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) [2, 4]

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, 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 1/24, C25C 3/36) **[1, 2006.01, 2023.01]**

1/02 • by melting **[1, 2006.01]**

1/03 • • using master alloys **[2, 2006.01]**

1/04 • by powder metallurgy (C22C 1/08 takes precedence) **[1, 2, 2006.01, 2023.01]**

1/047 • • comprising intermetallic compounds **[2023.01]**

1/05 • • Mixtures of metal powder with non-metallic powder (C22C 1/08 takes precedence) **[1, 2, 2006.01, 2023.01]**

1/051 • • • Making hard metals based on borides, carbides, nitrides, oxides or silicides; Preparation of the powder mixture used as the starting material therefor **[2023.01]**

1/053 • • • • with in situ formation of hard compounds **[2023.01]**

1/055 • • • • • using carbon **[2023.01]**

1/056 • • • • • using gas **[2023.01]**

1/057 • • • • with in situ formation of phases other than hard compounds by solid state reaction sintering, e.g. metal phase formed by reduction reaction **[2023.01]**

1/059 • • • Making alloys comprising less than 5% by weight of dispersed reinforcing phases **[2023.01]**

1/06 • with the use of special agents for refining or deoxidising **[1, 2006.01]**

1/08 • Alloys with open or closed pores **[1, 2006.01]**

1/10 • Alloys containing non-metals (C22C 1/05, C22C 1/08 take precedence) **[1, 2, 2006.01, 2023.01]**

1/11 • Making amorphous alloys **[2023.01]**

1/12 • by processing in a semi-solid state, e.g. holding the alloy in the solid-liquid phase **[2023.01]**

3/00 Removing material from non-ferrous alloys to produce alloys of different constitution [1, 2006.01]

5/00 Alloys based on noble metals [1, 2006.01]

5/02 • Alloys based on gold **[2, 2006.01]**

5/04 • Alloys based on a platinum group metal **[2, 2006.01]**

5/06 • Alloys based on silver **[2, 2006.01]**

5/08 • • with copper as the next major constituent **[2, 2006.01]**

5/10 • • with cadmium as the next major constituent **[2, 2006.01]**

7/00 Alloys based on mercury [1, 2006.01]

9/00 Alloys based on copper [1, 2006.01]
9/01 • with aluminium as the next major constituent **[2, 2006.01]**
9/02 • with tin as the next major constituent **[1, 2, 2006.01]**
9/04 • with zinc as the next major constituent **[1, 2, 2006.01]**
9/05 • with manganese as the next major constituent **[2, 2006.01]**
9/06 • with nickel or cobalt as the next major constituent **[1, 2, 2006.01]**
9/08 • with lead as the next major constituent **[1, 2, 2006.01]**
9/10 • with silicon as the next major constituent **[1, 2006.01]**

11/00 Alloys based on lead [1, 2006.01]
11/02 • with an alkali or an alkaline earth metal as the next major constituent **[1, 2, 2006.01]**
11/04 • with copper as the next major constituent **[2, 2006.01]**
11/06 • with tin as the next major constituent **[2, 2006.01]**
11/08 • with antimony or bismuth as the next major constituent **[2, 2006.01]**
11/10 • • with tin **[2, 2006.01]**

12/00 Alloys based on antimony or bismuth [2, 2006.01]

13/00 Alloys based on tin [1, 2006.01]
13/02 • with antimony or bismuth as the next major constituent **[2, 2006.01]**

14/00 Alloys based on titanium [2, 2006.01]

16/00 Alloys based on zirconium [2, 2006.01]

18/00 Alloys based on zinc [2, 2006.01]
18/02 • with copper as the next major constituent **[2, 2006.01]**
18/04 • with aluminium as the next major constituent **[2, 2006.01]**

19/00 Alloys based on nickel or cobalt [1, 2006.01]
19/03 • based on nickel **[2, 2006.01]**
19/05 • • with chromium **[2, 2006.01]**
19/07 • based on cobalt **[2, 2006.01]**

20/00 Alloys based on cadmium [2, 2006.01]

21/00 Alloys based on aluminium [1, 2006.01]
21/02 • with silicon as the next major constituent **[1, 2, 2006.01]**
21/04 • • Modified aluminium-silicon alloys **[1, 2006.01]**
21/06 • with magnesium as the next major constituent **[2, 2006.01]**
21/08 • • with silicon **[2, 2006.01]**
21/10 • with zinc as the next major constituent **[2, 2006.01]**
21/12 • with copper as the next major constituent **[2, 2006.01]**

Note(s) [4]

In groups C22C 21/14-C22C 21/18, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place.

