

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](#))

Definition statement

This place covers:

Production of liquid hydrocarbon mixtures from oil-shale, oil-sand or non-melting solid carbonaceous materials (e.g. wood, coal), from oxides of carbon (e.g. Fischer-Tropsch processes), from oxygen-containing organic materials (e.g. fatty acids or fatty oils) or from gases (e.g. natural gas).

Distillation, dewatering or demulsification of hydrocarbon oils.

Catalytic or non-catalytic cracking of hydrocarbon oils in the absence of hydrogen.

Refining of hydrocarbon oils in the absence of hydrogen.

Reforming naphtha.

Hydrotreatment processes involving refining, cracking or other treatment of hydrocarbon oils in the presence of hydrogen or hydrogen generating compounds.

Production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. oligomerisation or polymerisation to make longer carbon chains. Multi-step processes for treating hydrocarbon oils in the presence or absence of hydrogen.

Working up of normally gaseous mixtures of undefined composition obtained from cracking processes.

Treatment of hydrocarbon oils or fatty oils for lubricating purposes, including thickening by voltolisation. Recovery of refining of mineral waxes, e.g. montan wax.

Relationships with other classification places

This subclass covers the production or treatment of normally liquid hydrocarbon mixtures. The production or treatment of normally solid or gaseous carbonaceous materials is covered by subclasses [C10B](#), [C10C](#), [C10F](#), [C10J](#), [C10K](#).

The borderline between [C10G 2/00](#), [C10L 3/06](#) and [C07C 1/02](#) is not entirely clear in respect of the production of hydrocarbons from oxides of carbon (e.g. using processes such as the Fischer-Tropsch process starting from synthesis gas or syngas). Multiple classifications exist in this area.

Processes in general and apparatus for distillation are classified in [B01D](#) and working-up unidentified gaseous mixtures obtained by cracking hydrocarbon oils are classified in [C10G 7/00](#)

Catalytic reactors are in general classified in [B01J](#) and refining of hydrocarbon oils, in the absence of hydrogen, with solid sorbents are classified in [C10G 25/00](#)

Apparatus used in [C10G](#) are classified in [B01D](#), [B01D](#) when the apparatus is the invention.

References

Limiting references

This place does not cover:

| | |
|---|----------------------------|
| Mechanical separation of oil from oil-shale, oil-sand or the like | B03B |
| Cracking mainly to hydrogen or synthesis gas | C01B |
| Preparation of individual hydrocarbons or mixtures thereof of definite or specified constitution, including by cracking or pyrolysis of hydrocarbon gases | C07C |
| Compositions essentially based on waxes | C08L 91/00 |
| Chemical modification of drying-oils by voltolising | C09F 7/04 |
| Cracking to produce cokes | C10B |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|---|----------------------------|
| Distillation in general | B01D |
| Destructive distillation of oil-shale | C10B 53/06 |
| Lubricating compositions | C10M |
| Inhibiting corrosion or incrustation in general | C23F |
| Protection of pipes against corrosion or incrustation | F16L 58/00 |

Special rules of classification

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](#).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

- "in the presence of hydrogen" or "in the absence of hydrogen" mean treatments with 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 or 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.

| | |
|----------|--|
| Cracking | Cracking is the process whereby complex organic molecules such as heavy hydrocarbons are broken down into simpler molecules (e.g. light hydrocarbons) by the breaking of carbon-carbon bonds in the precursors. the rate of cracking and the end products are strongly dependent on the temperature and the presence of any catalysts. |
|----------|--|

| | |
|---------------------------|---|
| Refining | Refining is the process of purification of a substance. The term is usually used of a natural resource that is almost in a usable form, but which is more useful in a purer form. For instance, most types of natural petroleum will burn straight from the ground, but they will burn poorly and quickly clog an engine with residues and byproducts. the Term "refining" is broad and may include more drastic transformations. the refining of liquids is often accomplished by distillation or fractionation. |
| Reforming (catalytic) | Thermal or catalytic reforming is a chemical process used to convert naphtha boiling range feedstocks, typically having low octane ratings, into high-octane liquid products called reformates which are components of high-octane gasoline (also known as petrol). The process represents the total effect of numerous simultaneous reactions, such as dehydrogenation, isomerisation, cracking and polymerisation. |
| Destructive hydrogenation | Splitting of molecules of the raw material with addition of hydrogen to them, also called direct liquefaction, liquefaction of coal by reacting it with hydrogen at high temperature and pressure |
| Voltolising | Subjecting oils to treatment with an electric discharge. |

