

## C21C

**PROCESSING OF PIG-IRON, e.g. REFINING, MANUFACTURE OF WROUGHT-IRON OR STEEL; TREATMENT IN MOLTEN STATE OF FERROUS ALLOYS (refining metals in general C22B9/00 )**

### Definition statement

*This subclass/group covers:*

all treatments of molten iron or steel, including the apparatuses specifically related thereto, e.g. converter, electric furnace.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Ferrous alloy compositions	<a href="#">C22C 38/00</a>
Cast iron alloys	<a href="#">C22C 37/00</a>

## C21C 1/02

### Dephosphorising or desulfurising

#### Definition statement

*This subclass/group covers:*

Also the specific treating agents

#### Informative references

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

Dephosphorising or desulfurising of molten ferrous alloys	<a href="#">C21C 7/064</a>
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#### Special rules of classification within this group

In case the dephosphorising, desulfurising are more generally claimed and could also apply to ferrous alloys (incl. steel), [C21C 7/064](#) should be attributed as well.

If the method of introduction is specifically claimed, the corresponding class in [C21C 7/00](#) should be attributed

## C21C 1/04

### Removing impurities other than carbon, phosphorus or sulfur

#### Informative references

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

Removing impurities of ferrous alloys	<a href="#">C21C 7/04</a>
General processes of refining metals	<a href="#">C22B 9/00</a> - <a href="#">C22B 9/22</a>

#### Special rules of classification within this group

In case the treatments to remove other impurities are more generally claimed and could also apply to ferrous alloys (incl. steel), [C21C 7/04](#) or any appropriate class below should be attributed as well.

If the method of introduction is specifically claimed, the corresponding class in [C21C 7/00](#) should be attributed

## C21C 1/06

### Constructional features of mixers for pig-iron

#### Informative references

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

Stirring devices for molten metal	<a href="#">F27D 27/00</a> , <a href="#">F27D 27/00</a>
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## C21C 1/08

### Manufacture of cast-iron

#### Definition statement

*This subclass/group covers:*

Treatment of pig iron to obtain non-spheroidal cast-iron.

#### References relevant to classification in this group

*This subclass/group does not cover:*

Cast-iron alloys (composition)	<a href="#">C22C 37/00</a> to <a href="#">C22C 37/10</a>
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## Informative references

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

Making of cast-iron alloys	<a href="#">C22C 33/08</a> , <a href="#">C22C 33/10</a>
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## C21C 1/10

### Making spheroidal graphite cast-iron

#### Definition statement

*This subclass/group covers:*

Also the nodularising agents

#### Informative references

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

Cast-iron alloys	<a href="#">C22C 37/00</a> - <a href="#">C22C 37/10</a>
Making of cast-iron alloys	<a href="#">C22C 33/08</a> , <a href="#">C22C 33/10</a>

## C21C 3/00

### Manufacture of wrought-iron or wrought-steel

## C21C 5/00

### Manufacture of carbon-steel, e.g. plain mild steel, medium carbon steel or cast steel [N: or stainless steel]

#### Definition statement

*This subclass/group covers:*

Also the manufacturing of stainless steels and ferro-alloys ; apparatuses, in particular converters, which are specifically dedicated to the steel processing are classified within this group as well

#### References relevant to classification in this group

*This subclass/group does not cover:*

Ferrous alloy compositions	<a href="#">C22C 38/00</a> to <a href="#">C22C 38/60</a>
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### Special rules of classification within this group

Indexing Codes [C21C 5/00](#) to [C21C 5/56](#) apply for additional information or in case no corresponding EC-subgroup exists.

### C21C 5/28

**Manufacture of steel in the converter [N: (C21C5/005 takes precedence)]**

#### Definition statement

*This subclass/group covers:*  
Also the full plant lay-out.

### C21C 5/30

**Regulating or controlling the blowing**

#### Definition statement

*This subclass/group covers:*  
Converter processes in which the regulation or control of the blowing is claimed, be it from above, through the bath or a combination thereof, i.e. not specific to one of the methods ; the regulation or control can relate to the amount, the sequence, the composition etc of the gases.

