

ECLA**EUROPEAN CLASSIFICATION****C22C****ALLOYS** (flints [C06C15/00](#); treatment of alloys C21D, C22F) [\[C9506\]](#)**Note**

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

[N: [Notes](#) [\[C0807\]](#)

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Guide heading:

Non-ferrous alloys, i.e. alloys based essentially on metals other than iron ([master alloys for iron and steel C22C35/00](#); [alloys containing radioactive material C22C43/00](#); [amorphous alloys C22C45/00](#); [alloys containing fibres or filaments C22C47/00, C22C49/00](#)) [\[C0209\]](#)

C22C1/00

Making alloys (powder-metallurgical apparatus or processes, not specially modified for making alloys [B22F](#); by electrothermal methods [C22B4/00](#); by electrolysis [C25C](#))

C22C1/00B

- [N: Making amorphous alloys (processes for making amorphous material by powder metallurgy [B22F](#))]

C22C1/00D

- [N: Making alloys with holding in the range of the solid-liquid phase]

C22C1/00S

- [N: Preparing arsenides or antimonides, especially of the III-VI-compound type, e.g. aluminium or gallium arsenide]

C22C1/02

- by melting [N: ([C22C1/10D](#) takes precedence)]

C22C1/02B

- • [N: Alloys based on nickel]

C22C1/02C

- • [N: Alloys based on aluminium]

C22C1/03

- • using master alloys

C22C1/04

- by powder metallurgy ([C22C1/08](#), [N: [C22C1/05](#), [C22C1/10](#), [C22C32/00](#), [C22C47/00](#), [C22C49/00](#)] take precedence)

C22C1/04B

- • [N: Light metal alloys]

C22C1/04B1

- • • [N: Aluminium-based alloys]

C22C1/04C

- • [N: Copper-based alloys]

C22C1/04D

- • [N: Nickel- or cobalt-based alloys]

C22C1/04D1

- • • [N: Alloys based on intermetallic compounds of the type rare earth - Co, Ni]

C22C1/04F

- • [N: Alloys based on refractory metals]

C22C1/04F1

- • • [N: Alloys based on titanium, zirconium, hafnium]

C22C1/04H

- • [N: Alloys based on noble metals]

C22C1/04I

- • [N: Impregnated alloys]

C22C1/04M

- • [N: Alloys based on the low melting point metals Zn, Pb, Sn, Cd, In or Ga] [\[N0706\]](#)

C22C1/04R

- • [N: comprising intermetallic compounds ([C22C1/04D1](#) takes precedence)] [\[C0209\]](#)

C22C1/05

- • Mixtures of metal powder with non-metallic powder ([C22C1/08](#), [N: [C22C47/00](#),

- [C22C49/00](#) take precedence)
- C22C1/05B . . . [N: Making hard metals based on borides, carbides, nitrides, oxides or silicides; Preparation of the powder mixture used as the starting material]
 - C22C1/05B2 [N: with in situ forming of the hard compound ([C22C1/05R](#) takes precedence)]
 - C22C1/05B2C [N: using carbon]
 - C22C1/05B2D [N: using gas]
 - C22C1/05R . . . [N: by reaction sintering (i.e. gasless reaction starting from a mixture of solid metal compounds)]
 - C22C1/06 . with the use of special agents for refining or deoxidising
 - C22C1/08 . Alloys with open or closed pores [N: (by powder metallurgy B22F3/11)] [[C0706](#)]
 - C22C1/10 . Alloys containing non-metals ([N: [C22C1/05](#)], [C22C1/08](#), [N: [C22C47/00](#), [C22C49/00](#) take precedence]) [[C1201](#)]
 - C22C1/10A . . [N: Pretreatment of the non-metallic additives (pretreatment of non-metallic fibres C22C47/02)] [[C0706](#)] [N: WARNING Groups C22C1/10A, C22C1/10A4 and C22C1/10A6 are not complete, see also C22C1/10] [[C0706](#)]
 - C22C1/10A4 . . . [N: by coating] [[N0706](#)]
 - C22C1/10A6 . . . [N: by preparing or treating a non-metallic additive preform] [[N0706](#)]
 - C22C1/10B . . [N: starting from a solution or a suspension of (a) compound(s) of at least one of the alloy constituents]
 - C22C1/10C . . [N: starting from (a) gaseous compound(s) or (a) vapour(s) of at least one of the constituents]
 - C22C1/10D . . [N: starting from a melt (infiltration of sintered ceramic preforms with molten metal [C04B41/51](#))] [[C9905](#)]
 - C22C1/10D2 . . . [N: by atomising (atomising molten metal [B22F9/08](#))]
 - C22C1/10D8 . . . [N: Making hard metals based on borides, carbides, nitrides, oxides, silicides]
 - C22C1/10E . . [N: by internal oxidation of material in solid state]
 - C22C1/10F . . [N: by mechanical alloying (blending, milling)]
 - C22C1/10T . . [N: comprising an after-treatment] [[C9412](#)]