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

| | |
|--------------|--------------------|
| cat-cracking | catalytic cracking |
|--------------|--------------------|

C10G 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](#))

Definition statement

This place covers:

- Pretreatments for liquefaction processes;
- Production of liquid hydrocarbon mixtures from oil-shale, oil-sand or non-melting solid carbonaceous, biomass, e.g. bagasse, vegetation, hay, straw, cornstalk
- Oil release using microorganisms, electric or magnetic means or radiation (not classified in [C10G 32/00](#)).

References

Limiting references

This place does not cover:

| | |
|---|--|
| Production of liquid hydrocarbons from rubber, rubber waste, plastic | C10G 1/10 |
| Production of liquid hydrocarbons starting from solids using pressure | B01J 3/00 |
| Mechanical separation of oil from oil-shales, oil-sand or the like | B03B 1/00 , B03B 4/00 , B03B 5/00 , B03B 7/00 , B03B 9/00 , B03B 11/00 , B03B 13/00 |

C10G 1/006

{Combinations of processes provided in groups [C10G 1/02](#) - [C10G 1/08](#)}

Definition statement

This place covers:

Liquefaction processes of feedstocks, being already partially liquefied in a pretreatment step.

Combinations of processes provided in groups [C10G 1/02](#) - [C10G 1/08](#).

C10G 1/008

{Controlling or regulating of liquefaction processes (controlling or regulation in general [G05](#))}

References**Limiting references**

This place does not cover:

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 1/02

by distillation (destructive distillation of oil-shale [C10B 53/06](#))

References**Limiting references**

This place does not cover:

| | |
|---|----------------------------|
| Destructive distillation of liquid hydrocarbon feedstocks | C10G 9/00 |
| Destructive distillation of oil-shale | C10B 53/06 |
| Apparatus for destructive distillation | C10B 53/06 |
| For apparatus | C10B 53/06 |
| Gasification with production of H ₂ and CO | C10J 3/00 |

C10G 1/045

{Separation of insoluble materials}

Definition statement

This place covers:

Production of liquid hydrocarbons mixtures from oil-shale, oil-sand, or non-melting solid carbonaceous by separation of insoluble materials

Separation process of bitumen from froth, which can be prepared by a process classified in [C10G 1/047](#).

C10G 1/06

by destructive hydrogenation

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| | |
|---------------------------|--|
| destructive hydrogenation | reaction of splitting of molecules of the raw material with addition of hydrogen to them, e.g. direct liquefaction of coal by reacting coal with hydrogen at high temperature and pressure |
|---------------------------|--|

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "Hydroretorting" and "destructive hydrogenation"

C10G 1/08

with moving catalysts

Definition statement

This place covers:

Production of liquid hydrocarbon mixtures from oil-shale, oil-sand or similar material in the presence of a catalyst, the catalyst being moving or not.

C10G 1/10

from rubber or rubber waste

Definition statement

This place covers:

Production of liquid hydrocarbons from rubber or polymers as such.

References

Limiting references

This place does not cover:

| | |
|--|----------------------|
| Destructive distillation of carbonaceous materials | C10B |
| Lubricating compositions | C10M |

C10G 2/00

Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon

Definition statement

This place covers:

Production of liquid hydrocarbon mixtures from CO or CO₂, Fisher-Tropsch reaction

References

Limiting references

This place does not cover:

| | |
|--|---------------------------|
| Production of liquid hydrocarbons from oxygenated hydrocarbons | C10G 3/00 |
| Production of liquid hydrocarbons of defined composition | C07C 1/00 |

C10G 2/30

{from carbon monoxide with hydrogen}

Definition statement

This place covers:

Production of liquid hydrocarbon mixtures of undefined composition from gas not from a liquid like in reforming reaction

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|---|
| Production of liquid hydrocarbons of defined composition | C07C 1/04 , C07C 1/06 |
|--|---|

C10G 2/32

{with the use of catalysts}

Definition statement

This place covers:

Processes using Fischer-Tropsch reactions as such (no details), e.g. in combination with other process steps.

