CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SHAPING

B22 CASTING; POWDER METALLURGY

B22F WORKING METALLIC POWDER; MANUFACTURE OF ARTICLES FROM METALLIC POWDER; MAKING METALLIC POWDER (processes or devices for granulating materials in general B01J 2/00; making ceramics by compacting or sintering C04B, e.g. C04B 35/64; for the production of metals as such, see class C22; reduction or decomposition of metal compounds in general C22B; making alloys by powder metallurgy C22C; electrolytic production of metal powder C25C 5/00)

NOTES

1. This subclass covers the making of metallic powder only insofar as powder with specific physical characteristics is made;
2. In this subclass, the following terms or expressions are used with the meanings indicated:
   - "metallic powder" covers powders containing a substantial proportion of non-metallic material;
   - "powder" includes somewhat larger particles which are worked, obtained or behave in a manner similar to powder, e.g. fibres.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   B22F 3/035 covered by B22F 3/03
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 **Special treatment of metallic powder, e.g. to facilitate working, to improve properties {(treatment of powder by mechanical means, e.g. by grinding, milling, rolling B22F 9/04)}; Metallic powders per se, e.g. mixtures of particles of different composition** (C04, C08 take precedence; {amorphous powder B22F 9/002})

1/0003 . {Metallic powders per se; Mixtures of metallic powders; Metallic powders mixed with a lubricating or binding agent (making ferrous alloys using a mixture of prealloyed powders C22C 33/0207)}

1/0007 . . {Metallic powder characterised by its shape or structure, e.g. fibre structure}

1/0011 . . . {Metallic powder characterised by size or surface area only}

1/0014 . . . . {by size mixtures or distribution}

1/0018 . . . . {Nanometer sized particles}

1/0022 . . . . . {Dispersions or suspensions thereof}

1/0025 . . . . . {Nanofibres or nanotubes}

2001/0029 . . . . . {Hollow particles, including tubes and shells}

2001/0033 . . . . . {Flake form nanoparticles}

2001/0037 . . . . . {Complex form nanoparticles, e.g.. prism, pyramid, octahedron}

1/004 . . . {Fibre structure (B22F 1/0025 takes precedence)}

1/0044 . . . {Nanometer size structures}

1/0048 . . . {Spherical powder}

1/0051 . . . . {Hollow particles}

1/0055 . . . {Flake form powders}

1/0059 . . {Metallic powders mixed with a lubricating or binding agent or organic material}

1/0062 . . . {Powders coated with organic material}

2001/0066 . . . {Organic binder comprising a mixture or obtained by reaction of more than one component other than solvent, lubricant}

1/007 . . . {Non-organic or metal salt binders or lubricants}

1/0074 . . . {Organic materials comprising a solvent, e.g. for slip casting}

1/0077 . . . {Mixtures obtained by warm mixing}

1/0081 . {Special treatment of metallic powder, e.g. to facilitate working, to improve properties (coating with organic material B22F 1/0062)}

1/0085 . . {Thermal or thermo-mechanical treatment}

1/0088 . . {Chemical treatment, e.g. passivation}

2001/0092 . . . {Making a dispersion}

1/0096 . . {Treatment resulting in the production of agglomerates}

1/02 . comprising coating of the powder {(coating with organic material B22F 1/0062; chemical surface treatment B22F 1/0088)}

1/025 . . {Metallic coating}

3/00 **Manufacture of workpieces or articles from metallic powder characterised by the manner of compacting or sintering; Apparatus specially adapted therefor {; Presses and furnaces}**

WARNING

Group B22F 3/00 is impacted by reclassification into groups B22F 10/00 - B22F 12/90.

Groups B22F 3/00 and B22F 10/00 - B22F 12/90 should be considered in order to perform a complete search.

