

## SECTION C — CHEMISTRY; METALLURGY

### C22 METALLURGY; FERROUS OR NON-FERROUS ALLOYS; TREATMENT OF ALLOYS OR NON-FERROUS METALS

C22C ALLOYS (treatment of alloys C21D, C22F)

#### Note(s)

In this subclass, the following terms or expressions are used with the meanings indicated:

- "alloys" includes also:
  - a. metallic composite materials containing a substantial proportion of fibres or other somewhat larger particles;
  - b. ceramic compositions containing free metal bonded to carbides, diamond, oxides, borides, nitrides or silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides, other than as macroscopic reinforcing agents.
- "based on" requires at least 50% by weight of the specified constituent or of the specified group of constituents.

#### Subclass index

##### NON-FERROUS ALLOYS

Manufacture.....1/00, 3/00  
Based on or containing particular metals.....5/00-32/00

##### FERROUS ALLOYS

Manufacture.....33/00  
Master alloys.....35/00  
Cast-iron alloys.....37/00  
Iron alloys.....38/00

RADIOACTIVE ALLOYS.....43/00

AMORPHOUS ALLOYS.....45/00

ALLOYS CONTAINING FIBRES OR FILAMENTS.....47/00, 49/00

#### Non-ferrous alloys, i.e. alloys based essentially on metals other than iron [2, 5]

##### Note(s) [2009.01]

Groups C22C 43/00-C22C 49/00 take precedence over groups C22C 1/00-C22C 38/00.

#### **1/00 Making non-ferrous alloys** (by electrothermic methods C22B 4/00; by electrolysis C25C)

- 1/02 • by melting
- 1/03 • • using master alloys [2]
- 1/04 • by powder metallurgy (C22C 1/08 takes precedence) [2]
- 1/05 • • Mixtures of metal powder with non-metallic powder (C22C 1/08 takes precedence) [2]
- 1/06 • with the use of special agents for refining or deoxidising
- 1/08 • Alloys with open or closed pores
- 1/10 • Alloys containing non-metals (C22C 1/08 takes precedence) [2]

#### **3/00 Removing material from non-ferrous alloys to produce alloys of different constitution**

##### **5/00 Alloys based on noble metals**

- 5/02 • Alloys based on gold [2]
- 5/04 • Alloys based on a platinum group metal [2]
- 5/06 • Alloys based on silver [2]

- 5/08 • • with copper as the next major constituent [2]
- 5/10 • • with cadmium as the next major constituent [2]

##### **7/00 Alloys based on mercury**

##### **9/00 Alloys based on copper**

- 9/01 • with aluminium as the next major constituent [2]
- 9/02 • with tin as the next major constituent [2]
- 9/04 • with zinc as the next major constituent [2]
- 9/05 • with manganese as the next major constituent [2]
- 9/06 • with nickel or cobalt as the next major constituent [2]
- 9/08 • with lead as the next major constituent [2]
- 9/10 • with silicon as the next major constituent

##### **11/00 Alloys based on lead**

- 11/02 • with an alkali or an alkaline earth metal as the next major constituent [2]
- 11/04 • with copper as the next major constituent [2]
- 11/06 • with tin as the next major constituent [2]
- 11/08 • with antimony or bismuth as the next major constituent [2]
- 11/10 • • with tin [2]

##### **12/00 Alloys based on antimony or bismuth [2]**

##### **13/00 Alloys based on tin**

- 13/02 • with antimony or bismuth as the next major constituent [2]

**14/00 Alloys based on titanium [2]**

**16/00 Alloys based on zirconium [2]**

**18/00 Alloys based on zinc [2]**

- 18/02 • with copper as the next major constituent [2]  
18/04 • with aluminium as the next major constituent [2]

**19/00 Alloys based on nickel or cobalt**

- 19/03 • based on nickel [2]  
19/05 • • with chromium [2]  
19/07 • based on cobalt [2]

**20/00 Alloys based on cadmium [2]**

**21/00 Alloys based on aluminium**

- 21/02 • with silicon as the next major constituent [2]  
21/04 • • Modified aluminium-silicon alloys  
21/06 • with magnesium as the next major constituent [2]  
21/08 • • with silicon [2]  
21/10 • with zinc as the next major constituent [2]  
21/12 • with copper as the next major constituent [2]

**Note(s)**

In groups C22C 21/14-C22C 21/18, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place.