C10G 2/332

{of the iron-group}

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| | |
|------------|---------------|
| Iron group | Fe, Co and Ni |
|------------|---------------|

C10G 2/333

{of the platinum-group}

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| | |
|----------------|------------------------|
| Platinum-group | Ru, Rh, Pd, Os, Ir, Pt |
|----------------|------------------------|

C10G 2/341**{with stationary catalyst bed}****Glossary of terms***In this place, the following terms or expressions are used with the meaning indicated:*

| | |
|-------------------------|--|
| Stationary catalyst bed | Fixed bed reactor, trickle bed reactor |
|-------------------------|--|

C10G 2/342**{with moving solid catalysts}****Glossary of terms***In this place, the following terms or expressions are used with the meaning indicated:*

| | |
|------------------------|---|
| Moving solid catalysts | an ebullated bed reactor, a slurry bed reactor, or a loop reactor |
|------------------------|---|

C10G 2/343**{according to the "moving-bed" method}****References****Limiting references***This place does not cover:*

| | |
|--|----------------------------|
| Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon with moving solid catalysts according to the ebulating bed techniques | C10G 2/342 |
| Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon with moving solid catalysts according to the fluidised-bed technique | C10G 2/344 |

Glossary of terms*In this place, the following terms or expressions are used with the meaning indicated:*

| | |
|-------------------|---|
| Moving bed method | process where there is a netto movement of the catalyst, i.e. a laminar flow, the whole catalyst moves up or down in one direction. (all the catalyst moves up or down, moves in one direction) |
|-------------------|---|

C10G 2/40**{from carbon monoxide with water vapor}****Definition statement***This place covers:*

Production of liquid hydrocarbon mixtures of undefined composition from carbon monoxide with water vapour

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|---------------------------|
| Production of liquid hydrocarbons of defined composition | C07C 1/10 |
| Production of gases containing carbon monoxide and hydrogen from solid carbonaceous materials by partial oxidation processes involving oxygen or steam | C10J |

C10G 2/50

{from carbon dioxide with hydrogen}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|---------------------------|
| Production of liquid hydrocarbons of defined composition | C07C 1/12 |
|--|---------------------------|

C10G 3/00

Production of liquid hydrocarbon mixtures from oxygen-containing or organic materials, e.g. fatty oils, fatty acids (production from non-melting solid oxygen-containing carbonaceous materials [C10G 1/00](#); preparation of individual hydrocarbons or mixtures thereof of definite or specified contribution [C07C](#))

References

Limiting references

This place does not cover:

| | |
|--|---------------------------|
| Production from non-melting solid oxygen-containing carbonaceous materials | C10G 1/00 |
| Preparation of individual hydrocarbons or mixtures thereof of definite or specified contribution | C07C 1/00 |

C10G 5/06

by cooling or compressing

Definition statement

This place covers:

Recovery of liquid hydrocarbon mixtures from gases by cooling or compressing, e.g. straight condensation cooling

Relationships with other classification places

Recovery of liquid hydrocarbon from gases by condensation cooling is classified in [C10G 5/00](#)

Distillation of hydrocarbon oils is classified in [C10G 7/00](#)

Refining of hydrocarbon oils in the absence of hydrogen by cooling is classified in [C10G 31/06](#)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|--|
| Production of liquid hydrocarbons starting from gas using pressure | B01J 3/00 |
| Cryogenic processing | F25J 1/00 , F25J 3/00 , F25J 5/00 |

C10G 7/00

Distillation of hydrocarbon oils (distillation in general [B01D](#))

References

Limiting references

This place does not cover:

| | |
|---|--|
| Processes combining adsorption and distillation | C10G 25/11 |
| Distillation in general | B01D 1/00 - B01D 71/00 |

C10G 7/04

Dewatering

References

Limiting references

This place does not cover:

| | |
|---|----------------------------|
| Dewatering with electrical or magnetic means | C10G 32/02 |
| Dewatering with chemical means | C10G 33/04 |
| Dewatering with mechanical means | C10G 33/06 |
| Treatment of water, waste water, sewage or sludge | C02F |

C10G 7/08

Azeotropic or extractive distillation (refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents [C10G 21/00](#))

References

Limiting references

This place does not cover:

| | |
|---|----------------------------|
| Refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents | C10G 21/00 |
|---|----------------------------|

C10G 9/00

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

Definition statement

This place covers:

Dehydrogenation of parafins to olefins; dehydrogenation of naphthenes to aromatics.