Also post-combustion is considered as a means to control the blowing

#### Synonyms and Keywords

In patent documents the following abbreviations are often used:

Post-combustion	after burning
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### C21C 5/32

**Blowing from above (C21C5/35 takes precedence)**

#### Definition statement

*This subclass/group covers:*

Regulation or control of blowing ONLY from above, i.e. through a lance

### References relevant to classification in this group

*This subclass/group does not cover:*

Lance details	<a href="#">C21C 5/46</a> , <a href="#">F27D 3/16</a> , <a href="#">F27D 3/18</a>
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## C21C 5/34

**Blowing through the bath (C21C5/35 takes precedence)**

### Definition statement

*This subclass/group covers:*

Regulation or control of blowing only through the melt, i.e. through a tuyere or bottom

### References relevant to classification in this group

*This subclass/group does not cover:*

Tuyere details	<a href="#">C21C 5/48</a> , <a href="#">B22D 1/005</a>
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## C21C 5/38

**Removal of waste gases or dust**

### Definition statement

*This subclass/group covers:*

The treatment of the off-gas

### Informative references

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

Separation	<a href="#">B01D</a>
In particular of solids from gases or vapours by gravity, inertia or centrifugal forces	<a href="#">B01D 45/00</a> - <a href="#">B01D 45/18</a>
By filters	<a href="#">B01D 46/00</a> - <a href="#">B01D 46/54</a>

By liquids	<a href="#">B01D 47/00</a> - <a href="#">B01D 47/18</a>
By other means	<a href="#">B01D 49/00</a> - <a href="#">B01D 49/02</a>
Purifying or modifying the chemical composition of combustible gases containing CO	<a href="#">C10K 1/00</a> - <a href="#">C10K 1/34</a> , <a href="#">C10K 3/00</a> - <a href="#">C10K 1/06</a>

## C21C 5/40

### Offtakes or separating apparatus for converter waste gases or dust

#### Definition statement

*This subclass/group covers:*

The installation required for capturing and treating of the off-gas.

#### Informative references

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

Arrangements for using waste heat, using or disposing of waste gas	<a href="#">F27D 17/00</a> , <a href="#">F27D 17/00</a>
Preventing escape from fumes from the area where they are produced, collecting or removing fumes therefrom	<a href="#">B08B 15/00</a> - <a href="#">B08B 15/04</a>
Devices for conducting smoke or fumes for factories or large buildings	<a href="#">F23J 11/12</a>

## C21C 5/44

### Refractory linings

#### Definition statement

*This subclass/group covers:*

Apart from the lining itself, the equipment to make, apply or repair the lining, both of the vessel and of the taphole in particular.

## Informative references

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

Linings for furnaces in general, incl. making and repairing	<a href="#">F27D 1/00</a> , <a href="#">F27D 1/16</a> <a href="#">F27D 1/00</a> , <a href="#">F27D 1/16</a>
Tapholes	<a href="#">F27D 3/15</a> , <a href="#">F27D 3/15</a>

## C21C 5/46

### Details or accessories

#### Definition statement

*This subclass/group covers:*

Lances, means for their handling ; supporting means for the converter ; cooling arrangements ; tapholes, their opening and sealing ; charging devices ; measuring and sampling devices ; support and transport devices for the converter ; cleaning and skull removal.

## Informative references

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

Lances injecting a gas jet ; injecting particulate material using a fluid jet	<a href="#">F27D 3/16</a> , <a href="#">F27D 3/16</a> ; <a href="#">F27D 3/18</a> , <a href="#">F27D 3/18</a>
Trunnions in general bearings and accessories in general	<a href="#">F16C 11/02</a> <a href="#">F16C 17/00</a> - <a href="#">F16C 43/00</a>
Devices or methods for removing incrustations	<a href="#">F27D 15/00</a> , <a href="#">F27D 15/00</a>
Arrangements of controlling devices	<a href="#">F27D 19/00</a> , <a href="#">F27D 19/00</a>
Arrangements of monitoring devices	<a href="#">F27D 21/00</a> - <a href="#">F27D 21/04</a> , <a href="#">F27D 21/00</a> - <a href="#">F27D 21/04</a>
Charging of furnaces	<a href="#">F27D 3/00</a> - <a href="#">F27D 3/18</a> , <a href="#">F27D 3/00</a> - <a href="#">F27D 3/18</a>
Travelling or movable supports for the charge	<a href="#">F27D 3/12</a> , <a href="#">F27D 3/12</a>
Tapholes, opening and sealing	<a href="#">F27D 3/15</a> , <a href="#">F27D 3/15</a> ; <a href="#">C21B 7/12</a>

Measuring, testing in general of weight of vibrations or ultra-, infra- or sonic waves radiation pyrometry other temperature measurements	G01 <a href="#">G01G</a> <a href="#">G01H</a> <a href="#">G01J 5/00</a> - <a href="#">G01J 5/62</a> <a href="#">G01K</a>
Specific techniques for measuring or analysing materials by determining their chemical or physical properties	<a href="#">G01N</a>
Measuring the weight of the converter	<a href="#">C21C 5/46</a>

