

C22 METALLURGY (of iron C21); **FERROUS OR NON-FERROUS ALLOYS; TREATMENT OF ALLOYS OR NON-FERROUS METALS** (general methods or devices for heat treatment of ferrous or non-ferrous metals or alloys C21D; production of metals by electrolysis or electrophoresis C25)

C22C ALLOYS (flints C06C 15/00; treatment of alloys C21D, C22F)

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. [4]
- “based on” requires at least 50% by weight of the specified constituent or of the specified group of constituents. [2]

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]

Groups C22C 43/00 C22C 49/00 take precedence over groups C22C 1/00 C22C 38/00. [2009.01]

- 1/00 Making non-ferrous alloys** (powder-metallurgical apparatus or processes, not specially modified for making alloys B22F; 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]

C22C

- 21/12 . with copper as the next major constituent [2]

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. [4]

- 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]

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. [4]

- 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 (working metallic powder B22F)
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

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. [2]

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]

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. [7]

- 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]