References

Limiting references

This place does not cover:

| | |
|--|---------------------------|
| Thermal non-catalytic cracking mainly producing hydrogen | C01B 3/24 |
|--|---------------------------|

C10G 9/005

{Coking (in order to produce liquid products mainly)}

Definition statement

This place covers:

Coking, in the absence of hydrogen, of hydrocarbon oils to produce liquid products

References

Limiting references

This place does not cover:

| | |
|--|--|
| Thermal cracking with production of gas, coke or tar as main product | C10B 1/00 - C10B 57/00 |
|--|--|

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "Delayed coking" and "coking"

C10G 9/12

Removing incrustation

Definition statement

This place covers:

Thermal non-catalytic cracking, in the absence of hydrogen, of hydrocarbon oils by pressure distillation characterised by the apparatus for removing incrustation, e.g corrosion

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|----------------------------------|----------------------------|
| Removing incrustation in general | C10G 75/00 |
|----------------------------------|----------------------------|

C10G 9/16

Preventing or removing incrustation

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|----------------------------|
| Preventing or removing incrustation in general | C10G 75/00 |
|--|----------------------------|

C10G 9/36

with heated gases or vapours

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| | |
|----------------|-----------------------------------|
| Steam cracking | cracking in the presence of steam |
|----------------|-----------------------------------|

C10G 11/00

Catalytic cracking, in the absence of hydrogen, of hydrocarbon oils (cracking in direct contact with molten metals or salts [C10G 9/34](#))

References

Limiting references

This place does not cover:

| | |
|--|---------------------------|
| Cracking in direct contact with molten metals or salts | C10G 9/34 |
|--|---------------------------|

C10G 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](#))}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--|-----------------------------|
| Combined use of gas and steam turbines | F01K 3/185 |
| Using steam turbines | F01K 23/064 |
| Using gas turbines | F01K 25/14 |

C10G 11/187**{Controlling or regulating (controlling or regulating in general [G05](#))}****References****Limiting references***This place does not cover:*

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 17/07**using halogen acids or oxyacids of halogen (acids generating halogen [C10G 27/02](#))****Definition statement***This place covers:*

Refining of hydrocarbon oils in the absence of hydrogen by liquid-liquid treatment forming two immiscible phases using halogen acids or oxyacids of halogen, e.g. acid halide, HF (hydrogen fluoride)

References**Limiting references***This place does not cover:*

| | |
|--|----------------------------|
| Refining with acids generating halogen | C10G 27/02 |
|--|----------------------------|

C10G 17/08**with acid-forming oxides (refining with CO₂ or SO₂ as a selective solvent [C10G 21/06](#))****Definition statement***This place covers:*

Refining of hydrocarbon oils in the absence of hydrogen by liquid-liquid treatment forming two immiscible phases using acid-forming oxides, e.g. oleum

References**Limiting references***This place does not cover:*

| | |
|---|----------------------------|
| Refining with CO ₂ or SO ₂ as a selective solvent | C10G 21/06 |
|---|----------------------------|

C10G 21/00

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](#))

References

Limiting references

This place does not cover:

| | |
|---------------|----------------------------|
| Dewaxing oils | C10G 73/02 |
|---------------|----------------------------|

C10G 21/12

Organic compounds only

Definition statement

This place covers:

Refining processes using a mixture of compounds from groups [C10G 21/14](#) - [C10G 21/26](#).

C10G 21/27

Organic compounds not provided for in a single one of groups [C10G 21/14](#) - [C10G 21/26](#)

Definition statement

This place covers:

Refining processes using as a solvent a compound containing two or more elements from the group (oxygen, halogen, nitrogen, sulfur, selenium, tellurium, phosphor and silicon);

organic compounds not provided for in a single one of groups [C10G 21/14](#) - [C10G 21/26](#).

C10G 21/30

Controlling or regulating (controlling or regulating in general [G05](#))

References

Limiting references

This place does not cover:

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 25/00

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

Definition statement

This place covers:

Refining processes using physical adsorbents.