3/001 . {Starting from powder comprising reducible metal compounds (making ferrous alloys starting from compounds C22C 33/0235)}
3/002 . {Manufacture of articles essentially made from metallic fibres}
3/003 . {Apparatus, e.g. furnaces (in general F27B)}
3/004 . {Filling molds with powder (feeding material to presses in general B30B 15/302)}
3/005 . {Loading or unloading powder metal objects (transport in general B65G)}
3/006 . {Amorphous articles}
3/007 . . {by diffusion starting from non-amorphous articles prepared by powder metallurgy}
3/02 . Compacting only
2003/023 . . {Lubricant mixed with the metal powder}
2003/026 . . {Mold wall lubrication or article surface lubrication}
3/03 . . Press-moulding apparatus therefor
2003/031 . . . {with punches moving in different directions in different planes}
2003/033 . . . {with multiple punches working in the same direction}
3/04 . . by applying fluid pressure {, e.g. by cold isostatic pressing [CIP]}
3/045 . . . {Semi-isostatic pressure}
3/06 . . by centrifugal forces
3/08 . . by explosive forces {(generating shock waves in general G10K 15/043)}
3/087 . . using high energy impulses, e.g. magnetic field impulses
3/093 . . using vibrations {or friction}
3/10 . Sintering only
3/1003 . . {Use of special medium during sintering, e.g. sintering aid}
3/1007 . . . {Atmosphere (B22F 3/1021 takes precedence)}
3/101 . . . . {Changing atmosphere}
2003/1014 . . . {Getter}
3/1017 . . {Multiple heating or additional steps (B22F 3/101 takes precedence)}
3/1021 . . . {Removal of binder or filler (removal of binder from ceramics C04B 35/638)}
3/1025 . . . . {not by heating only}
3/1028 . . . {Controlled cooling}
2003/1032 . . {comprising a grain growth inhibitor}
3/1035 . . {Liquid phase sintering}
3/1039 . . {by reaction (B22F 3/001, B22F 3/23 take precedence)}
2003/1042 . . {with support for articles to be sintered}
2003/1046 . . . {with separating means for articles to be sintered}
3/105 . . by using electric current {other than for infra-red radiant energy}, laser radiation or plasma (B22F 3/11 takes precedence){; by ultrasonic bonding (B22F 3/115 takes precedence)}
2003/1051 . . . {by electric discharge}
2003/1052 . . . {assisted by energy absorption enhanced by the coating or powder}
2003/1053 . . . {by induction}
2003/1054 . . . {by microwave}
3/11 . . Making porous workpieces or articles
3/1103 . . . {with particular physical characteristics}
2003/1106 . . . . {Product comprising closed porosity}
3/1109 . . . . {Inhomogenous pore distribution (composite layers of porous nature B22F 7/002)}
3/1112 . . . . {comprising hollow spheres or hollow fibres}
3/1115 . . . . {comprising complex forms, e.g. honeycombs}
3/1118 . . . . {comprising internal reinforcements}
3/1121 . . . {by using decomposable, meltable or sublimatable fillers}
3/1125 . . . . {involving a foaming process}
2003/1128 . . . . . {Foaming by expansion of dissolved gas, other than with foaming agent}
2003/1131 . . . . . {Foaming in a liquid suspension and decomposition}
3/1134 . . . . {Inorganic fillers (carbonaceous or paper filler B22F 3/1121)}
3/1137 . . . . {by coating porous removable preforms}
3/114 . . . {the porous products being formed by impregnation (B22F 3/1137, B22F 3/26 take precedence)}
3/1143 . . . {involving an oxidation, reduction or reaction step}
3/1146 . . . {After-treatment maintaining the porosity (B22F 3/114 takes precedence)}
3/115 . by spraying molten metal, i.e. spray sintering, spray casting
3/12 . Both compacting and sintering (by forging B22F 3/17)
3/1208 . . {Containers or coating used therefor}
3/1216 . . . {Container composition}
3/1225 . . . . {Glass}
3/1233 . . . . {Organic material}
3/1241 . . . . {layered}
3/125 . . . {Initially porous container}
3/1258 . . . {Container manufacturing}
3/1266 . . . . {by coating or sealing the surface of the preformed article, e.g. by melting}
3/1275 . . . . {by coating a model and eliminating the model before consolidation}
3/1283 . . . . {Container formed as an undeformable model eliminated after consolidation}
3/1291 . . . . {Solid insert eliminated after consolidation}
3/14 . . simultaneously
2003/145 . . . {by warm compacting, below debindering temperature}
3/15 . . . Hot isostatic pressing
2003/153 . . . . {apparatus specific to HIP}
3/156 . . . . {by a pressure medium in liquid or powder form}
3/16 . . in successive or repeated steps
3/162 . . . {Machining, working after consolidation}