[N: **Note**

Documents classified in group [C22C1/10T](#) are also classified in subclass [C22F](#) [[N9412](#)]
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C22C3/00 Removing material from alloys to produce alloys of different constitution [N: separation of the constituents of alloys]

- C22C3/00N . [N: Separation of the constituents of alloys]

C22C5/00 Alloys based on noble metals

- C22C5/02 . Alloys based on gold
- C22C5/04 . Alloys based on a platinum group metal

- C22C5/06 . Alloys based on silver
- C22C5/08 . . with copper as the next major constituent
- C22C5/10 . . with cadmium as the next major constituent

C22C7/00 Alloys based on mercury

C22C9/00 Alloys based on copper

- C22C9/01 . with aluminium as the next major constituent
- C22C9/02 . with tin as the next major constituent
- C22C9/04 . with zinc as the next major constituent
- C22C9/05 . with Magnese as the next major constituent
- C22C9/06 . with nickel or cobalt as the next major constituent
- C22C9/08 . with lead as the next major constituent
- C22C9/10 . with silicon as the next major constituent

C22C11/00 Alloys based on lead

- C22C11/02 . with an alkali or an alkaline earth metal as the next major constituent
- C22C11/04 . with copper as the next major constituent
- C22C11/06 . with tin as the next major constituent
- C22C11/08 . with antimony or bismuth as the next major constituent
- C22C11/10 . . with tin

C22C12/00 Alloys based on antimony or bismuth

C22C13/00 Alloys based on tin

- C22C13/02 . with antimony or bismuth as the next major constituent

C22C14/00 Alloys based on titanium

C22C16/00 Alloys based on zirconium

C22C18/00 Alloys based on zinc

C22C18/02 . with copper as the next major constituent

C22C18/04 . with aluminium as the next major constituent

C22C19/00 Alloys based on nickel or cobalt

C22C19/00B . [N: with copper as the next major constituent]

C22C19/00C . [N: with Magnese as the next major constituent]

C22C19/00D . [N: with a light metal (alkali metal Li, Na, K, Rb, Cs; earth alkali metal Be, Mg, Ca, Sr, Ba, Al Ga, Ge, Ti) or B, Si, Zr, Hf, Sc, Y, lanthanides, actinides, as the next major constituent]

C22C19/03 . based on nickel

C22C19/05 . . with chromium

C22C19/05P . . . [N: and Mo or W]

C22C19/05P2 [N: with the maximum Cr content being at least 40%]

C22C19/05P3 [N: with the maximum Cr content being at least 30% but less than 40%]

C22C19/05P4 [N: with the maximum Cr content being at least 20% but less than 30%]

C22C19/05P5 [N: with the maximum Cr content being at least 10% but less than 20%]

C22C19/05P6 [N: with the maximum Cr content being less 10%]

C22C19/05R . . . [N: without Mo and W]

C22C19/07 . based on cobalt

C22C20/00 Alloys based on cadmium

C22C21/00 Alloys based on aluminium

C22C21/00B . [N: containing at least 2.6% of one or more of the following elements. Sn, Pb, Sb, Bi, Cd, T]

C22C21/00C . [N: containing Hg]