Special rules of classification

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.

C10G 25/003

{Specific sorbent material, not covered by [C10G 25/02](#) or [C10G 25/03](#)}

Definition statement

This place covers:

Specific sorbent materials, like silica, alumina, etc. not covered by [C10G 25/02](#) or [C10G 25/03](#).

C10G 25/02

with ion-exchange material

Definition statement

This place covers:

Processes using ion-exchange material as adsorbent, thus no ion-exchange takes place, i.e. the material adsorbs the impurity without leaving an ion (being part of the material) in the hydrocarbon liquid.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| | |
|-----------------------|--|
| ion-exchange material | material that can exchange ions, e.g. clay |
|-----------------------|--|

C10G 25/03

with crystalline aluminosilicates, e.g. molecular sieves

Definition statement

This place covers:

Refining of hydrocarbon oils in the absence of hydrogen, with crystalline aluminosilicates, e.g. molecular sieves, zeolites

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

molecular sieves means crystalline aluminosilicates, ALPO, SAPO.

C10G 27/06

in the presence of alkaline solutions

Definition statement

This place covers:

Oxidation processes using as the catalyst an alkaline solution, e.g. sodium hydroxide solution

C10G 27/08**in the presence of copper chloride****Definition statement***This place covers:*

Oxidation processes using as the catalyst copper chloride.

C10G 27/10**in the presence of metal-containing organic complexes, e.g. chelates, or cationic ion-exchange resins****Definition statement***This place covers:*

Refining of hydrocarbon oils in the absence of hydrogen by oxidation processes using as the catalyst metal-containing organic complexes or cationic ion-exchange resins

C10G 27/12**with oxygen-generating compounds, e.g. per-compounds, chromic acid, chromates (plumbites or plumbates [C10G 19/06](#))****References****Limiting references***This place does not cover:*

| | |
|-------------------------------|----------------------------|
| Use of plumbites or plumbates | C10G 19/06 |
|-------------------------------|----------------------------|

C10G 29/00**Refining of hydrocarbon oils in the absence of hydrogen, with other chemicals****Definition statement***This place covers:*

Refining of hydrocarbons oils by adding a catalyst; chemisorption, other chemicals being any compound that will react with the hydrocarbon oils in order to refine them, to remove impurities.

Relationships with other classification placesRefining of hydrocarbon oils in the absence of hydrogen, with solid adsorbents is classified in [C10G 25/00](#)**C10G 29/205****{by reaction with hydrocarbons added to the hydrocarbon oil}****Definition statement***This place covers:*

Refining of hydrocarbon oils in the absence of hydrogen by reaction with hydrocarbons added to the hydrocarbon oil, e.g.

Alkylation processes.

C10G 31/00

Refining of hydrocarbon oils in the absence of hydrogen, by methods not otherwise provided for (by distillation [C10G 7/00](#))

References

Limiting references

This place does not cover:

| | |
|--------------------------|---------------------------|
| Refining by distillation | C10G 7/00 |
|--------------------------|---------------------------|

C10G 31/08

by treating with water

Definition statement

This place covers:

Desalting processes, refining of hydrocarbon oils in the absence of hydrogen, by treating with liquid water or steam

C10G 32/04

by particle radiation

Definition statement

This place covers:

Refining of hydrocarbon oils by particle radiation

Nuclear radiation processes.

C10G 33/00

Dewatering or demulsification of hydrocarbon oils (by distillation [C10G 7/04](#))

References

Limiting references

This place does not cover:

| | |
|----------------------------|---------------------------|
| Dewatering by distillation | C10G 7/04 |
|----------------------------|---------------------------|

C10G 33/08**Controlling or regulating (controlling or regulating in general [G05](#))****References****Limiting references***This place does not cover:*

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 35/00**Reforming naphtha****Definition statement***This place covers:*

Treatment of naphtha, in order to improve the octane number or its aromatic content.

