absence of hydrogen	73/16	. . . . Nitrogen-containing compounds
67/14	. . including at least two different refining steps in the absence of hydrogen	73/18	. . . . containing sulfur, selenium or tellurium
67/16	. plural parallel stages only	73/20	. . . . containing phosphorus
<b>69/00</b>	<b>Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one other conversion process (<a href="#">C10G 67/00</a> takes precedence)</b>	73/22	. . . . Mixtures or organic compounds
69/02	. plural serial stages only	73/24	. . by formation of adducts
69/04	. . including at least one step of catalytic cracking in the absence of hydrogen	73/26	. . by flotation
69/06	. . including at least one step of thermal cracking in the absence of hydrogen	73/28	. . by centrifugal force
69/08	. . including at least one step of reforming naphtha	73/30	. . with electric means
69/10	. . . hydrocracking of higher boiling fractions into naphtha and reforming the naphtha obtained	73/32	. . Methods of cooling during dewaxing
69/12	. . including at least one polymerisation or alkylation step	73/34	. . Controlling or regulating ( <a href="#">controlling or regulating in general G05</a> )
69/123	. . . {alkylation}	73/36	. Recovery of petroleum waxes from other compositions containing oil in minor proportions, from concentrates or from residues; De-oiling, sweating
69/126	. . . {polymerisation, e.g. oligomerisation}	73/38	. Chemical modification of petroleum
69/14	. plural parallel stages only	73/40	. Physical treatment of waxes or modified waxes, e.g. granulation, dispersion, emulsion, irradiation
<b>70/00</b>	<b>Working-up undefined normally gaseous mixtures obtained by processes covered by groups <a href="#">C10G 9/00</a>, <a href="#">C10G 11/00</a>, <a href="#">C10G 15/00</a>, <a href="#">C10G 47/00</a>, <a href="#">C10G 51/00</a></b>	73/42	. Refining of petroleum waxes
70/002	. {by forming adducts or complexes}	73/44	. . in the presence of hydrogen or hydrogen-generating compounds
70/004	. . {with solutions of copper salts}	<b>75/00</b>	<b>Inhibiting corrosion or fouling in apparatus for treatment or conversion of hydrocarbon oils, in general (<a href="#">C10G 7/10</a>, <a href="#">C10G 9/16</a> take precedence; protection of pipes against corrosion or incrustation <a href="#">F16L 58/00</a>)</b>
70/006	. {with the use of acids or sulfur oxides}	75/02	. by addition of corrosion inhibitors
70/008	. {with the use of organometallic compounds}	75/04	. by addition of antifouling agents
70/02	. by hydrogenation	<b>99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>
70/04	. by physical processes		

**2300/00 Aspects relating to hydrocarbon processing covered by groups [C10G 1/00](#) - [C10G 99/00](#)**

- 2300/10 . Feedstock materials
- 2300/1003 . . Waste materials
- 2300/1007 . . . Used oils
- 2300/1011 . . Biomass
- 2300/1014 . . . of vegetal origin
- 2300/1018 . . . of animal origin
- 2300/1022 . . Fischer-Tropsch products
- 2300/1025 . . Natural gas
- 2300/1029 . . Gas hydrates
- 2300/1033 . . Oil well production fluids
- 2300/1037 . . Hydrocarbon fractions
- 2300/104 . . . Light gasoline having a boiling range of about 20 - 100 °C
- 2300/1044 . . . Heavy gasoline or naphtha having a boiling range of about 100 - 180 °C
- 2300/1048 . . . Middle distillates
- 2300/1051 . . . . Kerosene having a boiling range of about 180 - 230 °C
- 2300/1055 . . . . Diesel having a boiling range of about 230 - 330 °C
- 2300/1059 . . . . Gasoil having a boiling range of about 330 - 427 °C
- 2300/1062 . . . Lubricating oils
- 2300/1066 . . . . Special oils
- 2300/107 . . Atmospheric residues having a boiling point of at least about 538 °C
- 2300/1074 . . Vacuum distillates
- 2300/1077 . . Vacuum residues
- 2300/1081 . . Alkanes
- 2300/1085 . . . Solid paraffins
- 2300/1088 . . Olefins
- 2300/1092 . . . C2-C4 olefins
- 2300/1096 . . Aromatics or polyaromatics
- 2300/20 . Characteristics of the feedstock or the products
- 2300/201 . . Impurities
- 2300/202 . . . Heteroatoms content, i.e. S, N, O, P
- 2300/203 . . . . Naphthenic acids, TAN
- 2300/205 . . . Metal content
- 2300/206 . . . . Asphaltenes
- 2300/207 . . . Acid gases, e.g. H<sub>2</sub>S, COS, SO<sub>2</sub>, HCN
- 2300/208 . . . Sediments, e.g. bottom sediment and water or BSW
- 2300/30 . . Physical properties of feedstocks or products
- 2300/301 . . . Boiling range
- 2300/302 . . . Viscosity
- 2300/304 . . . Pour point, cloud point, cold flow properties
- 2300/305 . . . Octane number, e.g. motor octane number [MON], research octane number [RON]
- 2300/307 . . . Cetane number, cetane index
- 2300/308 . . . Gravity, density, e.g. API
- 2300/40 . Characteristics of the process deviating from typical ways of processing
- 2300/4006 . . Temperature
- 2300/4012 . . Pressure
- 2300/4018 . . Spatial velocity, e.g. LHSV, WHSV
- 2300/4025 . . Yield
- 2300/4031 . . Start up or shut down operations
- 2300/4037 . . In-situ processes
- 2300/4043 . . Limiting CO<sub>2</sub> emissions
- 2300/405 . . Limiting CO, NO<sub>x</sub> or SO<sub>x</sub> emissions

- 2300/4056 . . Retrofitting operations
- 2300/4062 . . Geographical aspects, e.g. different process units form a combination process at different geographical locations
- 2300/4068 . . Moveable devices or units, e.g. on trucks, barges
- 2300/4075 . . Limiting deterioration of equipment
- 2300/4081 . . Recycling aspects
- 2300/4087 . . Catalytic distillation
- 2300/4093 . . Catalytic stripping
- 2300/42 . . Hydrogen of special source or of special composition
- 2300/44 . . Solvents
- 2300/70 . Catalyst aspects
- 2300/701 . . Use of spent catalysts
- 2300/703 . . Activation
- 2300/705 . . Passivation
- 2300/706 . . Catalytic metal recovery
- 2300/708 . . Coking aspect, coke content and composition of deposits
- 2300/80 . Additives
- 2300/802 . . Diluents
- 2300/805 . . Water
- 2300/807 . . . Steam

**2400/00 Products obtained by processes covered by groups [C10G 9/00](#) - [C10G 69/14](#)**

- 2400/02 . Gasoline
- 2400/04 . Diesel oil
- 2400/06 . Gasoil
- 2400/08 . Jet fuel
- 2400/10 . Lubricating oil
- 2400/12 . Electrical isolation oil
- 2400/14 . White oil, eating oil
- 2400/16 . Residues
- 2400/18 . Solvents
- 2400/20 . C2-C4 olefins
- 2400/22 . Higher olefins
- 2400/24 . Acetylene and homologues
- 2400/26 . Fuel gas
- 2400/28 . Propane and butane
- 2400/30 . Aromatics