- 21/14 • • with silicon [2]  
21/16 • • with magnesium [2]  
21/18 • • with zinc [2]

**22/00 Alloys based on manganese [2]**

**23/00 Alloys based on magnesium**

- 23/02 • with aluminium as the next major constituent [2]  
23/04 • with zinc or cadmium as the next major constituent [2]  
23/06 • with a rare earth metal as the next major constituent [2]

**24/00 Alloys based on an alkali or an alkaline earth metal [2]**

**25/00 Alloys based on beryllium**

**26/00 Alloys containing diamond [4]**

**27/00 Alloys based on rhenium or a refractory metal not mentioned in groups C22C 14/00 or C22C 16/00 [2]**

- 27/02 • Alloys based on vanadium, niobium or tantalum [2]  
27/04 • Alloys based on tungsten or molybdenum [2]  
27/06 • Alloys based on chromium [2]

**28/00 Alloys based on a metal not provided for in groups C22C 5/00-C22C 27/00 [2]**

**29/00 Alloys based on carbides, oxides, borides, nitrides or silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides, sulfides [4]**

- 29/02 • based on carbides or carbonitrides [4]  
29/04 • • based on carbonitrides [4]  
29/06 • • based on carbides, but not containing other metal compounds [4]  
29/08 • • • based on tungsten carbide [4]  
29/10 • • • based on titanium carbide [4]  
29/12 • based on oxides [4]

- 29/14 • based on borides [4]  
29/16 • based on nitrides [4]  
29/18 • based on silicides [4]

**30/00 Alloys containing less than 50% by weight of each constituent [2]**

**Note(s)**

In groups C22C 30/02-C22C 30/06, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place.

- 30/02 • containing copper [2]  
30/04 • containing tin or lead [2]  
30/06 • containing zinc [2]

**32/00 Non-ferrous alloys containing at least 5% by weight but less than 50% by weight of oxides, carbides, borides, nitrides, silicides or other metal compounds, e.g. oxynitrides, sulfides, whether added as such or formed in situ [2]**

**Ferrous alloys, i.e. alloys based on iron [2, 5]**

**33/00 Making ferrous alloys (heat treatment thereof C21D 5/00, C21D 6/00)**

- 33/02 • by powder metallurgy  
33/04 • by melting [2]  
33/06 • • using master alloys [2]  
33/08 • Making cast-iron alloys [2]  
33/10 • • including procedures for adding magnesium [2]  
33/12 • • • by fluidised injection [2]

**35/00 Master alloys for iron or steel**

**Note(s)**

In groups C22C 37/00 and C22C 38/00, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place that provides for one of the alloying components.

**37/00 Cast-iron alloys [2]**

- 37/04 • containing spheroidal graphite  
37/06 • containing chromium [2]  
37/08 • • with nickel  
37/10 • containing aluminium or silicon

**38/00 Ferrous alloys, e.g. steel alloys (cast-iron alloys C22C 37/00) [2]**

- 38/02 • containing silicon [2]  
38/04 • containing manganese [2]  
38/06 • containing aluminium [2]  
38/08 • containing nickel [2]  
38/10 • containing cobalt [2]  
38/12 • containing tungsten, tantalum, molybdenum, vanadium or niobium [2]  
38/14 • containing titanium or zirconium [2]  
38/16 • containing copper [2]  
38/18 • containing chromium [2]  
38/20 • • with copper [2]  
38/22 • • with molybdenum or tungsten [2]  
38/24 • • with vanadium [2]  
38/26 • • with niobium or tantalum [2]  
38/28 • • with titanium or zirconium [2]  
38/30 • • with cobalt [2]  
38/32 • • with boron [2]  
38/34 • • with more than 1.5% by weight of silicon [2]