3/164 . . . {Partial deformation or calibration}
2003/166 . . . . {Surface calibration, blasting, burnishing, sizing, coining}
3/168 . . . . {Local deformation}
3/17 . by forging
3/172 . . {Continuous compaction, e.g. rotary hammering (with axial pressure and without reduction of section B22F 3/204)}
2003/175 . . {by hot forging, below sintering temperature}
3/177 . . {Rocking die forging}
3/18 . by using pressure rollers
2003/185 . . {by hot rolling, below sintering temperature}
3/20 . by extruding
2003/202 . . {with back pressure}
3/204 . . {Continuous compaction with axial pressure and without reduction of section}
2003/206 . . {Hydrostatic or hydraulic extrusion}
2003/208 . . {Warm or hot extruding}
3/22 . for producing castings from a slip
3/222 . . {by freeze-casting or in a supercritical fluid}
3/225 . . {by injection molding}
3/227 . . {by organic binder assisted extrusion}
3/23 . involving a self-propagating high-temperature synthesis or reaction sintering step {(making cermets by reaction sintering C22C 1/058)}
3/24 . After-treatment of workpieces or articles {(B22F 3/1146 takes precedence)}
2003/241 . . {Chemical after-treatment on the surface}
2003/242 . . . {Coating}
2003/244 . . . {Leaching}
2003/245 . . {Making recesses, grooves etc on the surface by removing material}
2003/247 . . {Removing material: carving, cleaning, grinding, hobbing, honing, lapping, polishing, milling, shaving, skiving, turning the surface}
2003/248 . . {Thermal after-treatment}
3/26 . . Impregnating {(making ferrous alloys by impregnation C22C 33/0242)}

5/00 Manufacture of workpieces or articles from metallic powder characterised by the special shape of the product

2005/001 . {Cutting tools, earth boring or grinding tool other than table ware}
2005/002 . {Tools other than cutting tools}
5/003 . {Articles made for being fractured or separated into parts}
2005/004 . {Article comprising helical form elements (B22F 5/085 takes precedence)}
2005/005 . {Article surface comprising protrusions}
5/006 . {of flat products, e.g. sheets (B22F 3/1103 takes precedence; by using pressure rollers only see B22F 3/18)}
5/007 . {of moulds}
5/008 . {of engine cylinder parts or of piston parts other than piston rings (of piston rings B22F 5/02)}
5/009 . {of turbine components other than turbine blades (of turbine blades B22F 5/04)}
5/02 . of piston rings
5/04 . of turbine blades
5/06 . of threaded articles, e.g. nuts
5/08 . of toothed articles, e.g. gear wheels; of cam discs
5/085 . . {with helical contours}
5/10 . of articles with cavities or holes, not otherwise provided for in the preceding subgroups
2005/103 . . {Cavity made by removal of insert}
5/106 . . {Tube or ring forms}
5/12 . of wires {(of tubes B22F 5/10)}

7/00 Manufacture of composite layers, workpieces, or articles, comprising metallic powder, by sintering the powder, with or without compacting {wherein at least one part is obtained by sintering or compression (application of coating layers by use of metal powders, see C23C)}

