

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](#)
]

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 B₄C]
- 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 B4C]
- 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]