C22C21/02 . with silicon as the next major constituent

C22C21/04 . . Modified aluminium-silicon alloys

C22C21/06 . with magnesium as the next major constituent

C22C21/08 . . with silicon

C22C21/10 . with zinc as the next major constituent

C22C21/12 . with copper as the next major constituent

C22C21/14 . . with silicon

C22C21/16 . . with magnesium

C22C21/18	. . with zinc
C22C22/00	Alloys based on manganese
C22C23/00	Alloys based on magnesium
C22C23/02	. with aluminium as the next major constituent
C22C23/04	. with zinc or cadmium as the next major constituent
C22C23/06	. with a rare earth metal as the next major constituent
C22C24/00	Alloys based on an alkali or an alkaline earth metal
C22C25/00	Alloys based on beryllium
C22C26/00	Alloys containing diamond [N: or cubic or wurtzitic boron nitride, fullerenes or carbon nanotubes] [M1201]
C22C27/00	Alloys based on rhenium or a refractory metal not mentioned in groups C22C14/00 or C22C16/00
C22C27/02	. Alloys based on vanadium, niobium, or tantalum
C22C27/02B	. . [N: alloys based on vanadium]
C22C27/04	. Alloys based on tungsten or molybdenum
C22C27/06	. Alloys based on chromium
C22C28/00	Alloys based on a metal not provided for in groups C22C5/00 to C22C27/00
C22C29/00	Alloys based on carbides, oxides, nitrides, borides, or silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides, sulfides [N: C22C26/00 takes precedence] [C0209]
C22C29/00M	. [N: comprising a particular metallic binder]
C22C29/02	. based on carbides or carbonitrides
C22C29/04	. . based on carbonitrides
C22C29/06	. . based on carbides, but not containing other metal compounds
C22C29/06B	. . . [N: based on B ₄ C]
C22C29/06C	. . . [N: based on SiC]
C22C29/06M	. . . [N: comprising a particular metallic binder]
C22C29/08	. . . based on tungsten carbide

C22C29/10	. . . based on titanium carbide
C22C29/12	. based on oxides
C22C29/14	. based on borides
C22C29/16	. based on nitrides [N: containing cubic BN or wurtzitic BN and diamond C22C26/00]
C22C29/18	. based on silicides
C22C30/00	Alloys containing less than 50% by weight of each constituent
C22C30/02	. containing copper
C22C30/04	. containing tin or lead
C22C30/06	. containing zinc
C22C32/00	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
	[N: Note This group comprises also dispersion hardened alloys with less than 5% of dispersed compounds]
C22C32/00A	. [N: with at least one oxides and at least one of carbides, nitrides, borides or silicides as the main non-metallic constituents] [N1204]
C22C32/00B	. [N: with only oxides] [N1204]
C22C32/00C	. [N: with only single oxide(s) as non-metallic constituent(s)]
C22C32/00C2	. . [N: matrix based on noble metals, Cu or alloys thereof]
C22C32/00C4	. . [N: matrix based on Ni, Co, Cr, or alloys thereof ; on Fe for only ODS steels (matrix based on Fe other than ODS steels C22C33/00 , by powder metallurgy C22C33/02)] [C1201]
C22C32/00C6	. . [N: matrix based on refractory metals, W, Mo, Nb, Hf, Ta, Zr, Ti, V, or alloys thereof]
C22C32/00C8	. . [N: matrix based on Al, Mg, Be, or alloys thereof]
C22C32/00C10	. . [N: matrix based on low melting metals, Pb, Sn, In, Zn, Cd, or alloys thereof]
C22C32/00D	. [N: with (a) carbides(s), nitrides(s), borides(s) and/or silicide(s) as the non-metallic constituent(s)]
C22C32/00D2	. . [N: only carbides]
C22C32/00D2B	. . . [N: based on B ₄ C]
C22C32/00D2C	. . . [N: based on SiC]
C22C32/00D4	. . [N: only nitrides]
C22C32/00D6	. . [N: only borides]

