

## C10K

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

#### Definition statement

*This subclass/group covers:*

Purifying combustible gases containing carbon monoxide, e.g. synthesis gas, e.g. by dust removal, condensing non-gaseous materials, washing, adsorption using solids such as active carbon; including regeneration of purifying material.

Modifying the chemical composition of combustible gases containing carbon monoxide to produce an improved fuel, e.g. by altering the calorific value, by reducing the carbon monoxide content (e.g. to zero), by catalytic treatment or by mixing with gases.

#### Relationship between large subject matter areas

Production of synthesis gas (syngas) from liquid or gaseous hydrocarbons is covered by [C01B 3/00](#).

Production of combustible gases containing carbon monoxide (including producer gas, wood gas, town gas, synthesis gas, manufactured gas and water gas) from solid carbonaceous fuels, is matter for [C10J](#).

Destructive distillation processes, e.g. carbonisation or coking, and excluding gasification processes, are covered by subclass [C10B](#). Combinations of gasification and destructive distillation are covered by group [C10J 3/58](#).

Other gaseous fuels, including natural gas, substitute natural gas or synthetic natural gas (SNG) and liquefied petroleum gas (LPG), are covered by group [C10L 3/00](#).

Modifying the properties of any distillation gases inside the oven is covered by subclass [C10B](#)

#### References relevant to classification in this subclass

*This subclass/group does not cover:*

Isolation of hydrogen from mixtures containing hydrogen and carbon monoxide	<a href="#">C01B 3/50</a>
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Multi-step process for production of hydrogen or of gaseous mixtures	<a href="#">C01B 3/02</a>
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containing a substantial proportion of hydrogen	
Multi-step process for preparation of compounds having hydroxy or O-metal groups bound to a carbon atom not belonging to a six-membered aromatic ring by reduction of oxides of carbon exclusively with hydrogen or hydrogen-containing gases, one step being the formation of initial mixture of carbon oxides and hydrogen for synthesis	<a href="#">C07C 29/1518</a>
Multi-step process for production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon	<a href="#">C10G 2/00</a>
Plants with an integrated combined cycle, having more than one engine delivering power externally to the plant	<a href="#">F01K 23/06</a>
Plant characterised by the engines using gaseous fuel generated in the plant from solid fuel	<a href="#">F02B 43/08</a>
Gas turbine plant with separate fuel gasifiers	<a href="#">F02C 3/28</a>
Carburettors for supplying combustible mixtures to internal combustion engines	<a href="#">F02M</a>

Places in relation to which this subclass is residual:

Separation of gases or vapour by diffusion	<a href="#">B01D 53/22</a>
Multi-step process for production of hydrogen or of gaseous mixtures containing a substantial proportion of hydrogen	<a href="#">C01B 3/02</a>
Multi-step process for preparation of	<a href="#">C01C 1/0405</a>

ammonia	
Multi-step process for preparation of hydrocarbons from carbon monoxide with hydrogen	<a href="#">C07C 1/04</a>
Multi-step process for preparation of compounds having hydroxy or O-metal groups bound to a carbon atom not belonging to a six-membered aromatic ring by reduction of oxides of carbon exclusively with hydrogen or hydrogen-containing gases, one step being the formation of initial	<a href="#">C07C 29/1518</a>
Preparation of urea	<a href="#">C07C 273/02</a>
Multi-step process for production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon	<a href="#">C10G 2/00</a>
Production of synthetic natural gas	<a href="#">C10L 3/08</a>
Plants with an integrated combined cycle, having more than one engine delivering power externally to the plant	01K23/06
Plant characterised by the engines using gaseous fuel generated in the plant from solid fuel	<a href="#">F02B 43/08</a>
Gas turbine plant with separate fuel gasifiers	<a href="#">F02C 3/28</a>
Combination of fuel cell with means for gasification of solid fuel	<a href="#">H01M 8/0643</a>

### **Informative references**

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

Gas washers	<a href="#">B01D 47/00</a>
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Chemical processes such as purification of gases or modification of the chemical composition thereof, applied to compositions other than combustible gases containing carbon monoxide	<a href="#">B01D 53/00</a> , <a href="#">B01J 19/00</a>
Isolation of inorganic compounds from gaseous mixtures which may include carbon monoxide	<a href="#">C07C</a> , <a href="#">C01B</a>
Processes of modifying the properties of distillation gases inside an oven	<a href="#">C10B 57/18</a>
Natural gas; Synthetic natural gas obtained by processes not covered by <a href="#">C10G</a> , <a href="#">C10K 3/02</a> or <a href="#">C10K 3/04</a>	<a href="#">C10L 3/06</a>

### Special rules of classification within this subclass

In the absence of an indication to the contrary, classification is made in the last appropriate place ("last place rule")

When necessary, multiple classification symbols have to be added to cover all the purification steps.