21/14 • • with silicon **[2, 2006.01]**
21/16 • • with magnesium **[2, 2006.01]**
21/18 • • with zinc **[2, 2006.01]**

22/00 Alloys based on manganese [2, 2006.01]

23/00 Alloys based on magnesium [1, 2006.01]
23/02 • with aluminium as the next major constituent **[2, 2006.01]**
23/04 • with zinc or cadmium as the next major constituent **[2, 2006.01]**
23/06 • with a rare earth metal as the next major constituent **[2, 2006.01]**

24/00 Alloys based on an alkali or an alkaline earth metal [2, 2006.01]

25/00 Alloys based on beryllium [1, 2006.01]

26/00 Alloys containing diamond [4, 2006.01]

27/00 Alloys based on rhenium or a refractory metal not mentioned in groups C22C 14/00 or C22C 16/00 [1, 2, 2006.01]
27/02 • Alloys based on vanadium, niobium or tantalum **[2, 2006.01]**
27/04 • Alloys based on tungsten or molybdenum **[2, 2006.01]**
27/06 • Alloys based on chromium **[2, 2006.01]**

28/00 Alloys based on a metal not provided for in groups C22C 5/00-C22C 27/00 [2, 2006.01]

29/00 Alloys based on carbides, oxides, borides, nitrides or silicides, e.g. cermets, or other metal compounds, e. g. oxynitrides, sulfides [1, 4, 2006.01]
29/02 • based on carbides or carbonitrides **[4, 2006.01]**
29/04 • • based on carbonitrides **[4, 2006.01]**
29/06 • • based on carbides, but not containing other metal compounds **[4, 2006.01]**
29/08 • • • based on tungsten carbide **[4, 2006.01]**
29/10 • • • based on titanium carbide **[4, 2006.01]**
29/12 • based on oxides **[4, 2006.01]**
29/14 • based on borides **[4, 2006.01]**
29/16 • based on nitrides **[4, 2006.01]**
29/18 • based on silicides **[4, 2006.01]**

30/00 Alloys containing less than 50% by weight of each constituent [2, 2006.01]

Note(s) [4]

In groups C22C 30/02-C22C 30/06, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place.

30/02 • containing copper **[2, 2006.01]**
30/04 • containing tin or lead **[2, 2006.01]**
30/06 • containing zinc **[2, 2006.01]**

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, 2006.01]

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

33/00 Making ferrous alloys (heat treatment thereof C21D 5/00, C21D 6/00) **[1, 2006.01]**
33/02 • by powder metallurgy **[1, 2006.01]**

33/04 • by melting **[2, 2006.01]**
33/06 • • using master alloys **[2, 2006.01]**
33/08 • Making cast-iron alloys **[2, 2006.01]**
33/10 • • including procedures for adding magnesium **[2, 2006.01]**
33/12 • • • by fluidised injection **[2, 2006.01]**

35/00 Master alloys for iron or steel [1, 2006.01]

Note(s) [2]

In groups C22C 37/00 and C22C 38/00, the last place priority rule is applied, i.e. at each hierarchical level, 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 [1, 2, 2006.01]
37/04 • containing spheroidal graphite **[1, 2006.01]**
37/06 • containing chromium **[1, 2, 2006.01]**
37/08 • • with nickel **[1, 2006.01]**
37/10 • containing aluminium or silicon **[1, 2006.01]**