## C21C 5/48

### Bottoms or tuyères of converters

#### Definition statement

*This subclass/group covers:*  
Porous plugs and tuyeres

#### Informative references

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

Treatment of fused masses in a ladle, incl. with gases	<a href="#">B22D 1/00</a>
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## C21C 5/50

### Tilting mechanisms for converters

#### Informative references

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

Pivotal connections in general ;	<a href="#">F16C 11/00</a> to <a href="#">F16C 11/12</a> ;
Bearings and accessories in general	<a href="#">F16C 17/00</a> to <a href="#">F16C 43/08</a>

## C21C 5/52

### Manufacture of steel in electric furnaces ([N: C21C5/005 takes



**precedence]; electric heating per se H05B)**

### **Definition statement**

*This subclass/group covers:*

Any type of electric heating : AC, DC, induction or plasma, incl. accessories as burners.

The manufacturing of alloyed steels, incl. ferro-alloys.

The charging of the electric furnace.

Multiple hearth furnaces.

The general lay-out of the melt shop.

### **Informative references**

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

Burners	<a href="#">F23D</a>
Methods or apparatus for combustion using fluent fuel	<a href="#">F23C</a>
Electrically heated hearth furnaces hearth furnaces in general and their accessories	<a href="#">F27B 3/08</a> , <a href="#">F27B 3/08</a> <a href="#">F27B 3/00</a> - <a href="#">F27B 3/26</a> , <a href="#">F27B 3/00</a> - <a href="#">F27B 3/26</a>
Arrangements of elements for electric heating in or on furnaces	<a href="#">F27D 11/00</a> - <a href="#">F27D 11/12</a> , <a href="#">F27D 11/00</a> - <a href="#">F27D 11/12</a>
Electric heating elements or system	<a href="#">F27D 99/00</a>
Electric heating in general	<a href="#">H05B</a>

### **Special rules of classification within this group**

specific Indexing Codes exist for the presence/absence of a foam or a molten heel in the electric furnace

### **C21C 5/56**

**Manufacture of steel by other methods (making liquid steel by direct processes C21B13/00) [N: (C21C5/005 takes precedence)]**

## Definition statement

*This subclass/group covers:*

Also methods starting from scrap (with/without preheating) not treated in electric (arc) furnaces

## C21C 7/00

**Treating molten ferrous alloys, e.g. steel, not covered by groups C21C1/00 to C21C5/00 (treating molten metals during moulding B22D1/00, B22D27/00; remelting ferrous metals C22B)**

## Definition statement

*This subclass/group covers:*

Treatments of refining or alloying by means of the treatment agents, the form thereof, purpose or the circumstances.

Metallic, carbonaceous or exothermic treatment agents.

Loose or compacted agents or cored wires.

Treatments in a ladle, under pressure or in a current of streaming metal ;

special treatments of the slag.

## References relevant to classification in this group

*This subclass/group does not cover:*

Treating molten metals during moulding	<a href="#">B22D</a>
Remelting of ferrous alloys	<a href="#">C22B</a>

## Informative references

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

Making tubes by bending sheet	<a href="#">B21D 5/00</a>
Cored wires for welding, soldering	<a href="#">B23K</a>

## C21C 7/04

## Removing impurities by adding a treating agent

### Informative references

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

Removal of impurities from pig iron other than carbon, sulfur or phosphor	<a href="#">C21C 1/04</a>
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## C21C 7/064

### Dephosphorising; Desulfurising

#### Definition statement

*This subclass/group covers:*

Including specifically disclosed agents for desulfurising and dephosphorising

### Informative references

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

Removal of phosphor or sulfur from pig iron	<a href="#">C21C 1/02</a>
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## C21C 7/068

### Decarburising

#### Definition statement

*This subclass/group covers:*

Including stainless steels

### Informative references

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

Control and regulation of blowing in a converter	<a href="#">C21C 5/30</a> - <a href="#">C21C 5/35</a>
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## C21C 7/072

**Treatment with gases (C21C7/06, C21C7/064, C21C7/068 take precedence)**

**Informative references**

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

Refining metals by treating with gases	<a href="#">C22B 9/05</a>
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**C21C 7/076**

**Use of slags or fluxes as treating agents (C21C7/06, C21C7/064, C21C7/068 take precedence)**

**Informative references**

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

Refining metals by treating with fluxes	<a href="#">C22B 9/10</a>
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**C21C 7/10**

**Handling in a vacuum**

**Informative references**

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

Refining of metals by applying a vacuum	<a href="#">C22B 9/04</a>
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