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

Combustible gas containing carbon monoxide	syngas, synthesis gas, coke oven gas, pyrolysis gas, carbonisation gas
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### Synonyms and Keywords

In patent documents the following abbreviations are often used:

COG	Coke Oven Gas
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### C10K 1/001

**[N: working-up the condensates(recovering of NH<sub>3</sub> and NH<sub>4</sub> salts C01C1/00; working-up or purifying tars and tar-oils C10C1/00 )]**

### **References relevant to classification in this group**

*This subclass/group does not cover:*

Working-up or purifying tars and tar-oils	<a href="#">C10C 1/00</a>
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## **C10K 1/02**

### **Dust removal**

#### **Informative references**

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

Filters, i.e. particle separators, or filtering processes specially modified for separating dispersed particles from gases or vapours	<a href="#">B01D 46/00</a>
Separating dispersed particles from gases, air or vapours by liquid as separating agent	<a href="#">B01D 47/00</a>
Apparatus using free vortex flow, e.g. cyclones	<a href="#">B04C</a>

## **C10K 1/022**

**[N: by baffle plates]**

#### **Informative references**

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

Separating dispersed particles from gases or vapours by inertia	<a href="#">B01D 45/04</a>
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## **C10K 1/024**

## [N: by filtration]

### Informative references

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

Filters, i.e. particle separators, or filtering processes specially modified for separating dispersed particles from gases or vapours	<a href="#">B01D 46/00</a>
Separating dispersed particles from gases, air or vapours by liquid as separating agent	<a href="#">B01D 47/00</a>
Apparatus using free vortex flow, e.g. cyclones	<a href="#">B04C</a>

## C10K 1/026

### [N: by centrifugal forces]

### References relevant to classification in this group

This subclass/group does not cover:

Apparatus using free vortex flow, e.g. cyclones, per se	<a href="#">B04C</a>
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### Informative references

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

Separating dispersed particles from gases or vapours by centrifugal force	<a href="#">B01D 45/12</a>
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## C10K 1/04

by cooling to condense non-gaseous materials

### Special rules of classification within this group

[C10K 1/001](#) takes precedence

## C10K 1/06

combined with spraying with water

### Special rules of classification within this group

[C10K 1/001](#) takes precedence

## C10K 1/08

by washing with liquids; Reviving the used wash liquors

### Definition statement

*This subclass/group covers:*

Acid gas removal, e.g. H<sub>2</sub>S, HCN, CO<sub>2</sub>, by absorption process, e.g. amine scrubbing

### Informative references

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

Gas washers per se	<a href="#">B01D 47/00</a>
Separation of gases or vapours by absorption, such as acid gas removal	<a href="#">B01D 53/14</a>

## C10K 1/18

hydrocarbon oils

### Special rules of classification within this group

[C10K 1/165](#) takes precedence

## C10K 1/20

by treating with solids; Regenerating spent purifying masses [N: (separation by adsorption B01D53/02; separation by chemical reaction B01D53/34; refining of hydrocarbon oils with acids C10G17/02, C10G27/02, C10G29/12 )]

### Definition statement

*This subclass/group covers:*

Adsorption of impurities

### References relevant to classification in this group

*This subclass/group does not cover:*

Separation of gases by adsorption, e.g. PSA	<a href="#">B01D 53/02</a>
Separation of gases by chemical reaction	<a href="#">B01D 53/34</a>

### Informative references

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

Adsorbents per se	<a href="#">B01J 20/00</a>
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### C10K 1/32

**with selectively adsorptive solids, e.g. active carbon**

### Informative references

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

Adsorbents per se	<a href="#">B01J 20/00</a>
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### C10K 1/34

**by catalytic conversion of impurities to more readily removable materials**

### Definition statement

*This subclass/group covers:*

e.g. carbonyl sulfide (COS) hydrolysis

### C10K 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**

### **Glossary of terms**

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

In this main group, the following terms (or expressions) are used with the meaning indicated:

Calorific value	Thermal energy content
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### **C10K 3/04**

**reducing the carbon monoxide content [N: e.g. water-gas shift [WGS]]**

### **Informative references**

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

Production of hydrogen or of gaseous mixtures containing a substantial proportion of hydrogen by reaction of water vapour with carbon monoxide, water gas-shift reaction or WGS	<a href="#">C01B 3/12</a>
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