C10G 35/095**containing crystalline alumino-silicates, e.g. molecular sieves {([C10G 35/065](#) takes precedence)}****Definition statement***This place covers:*

Catalytic reforming naphtha characterised by the catalyst containing crystalline alumino-silicates, e.g. molecular sieves, zeolites including only silica or alumina

Special rules of classification[C10G 35/065](#) takes precedence, e.g. zeolite including other elements with or without silica or alumina like SAPO, ALPO**C10G 35/24****Controlling or regulating of reforming operations (controlling or regulating in general [G05](#))****References****Limiting references***This place does not cover:*

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 45/00

Refining of hydrocarbon oils using hydrogen or hydrogen-generating compounds

Definition statement

This place covers:

Hydrogenation of olefins.

References

Limiting references

This place does not cover:

| | |
|--------------------------------------|----------------------------|
| Selective hydrogenation of diolefins | C10G 45/32 |
| Selective hydrogenation of aromatics | C10G 45/44 |

C10G 45/16

suspended in the oil, e.g. slurries

Definition statement

This place covers:

Refining processes in the presence of an ebullated bed.

C10G 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](#))

Definition statement

This place covers:

Dewaxing processes by selective hydroisomerisation and/or selective hydrocracking, without changing the boiling point.

References

Limiting references

This place does not cover:

| | |
|--|----------------------------|
| Improving or increasing the octane number or aromatic content of naphtha | C10G 35/00 |
|--|----------------------------|

Special rules of classification

Refining of hydrocarbons oils by electric or magnetic means, by irradiation or by using microorganism: [C10G 32/00](#).

C10G 45/68**Aromatisation of hydrocarbon oil fractions (of naphtha [C10G 35/00](#))****Definition statement***This place covers:*

Dehydrogenation processes of naphthenes.

References**Limiting references***This place does not cover:*

| | |
|--------------------------|----------------------------|
| Aromatisation of naphtha | C10G 35/00 |
|--------------------------|----------------------------|

C10G 45/72**Controlling or regulating (controlling or regulating in general [G05](#))****References****Limiting references***This place does not cover:*

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 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](#))****References****Limiting references***This place does not cover:*

| | |
|--|---------------------------|
| Destructive hydrogenation of non-melting solid carbonaceous or similar materials | C10G 1/06 |
|--|---------------------------|

Special rules of classificationCracking of hydrocarbon oils by electric means, electromagnetic or mechanical vibrations, by particle radiation or with gases superheated in electric arcs: [C10G 15/00](#).

C10G 47/04**Oxides****Definition statement**

This place covers:

Cracking processes of hydrocarbon oils in the presence of hydrogen or hydrogen generating compounds characterised by the catalyst being oxides, the oxides does not form part of the reaction. It's a bulk catalyst

Cracking processes using a bulk catalyst, i.e. in the absence of a support.

C10G 47/06**Sulfides****Definition statement**

This place covers:

Cracking processes of hydrocarbon oils in the presence of hydrogen or hydrogen generating compounds characterised by the catalyst being sulfides

Cracking processes using a bulk catalyst, i.e. in the absence of a support.

C10G 47/08**Halides****Definition statement**

This place covers:

Cracking processes of hydrocarbon oils in the presence of hydrogen or hydrogen generating compounds characterised by the catalyst being halides

Cracking processes using a bulk catalyst, i.e. in the absence of a support.

C10G 47/22**Non-catalytic cracking in the presence of hydrogen****Definition statement**

This place covers:

Thermal hydrovisbreaking processes.

C10G 47/26**suspended in the oil, e.g. slurries****Definition statement**

This place covers:

Refining processes in the presence of an ebullated bed.

C10G 47/34

Organic compounds, e.g. hydrogenated hydrocarbons

Definition statement

This place covers:

Hydrocarbons that can give hydrogen, e.g. parafine transformed to olefine, the hydrogen being released with the reaction is used for the cracking process

Hydrogen donor diluent cracking, e.g. tetraline.

References

Limiting references

This place does not cover:

| | |
|---|----------------------------|
| Cracking starting from oil-shale, oil-sand or non-melting solid carbonaceous material | C10G 1/042 |
|---|----------------------------|

C10G 47/36

Controlling or regulating (controlling or regulating in general [G05](#))

References

Limiting references

This place does not cover:

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 49/00

Treatment of hydrocarbon oils in the presence of hydrogen or hydrogen-generating compounds, not provided for in a single one of the groups [C10G 45/02](#), [C10G 45/32](#), [C10G 45/44](#), [C10G 45/58](#) or [C10G 47/00](#)

References

Limiting references

This place does not cover:

| | |
|---|---|
| Processes specifying hydrotreating, hydrocracking in a list | C10G 45/00 , C10G 47/00 |
|---|---|

Special rules of classification

Treatment of hydrocarbon oils in the presence of hydrogen not provided for in a single one of the groups [C10G 45/02](#), [C10G 45/32](#), [C10G 45/44](#), [C10G 45/58](#) or [C10G 47/00](#), i.e. processes in general that can be applied to any process in the presence of hydrogen.