38/00 Ferrous alloys, e.g. steel alloys (cast-iron alloys C22C 37/00) **[2, 2006.01]**
38/02 • containing silicon **[2, 2006.01]**
38/04 • containing manganese **[2, 2006.01]**
38/06 • containing aluminium **[2, 2006.01]**
38/08 • containing nickel **[2, 2006.01]**
38/10 • containing cobalt **[2, 2006.01]**
38/12 • containing tungsten, tantalum, molybdenum, vanadium or niobium **[2, 2006.01]**
38/14 • containing titanium or zirconium **[2, 2006.01]**
38/16 • containing copper **[2, 2006.01]**
38/18 • containing chromium **[2, 2006.01]**
38/20 • • with copper **[2, 2006.01]**
38/22 • • with molybdenum or tungsten **[2, 2006.01]**
38/24 • • with vanadium **[2, 2006.01]**
38/26 • • with niobium or tantalum **[2, 2006.01]**
38/28 • • with titanium or zirconium **[2, 2006.01]**
38/30 • • with cobalt **[2, 2006.01]**
38/32 • • with boron **[2, 2006.01]**
38/34 • • with more than 1.5% by weight of silicon **[2, 2006.01]**
38/36 • • with more than 1.7% by weight of carbon **[2, 2006.01]**
38/38 • • with more than 1.5% by weight of manganese **[2, 2006.01]**
38/40 • • with nickel **[2, 2006.01]**
38/42 • • • with copper **[2, 2006.01]**
38/44 • • • with molybdenum or tungsten **[2, 2006.01]**
38/46 • • • with vanadium **[2, 2006.01]**
38/48 • • • with niobium or tantalum **[2, 2006.01]**
38/50 • • • with titanium or zirconium **[2, 2006.01]**
38/52 • • • with cobalt **[2, 2006.01]**
38/54 • • • with boron **[2, 2006.01]**
38/56 • • • with more than 1.7% by weight of carbon **[2, 2006.01]**
38/58 • • • with more than 1.5% by weight of manganese **[2, 2006.01]**
38/60 • containing lead, selenium, tellurium or antimony, or more than 0.04% by weight of sulfur **[2, 2006.01]**

43/00 Alloys containing radioactive materials [2, 2006.01]

45/00 Amorphous alloys (making amorphous non-ferrous alloys C22C 1/11) **[5, 2006.01, 2023.01]**
45/02 • with iron as the major constituent **[5, 2006.01]**
45/04 • with nickel or cobalt as the major constituent **[5, 2006.01]**
45/06 • with beryllium as the major constituent **[5, 2006.01]**
45/08 • with aluminium as the major constituent **[5, 2006.01]**
45/10 • with molybdenum, tungsten, niobium, tantalum, titanium, or zirconium as the major constituent **[5, 2006.01]**

Alloys containing fibres or filaments [7]

Note(s) [7]

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, 2006.01]
47/02 • Pretreatment of the fibres or filaments **[7, 2006.01]**
47/04 • • by coating, e.g. with a protective or activated covering **[7, 2006.01]**
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, 2006.01]**
47/08 • by contacting the fibres or filaments with molten metal, e.g. by infiltrating the fibres or filaments placed in a mould **[7, 2006.01]**
47/10 • • Infiltration in the presence of a reactive atmosphere; Reactive infiltration **[7, 2006.01]**
47/12 • • Infiltration or casting under mechanical pressure **[7, 2006.01]**
47/14 • by powder metallurgy, i.e. by processing mixtures of metal powder and fibres or filaments **[7, 2006.01]**
47/16 • by thermal spraying of the metal, e.g. plasma spraying **[7, 2006.01]**
47/18 • • using a preformed structure of fibres or filaments **[7, 2006.01]**
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, 2006.01]**

49/00 Alloys containing metallic or non-metallic fibres or filaments [7, 2006.01]
49/02 • characterised by the matrix material **[7, 2006.01]**
49/04 • • Light metals **[7, 2006.01]**
49/06 • • • Aluminium **[7, 2006.01]**
49/08 • • Iron group metals **[7, 2006.01]**
49/10 • • Refractory metals **[7, 2006.01]**
49/11 • • • Titanium **[7, 2006.01]**
49/12 • • Intermetallic matrix material **[7, 2006.01]**
49/14 • characterised by the fibres or filaments **[7, 2006.01]**

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, 2006.01]
101/02 • based on oxides, e.g. oxide ceramic fibres **[7, 2006.01]**
101/04 • • Aluminium oxide **[7, 2006.01]**
101/06 • • Mixed oxides, e.g. aluminium silicate or glass **[7, 2006.01]**
101/08 • based on non-oxides, e.g. non-oxide ceramic fibres **[7, 2006.01]**

101/10 • • Carbon **[7, 2006.01]**
101/12 • • Carbides **[7, 2006.01]**
101/14 • • • Silicon carbide **[7, 2006.01]**
101/16 • • Nitrides **[7, 2006.01]**
101/18 • • • Silicon nitride **[7, 2006.01]**
101/20 • • Boron **[7, 2006.01]**
101/22 • • Borides **[7, 2006.01]**

111/00 Metallic fibres or filaments [7, 2006.01]
111/02 • Refractory metal fibres or filaments, e.g. tungsten fibres **[7, 2006.01]**

121/00 Pretreated fibres or filaments [7, 2006.01]
121/02 • Coated fibres or filaments, e.g. ceramic fibres with protective coatings **[7, 2006.01]**