7/002 . {of porous nature}
7/004 . . {comprising at least one non-porous part}
7/006 . . . {the porous part being obtained by foaming}
7/008 . {characterised by the composition}
7/02 . of composite layers {(B22F 7/002 takes precedence)}
7/04 . . with one or more layers not made from powder, e.g. made from solid metal
2007/042 . . . {characterised by the layer forming method}
2007/045 . . . . {accompanied by fusion or impregnation}
2007/047 . . . . {non-pressurised baking of the paste or slurry containing metal powder}
7/06 . of composite workpieces or articles from parts, e.g. to form tipped tools {(B22F 7/002 takes precedence)}
7/062 . . {involving the connection or repairing of preformed parts}
7/064 . . . {using an intermediate powder layer}
2007/066 . . . {using impregnation}
2007/068 . . . {repairing articles}
7/08 . . with one or more parts not made from powder {(B22F 7/062 takes precedence)}

8/00 Manufacture of articles from scrap or waste metal particles

9/00 Making metallic powder or suspensions thereof

2009/001 . {from scrap particles}
9/002 . {amorphous or microcrystalline}
9/004 . . {by diffusion, e.g. solid state reaction}
9/005 . . . {Transformation into amorphous state by milling}
9/007 . . {Transformation of amorphous into microcrystalline state}
9/008 . . {Rapid solidification processing}
9/02 . using physical processes
9/023 . . {Hydrogen absorption}
9/026 . . {Spray drying of solutions or suspensions}
9/04 . . starting from solid material, e.g. by crushing, grinding or milling ({C22C 1/1084 takes precedence}; crushing, grinding or milling, in general, see the relevant subclasses, e.g. B02C)
2009/041 . . . {by mechanical alloying, e.g. blending, milling}
2009/042 . . . {using a particular milling fluid}
2009/043 . . . {by ball milling}
2009/044 . . . {by jet milling}
2009/045 . . . {by other means than ball or jet milling}
2009/046 . . . . {by cutting}
2009/047 . . . . {by rolling}
2009/048 . . . {by pulverising a quenched ribbon}
2009/049 . . . {by pulverising at particular temperature}

9/06 . . starting from liquid material
2009/065 . . . {Melting inside a liquid, e.g. making spherical balls}
9/08 . . . by casting, e.g. through sieves or in water, by atomising or spraying (using electric discharge B22F 9/14)
2009/0804 . . . . {Dispersion in or on liquid, other than with sieves}
2009/0808 . . . . . {Mechanical dispersion of melt, e.g. by sieves}
2009/0812 . . . . . {Pulverisation with a moving liquid coolant stream, by centrifugally rotating stream}
2009/0816 . . . . {by casting with pressure or pulsating pressure on the metal bath}
9/082 . . . . {atomising using a fluid (using centrifugal force B22F 9/10)}
2009/0824 . . . . . {with a specific atomising fluid}
2009/0828 . . . . . {with water}
2009/0832 . . . . . {Handling of atomising fluid, e.g. heating, cooling, cleaning, recirculating}
2009/0836 . . . . . {with electric or magnetic field or induction}
2009/084 . . . . . {combination of methods}
2009/0844 . . . . . {in controlled atmosphere}
2009/0848 . . . . . {Melting process before atomisation}
2009/0852 . . . . . {Electroslag melting}
2009/0856 . . . . . {Skull melting}
2009/086 . . . . . {Cooling after atomisation}
2009/0864 . . . . . {by oil, other non-aqueous fluid or fluid-bed cooling}
2009/0868 . . . . . {by injection of solid particles in the melt stream}
2009/0872 . . . . . {by water}
2009/0876 . . . . . {by gas}
2009/088 . . . . . {Fluid nozzles, e.g. angle, distance}
2009/0884 . . . . . {Spiral fluid}
2009/0888 . . . . . {casting construction of the melt process, apparatus, intermediate reservoir, e.g. tundish, devices for temperature control}
2009/0892 . . . . . {casting nozzle; controlling metal stream in or after the casting nozzle}
2009/0896 . . . . . {particle transport, separation: process and apparatus}
9/10 . . . . using centrifugal force
9/12 . . starting from gaseous material
9/14 . . using electric discharge
9/16 . using chemical processes
2009/165 . . {Chemical reaction in an Ionic Liquid [IL] (B22F 2009/245 takes precedence)}
9/18 . . with reduction of metal compounds
9/20 . . . starting from solid metal compounds
9/22 . . . . using gaseous reductors
9/24 . . . starting from liquid metal compounds, e.g. solutions
2009/245 . . . . {Reduction reaction in an Ionic Liquid [IL]}
9/26 . . . . using gaseous reductors
9/28 . . . starting from gaseous metal compounds
9/30 . . with decomposition of metal compounds, e.g. by pyrolysis
9/305 . . . {of metal carbonyls}