- C22C32/00D8 . . [N: only silicides]
 - C22C32/00E . [N: carbon or graphite as the non-metallic constituent] [C1201]
 - C22C32/00G . with other, not previously mentioned inorganic compounds as the main non-metallic constituent, e.g. sulfides, glass [C1207]
 - C22C32/00H . [N: with organic materials as the non-metallic constituent e.g. resin]
- Guide heading:** **Ferrous alloys, i.e. alloys based on iron** (alloys containing radioactive material C22C43/00; amorphous alloys C22C45/00; alloys containing fibres or filaments C22C47/00, C22C49/00; heat treatment thereof C21D) [C0209]
- C22C33/00 Making ferrous alloys**
- C22C33/00B . [N: making amorphous alloys]
 - C22C33/00C . [N: compositions used for making ferrous alloys]
 - C22C33/02 . by powder metallurgy (working metallic powder B22F)
 - C22C33/02A . . [N: Using a mixture of prealloyed powders or a master alloy (mixtures of metal powder in general B22F1/00A)]
 - C22C33/02A2 . . . [N: comprising P or a phosphorus compound]
 - C22C33/02A4 . . . [N: comprising S or a sulfur compound]
 - C22C33/02A6 . . . [N: comprising other non-metallic compounds or more than 5% of graphite]
 - C22C33/02B . . [N: Starting from compounds, e.g. oxides (manufacture of articles starting from powder comprising reducible metal compounds in general B22F3/00B)]
 - C22C33/02C . . [N: using the impregnating technique (impregnating articles in general B22F3/26)]
 - C22C33/02E . . [N: having an intermetallic of the REM-Fe type which is not magnetic] [N1204]
 - C22C33/02F . . [N: characterised by the range of the alloying elements]
 - C22C33/02F2 . . . [N: the maximum content of each alloying element not exceeding 5%] [N0706]
 - C22C33/02F2B [N: with only C, Mn, Si, P, S, As as alloying elements, e.g. carbon steel] [N0706]
 - C22C33/02F4 . . . [N: with at least one alloying element having a minimum content above 5%] [N0706]
 - C22C33/02F4B [N: with Cr, Co, or Ni having a minimum content higher than 5%] [N0706]
 - C22C33/02F4H [N: with more than 5% preformed carbides, nitrides or borides] [N0706]
 - C22C33/04 . by melting
 - C22C33/06 . . using master alloys
 - C22C33/08 . Making cast-iron alloys
 - C22C33/10 . . including procedures for adding magnesium
 - C22C33/12 . . . by fluidised injection
- C22C35/00 Master alloys for iron or steel**
- C22C35/00B . [N: based on iron, e.g. ferro-alloys]

Note

In the absence of an indication to the contrary, in groups [C22C37/00](#) to [C22C38/00](#) an alloy is classified in the last appropriate place that provides for one of the alloying components.

C22C37/00**Cast-iron alloys**

- [C22C37/04](#) . containing spheroidal graphite
- [C22C37/06](#) . containing chromium
- [C22C37/08](#) . . with nickel
- [C22C37/10](#) . containing aluminium or silicon

C22C38/00**Ferrous alloys, e.g. steel alloys** (cast-iron alloys [C22C37/00](#))

- [C22C38/00B](#) . [N: containing N]
- [C22C38/00C](#) . [N: containing In, Mg, or other elements not provided for in one single group [C22C38/00B](#) to [C22C38/60](#)]
- [C22C38/00D](#) . [N: Very low carbon steels, i.e. having a carbon content of less than 0,01%] [N0105]
- [C22C38/00E](#) . [N: containing rare earths, i.e. Sc, Y, Lanthanides] [N0105]
- [C22C38/00F](#) . [N: containing silver] [N0105]
- [C22C38/00G](#) . [N: containing tin] [N0105]
- [C22C38/02](#) . containing silicon
- [C22C38/04](#) . containing manganese
- [C22C38/06](#) . containing aluminium
- [C22C38/08](#) . containing nickel [N: ([C22C38/10B](#) takes precedence)]
- [C22C38/10](#) . containing cobalt
- [C22C38/10B](#) . . [N: containing Co and Ni]
- [C22C38/12](#) . containing tungsten, tantalum, molybdenum, vanadium, or niobium
- [C22C38/14](#) . containing titanium or zirconium
- [C22C38/16](#) . containing copper
- [C22C38/18](#) . containing chromium
- [C22C38/20](#) . . with copper