- 38/36 • • with more than 1.7% by weight of carbon [2]
- 38/38 • • with more than 1.5% by weight of manganese [2]
- 38/40 • • with nickel [2]
- 38/42 • • • with copper [2]
- 38/44 • • • with molybdenum or tungsten [2]
- 38/46 • • • with vanadium [2]
- 38/48 • • • with niobium or tantalum [2]
- 38/50 • • • with titanium or zirconium [2]
- 38/52 • • • with cobalt [2]
- 38/54 • • • with boron [2]
- 38/56 • • • with more than 1.7% by weight of carbon [2]
- 38/58 • • • with more than 1.5% by weight of manganese [2]
- 38/60 • containing lead, selenium, tellurium or antimony, or more than 0.04% by weight of sulfur [2]

#### **43/00 Alloys containing radioactive materials [2]**

#### **45/00 Amorphous alloys [5]**

- 45/02 • with iron as the major constituent [5]
- 45/04 • with nickel or cobalt as the major constituent [5]
- 45/06 • with beryllium as the major constituent [5]
- 45/08 • with aluminium as the major constituent [5]
- 45/10 • with molybdenum, tungsten, niobium, tantalum, titanium, or zirconium as the major constituent [5]

#### **Alloys containing fibres or filaments [7]**

##### **Note(s)**

In groups C22C 47/00 and C22C 49/00, it is desirable to add the indexing codes of groups C22C 101/00, C22C 111/00 and C22C 121/00.

#### **47/00 Making alloys containing metallic or non-metallic fibres or filaments [7]**

- 47/02 • Pretreatment of the fibres or filaments [7]
- 47/04 • • by coating, e.g. with a protective or activated covering [7]
- 47/06 • • by forming the fibres or filaments into a preformed structure, e.g. using a temporary binder to form a mat-like element [7]
- 47/08 • by contacting the fibres or filaments with molten metal, e.g. by infiltrating the fibres or filaments placed in a mould [7]
- 47/10 • • Infiltration in the presence of a reactive atmosphere; Reactive infiltration [7]

- 47/12 • • Infiltration or casting under mechanical pressure [7]
- 47/14 • by powder metallurgy, i.e. by processing mixtures of metal powder and fibres or filaments [7]
- 47/16 • by thermal spraying of the metal, e.g. plasma spraying [7]
- 47/18 • • using a preformed structure of fibres or filaments [7]
- 47/20 • by subjecting to pressure and heat an assembly comprising at least one metal layer or sheet and one layer of fibres or filaments [7]

#### **49/00 Alloys containing metallic or non-metallic fibres or filaments [7]**

- 49/02 • characterised by the matrix material [7]
- 49/04 • • Light metals [7]
- 49/06 • • • Aluminium [7]
- 49/08 • • Iron group metals [7]
- 49/10 • • Refractory metals [7]
- 49/11 • • • Titanium [7]
- 49/12 • • Intermetallic matrix material [7]
- 49/14 • characterised by the fibres or filaments [7]

#### **Indexing scheme associated with groups C22C 47/00 and C22C 49/00, relating to the nature of the fibrous materials contained in metal-fibrous composites. [7]**

#### **101/00 Non-metallic fibres or filaments [7]**

- 101/02 • based on oxides, e.g. oxide ceramic fibres [7]
- 101/04 • • Aluminium oxide [7]
- 101/06 • • Mixed oxides, e.g. aluminium silicate or glass [7]
- 101/08 • based on non-oxides, e.g. non-oxide ceramic fibres [7]
- 101/10 • • Carbon [7]
- 101/12 • • Carbides [7]
- 101/14 • • • Silicon carbide [7]
- 101/16 • • Nitrides [7]
- 101/18 • • • Silicon nitride [7]
- 101/20 • • Boron [7]
- 101/22 • • Borides [7]

#### **111/00 Metallic fibres or filaments [7]**

- 111/02 • Refractory metal fibres or filaments, e.g. tungsten fibres [7]

#### **121/00 Pretreated fibres or filaments [7]**

- 121/02 • Coated fibres or filaments, e.g. ceramic fibres with protective coatings [7]