10/00 **Additive manufacturing of workpieces or articles from metallic powder** (apparatus or devices therefor B22F 12/00)

WARNING

Group B22F 10/00 is incomplete pending reclassification of documents from group B22F 3/00.

Group B22F 10/00 is also impacted by reclassification into groups B22F 10/10 - B22F 12/90.

All groups listed in this Warning should be considered in order to perform a complete search.

10/10 . Formation of a green body

WARNING

Groups B22F 10/10 - B22F 10/18 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/12 . . by photopolymerisation, e.g. stereolithography [SLA] or digital light processing [DLP]
10/14 . . by jetting of binder onto a bed of metal powder
10/16 . . by embedding the binder within the powder bed
10/18 . . by mixing binder with metal in filament form, e.g. fused filament fabrication [FFF]
10/20 . Direct sintering or melting

WARNING

Groups B22F 10/20 - B22F 10/28 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/22 . . Direct deposition of molten metal
10/25 . . Direct deposition of metal particles, e.g. direct metal deposition [DMD] or laser engineered net shaping [LENS]
10/28 . . Powder bed fusion, e.g. selective laser melting [SLM] or electron beam melting [EBM]
10/30 . Process control

WARNING

Groups B22F 10/30 - B22F 10/39 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/31 . . Calibration of process steps or apparatus settings, e.g. before or during manufacturing
10/32 . . of the atmosphere, e.g. composition or pressure in a building chamber
10/322 . . . of the gas flow, e.g. rate or direction
10/34 . . of powder characteristics, e.g. density, oxidation or flowability
10/36 . . of energy beam parameters
10/362 . . . for preheating
10/364 . . . for post-heating, e.g. remelting

10/366 . . . Scanning parameters, e.g. hatch distance or scanning strategy
10/368 . . . Temperature or temperature gradient, e.g. temperature of the melt pool
10/37 . . of powder bed aspects, e.g. density
10/38 . . to achieve specific product aspects, e.g. surface smoothness, density, porosity or hollow structures
10/385 . . . {Overhang structures}
10/39 . . Traceability, e.g. incorporating identifier into a workpiece or article
10/40 . Structures for supporting workpieces or articles during manufacture and removed afterwards

WARNING

Groups B22F 10/40 - B22F 10/47 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/43 . . characterised by material
10/47 . . characterised by structural features
10/50 . Treatment of workpieces or articles during build-up, e.g. treatments applied to fused layers during build-up

WARNING

Group B22F 10/50 is incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

Groups B22F 3/00, B22F 10/00, and B22F 10/50 should be considered in order to perform a complete search.

10/60 . Treatment of workpieces or articles after build-up

WARNING

Groups B22F 10/60 - B22F 10/68 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/62 . . by chemical means
10/64 . . by thermal means (control of energy beam parameters for post heating B22F 10/364)
10/66 . . by mechanical means
10/68 . . Cleaning or washing
10/70 . Recycling

WARNING

Groups B22F 10/70 - B22F 10/77 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/73 . . of powder
10/77 . . of gas
10/80 . Data acquisition or data processing

WARNING

Groups B22F 10/80 and B22F 10/85 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

10/85 . . for controlling or regulating additive manufacturing processes

12/00 Apparatus or devices specially adapted for additive manufacturing; Auxiliary means for additive manufacturing; Combinations of additive manufacturing apparatus or devices with other processing apparatus or devices

WARNING

Groups B22F 12/00 - B22F 12/90 are incomplete pending reclassification of documents from groups B22F 3/00 and B22F 10/00.

All groups listed in this Warning should be considered in order to perform a complete search.