Exceptions are [C10G 49/002](#), [C10G 49/005](#), [C10G 49/007](#), [C10G 49/22](#) and [C10G 49/24](#): documents should be classified in [C10G 49/002](#), [C10G 49/005](#), [C10G 49/007](#), [C10G 49/22](#) or [C10G 49/24](#) and [C10G 45/00](#) (if hydrotreating) or [C10G 47/00](#) (if hydrocracking).

C10G 49/007

{in the presence of hydrogen from a special source or of a special composition or having been purified by a special treatment}

Definition statement

This place covers:

Treatment in the presence of hydrogen from a special source (refining, cracking, general) , e.g. Fischer-Tropsch tail gas.

Any specific source other than hydrogen, specific cleaning treatment

C10G 49/22**Separation of effluents****Definition statement**

This place covers:

Treatment in the presence of hydrogen (refining, cracking, general) comprising separation of the effluents.

C10G 49/24**Starting-up hydrotreatment operations****Definition statement**

This place covers:

Start-up treatment in the presence of hydrogen (refining, cracking, general).

C10G 49/26**Controlling or regulating (controlling or regulating in general [G05](#))****References****Limiting references**

This place does not cover:

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 50/00

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](#))

References**Limiting references**

This place does not cover:

| | |
|----------------------|-----------------------------|
| Alkylation processes | C10G 29/205 |
|----------------------|-----------------------------|

| | |
|--|---|
| Preparation of individual hydrocarbons or mixtures thereof of definite or specified constitution | C07C 2/00 , C07C 1/00 |
|--|---|

C10G 53/06

including only extraction steps, e.g. deasphalting by solvent treatment followed by extraction of aromatics (refining in one step with two or more solvents which are introduced or withdrawn separately [C10G 21/02](#))

References

Limiting references

This place does not cover:

| | |
|---|----------------------------|
| Refining in one step with two or more solvents which are introduced or withdrawn separately | C10G 21/02 |
|---|----------------------------|

C10G 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](#)

Definition statement

This place covers:

working-up undefined normally gaseous mixture obtained by processes covered by [C10G 9/00](#), [C10G 11/00](#), [C10G 15/00](#), [C10G 47/00](#) and [C10G 51/00](#).

working up implies improvement of the material, it's a kind of processing

C10G 71/00

Treatment by methods not otherwise provided for of hydrocarbon oils or fatty oils for lubricating purposes (by Fischer-Tropsch [C07C 1/00](#); lubricating compositions [C10M](#))

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|--------------------------|---|
| Lubricating compositions | C10M 1/00 - C10M 177/00 |
|--------------------------|---|

C10G 71/02

Thickening by voltolising (chemical modification of drying oils by voltolising [C09F 7/04](#))

References

Limiting references

This place does not cover:

| | |
|---|---------------------------|
| Chemical modification of drying oils by voltolising | C09F 7/04 |
|---|---------------------------|

C10G 73/00

Recovery or refining of mineral waxes, e.g. montan wax (compositions essentially based on waxes [C08L 91/00](#))

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|---|----------------------------|
| Compositions essentially based on waxes | C08L 91/00 |
|---|----------------------------|

C10G 73/34

Controlling or regulating (controlling or regulating in general [G05](#))

References

Limiting references

This place does not cover:

| | |
|--------------------------------------|---------------------|
| Controlling or regulating in general | G05 |
|--------------------------------------|---------------------|

C10G 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; protection of pipes against corrosion or incrustation [F16L 58/00](#))

Definition statement

This place covers:

Treatment of apparatus for treatment or conversion of hydrocarbons oils in general, against corrosion or fouling

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| | |
|---|----------------------------|
| Protection of pipes against corrosion or incrustation | F16L 58/00 |
|---|----------------------------|