C22C38/22	. . with molybdenum or tungsten
C22C38/24	. . with vanadium
C22C38/26	. . with niobium or tantalum
C22C38/28	. . with titanium or zirconium
C22C38/30	. . with cobalt
C22C38/32	. . with boron
C22C38/34	. . with more than 1.5% by weight of silicon
C22C38/36	. . with more than 1.7% by weight of carbon
C22C38/38	. . with more than 1.5% by weight of manganese
C22C38/40	. . with nickel
C22C38/42	. . . with copper
C22C38/44	. . . with molybdenum or tungsten
C22C38/46	. . . with vanadium
C22C38/48	. . . with niobium or tantalum
C22C38/50	. . . with titanium or zirconium
C22C38/52	. . . with cobalt
C22C38/54	. . . with boron
C22C38/56	. . . with more than 1.7% by weight of carbon
C22C38/58	. . . with more than 1.5% by weight of manganese
C22C38/60	. containing lead, selenium, tellurium, or antimony, or more than 0.04% by weight of sulfur

C22C43/00 Alloys containing radioactive materials

C22C45/00 Amorphous alloys

C22C45/00B	. [N: with Cu as the major constituent]
C22C45/00D	. [N: with one or more of the noble metals as major constituent]
C22C45/00F	. [N: with Mg as the major constituent]
C22C45/00H	. [N: with Cr as the major constituent]
C22C45/00K	. [N: with Fe, Co or Ni as the major constituent (C22C45/02 , C22C45/04 take precedence)]
C22C45/02	. with Fe as the major constituent
C22C45/04	. with Ni or Co as the major constituent
C22C45/06	. with Be as the major constituent
C22C45/08	. with Al as the major constituent
C22C45/10	. with Mo, W, Nb, Ta, Ti or Zr [N: or Hf] as the major constituent

Guide heading: Alloys containing fibres or filaments [N0209]**[N: WARNING**

The subgroups of [C22C47/00](#) and [C22C49/00](#) might be incomplete as some of the patent documents classified [C22C47/08](#), [C22C47/16](#) and [C22C49/00](#) might need reclassification to one or more subgroups or to [C22C47/02](#) and subgroups]

C22C47/00 Making alloys containing metallic or non-metallic fibres or filaments [N0209]

- C22C47/02 . Pretreatment of the fibres or filaments [N0209]
- C22C47/02A . . [N: Aligning or orienting the fibres] [N0706] [N: Warning Not complete, see also C22C47/02] [C0706]
- C22C47/04 . . by coating, e.g. with a protective or activated covering [N0209]
- C22C47/06 . . by forming the fibres or filaments into a preformed structure, e.g. using a temporary binder to form a mat-like element [N0209]
- C22C47/06W . . . [N: from wires or filaments only] [N0706] [N: Warning Groups C22C47/06W, C22C47/06W2, C22C47/06W4 and C22C47/06W6 are not complete, see also C22C47/02 or C22C47/06] [C0706]
- C22C47/06W2 [N: Winding wires] [N0706]
- C22C47/06W4 [N: Weaving wires] [N0706]
- C22C47/06W6 [N: Aligning wires] [N0706]
- C22C47/08 . by contacting the fibres or filaments with molten metal, e.g. by infiltrating the fibres or filaments placed in a mould [N: [C22C47/16](#) takes precedence] [N0209]
- C22C47/10 . . Infiltration in the presence of a reactive atmosphere; Reactive infiltration [N0209]
- C22C47/12 . . Infiltration or casting under mechanical pressure [N0209]
- C22C47/14 . by powder metallurgy, i.e. by processing mixtures of metal powder and fibres or filaments [N0209]
- C22C47/16 . by thermal spraying of the metal, e.g. plasma spraying [N: [atomising molten metal comprising fibres](#) see also [C22C1/10D2](#)] [N0209]
- C22C47/18 . . using a preformed structure of fibres or filaments [N0209]
- C22C47/20 . by subjecting to pressure and heat an assembly comprising at least one metal layer or sheet and one layer of fibres or filaments [N0209]

C22C49/00 Alloys containing metallic or non-metallic fibres or filaments [N0209]

- C22C49/02 . characterised by the matrix material [N0209]
- C22C49/04 . . Light metals [N0209]
- C22C49/06 . . . Aluminium [N0209]
- C22C49/08 . . Iron group metals [N0209]
- C22C49/10 . . Refractory metals [N0209]
- C22C49/11 . . . Titanium [N0209]
- C22C49/12 . . Intermetallic matrix material [N0209]

C22C49/14

- characterised by the fibres or filaments [N0209]