12/10 . Auxiliary heating means
12/13 . . to preheat the material
12/17 . . to heat the build chamber or platform
12/20 . Cooling means
12/22 . {Driving means}
12/222 . . {for motion along a direction orthogonal to the plane of a layer}
12/224 . . {for motion along a direction within the plane of a layer}
12/226 . . {for rotary motion}
12/30 . Platforms or substrates
12/33 . . translatory in the deposition plane
12/37 . . Rotatable
12/38 . {Housings, e.g. machine housings}
12/40 . Radiation means
12/41 . . characterised by the type, e.g. laser or electron beam
12/42 . . . Light-emitting diodes [LED]
12/43 . . . pulsed; frequency modulated
12/44 . . characterised by the configuration of the radiation means
12/45 . . . Two or more
12/46 . . with translatory movement
12/47 . . . parallel to the deposition plane
12/48 . . . in height, e.g. perpendicular to the deposition plane
12/49 . . Scanners
12/50 . Means for feeding of material, e.g. heads
12/52 . . Hoppers
12/53 . . Nozzles
12/55 . . Two or more means for feeding material
12/57 . . Metering means
12/58 . . for changing the material composition, e.g. by mixing
12/60 . Planarisation devices; Compression devices
12/63 . . Rollers
12/67 . . Blades
12/70 . Gas flow means

12/80 . Plants, production lines or modules
12/82 . . Combination of additive manufacturing apparatus or devices with other processing apparatus or devices
12/84 . . . Parallel processing within single device
12/86 . . . Serial processing with multiple devices grouped
12/88 . . Handling of additively manufactured products, e.g. by robots
12/90 . Means for process control, e.g. cameras or sensors

2201/00 Treatment under specific atmosphere
2201/01 . Reducing atmosphere
2201/013 . . Hydrogen
2201/016 . . NH_3
2201/02 . Nitrogen
2201/03 . Oxygen
2201/04 . CO or CO_2
2201/05 . Water or water vapour
2201/10 . Inert gases
2201/11 . . Argon
2201/12 . . Helium
2201/20 . Use of vacuum
2201/30 . Carburising atmosphere
2201/32 . Decarburising atmosphere
2201/40 . Metal compounds
2201/50 . air

2202/00 Treatment under specific physical conditions
2202/01 . Use of vibrations
2202/03 . Treatment under cryogenic or supercritical conditions
2202/05 . Use of magnetic field
2202/06 . Use of electric fields
2202/07 . by induction
2202/09 . Use of non-gravitational conditions
2202/11 . Use of irradiation
2202/13 . Use of plasma
2202/15 . Use of fluidised beds
2202/17 . use of centrifugal or vortex forces

2203/00 Controlling
2203/01 . To-be-deleted with administrative transfer to B22F 2203/00
2203/03 . for feed-back
2203/05 . thermal expansion
2203/11 . temperature, temperature profile
2203/13 . pressure
2203/15 . weight

2207/00 Aspects of the compositions, gradients
2207/01 . Composition gradients
2207/03 . . of the metallic binder phase in cermets
2207/05 . . . eta-phase
2207/07 . . Particles with core-rim gradient
2207/11 . Gradients other than composition gradients, e.g. size gradients
2207/13 . . Size gradients
2207/15 . . Temperature gradients
2207/17 . . density or porosity gradients
2207/20 . Cooperating components

2301/00 Metallic composition of the powder or its coating
2301/05 . Light metals
2301/052 . . Aluminium
2301/054 . . Alkali metals, i.e. Li, Na, K, Rb, Cs, Fr
2301/056 . . Alkaline metals, i.e. Ca, Sr, Ba, Ra
2301/058 . . Magnesium
2301/10 . Copper
2301/15 . Nickel or cobalt
2301/155 . . Rare Earth - Co or -Ni intermetallic alloys
2301/20 . Refractory metals
2301/205 . . Titanium, zirconium or hafnium
2301/25 . Noble metals, i.e. Ag Au, Ir, Os, Pd, Pt, Rh, Ru
2301/255 . . Silver or gold
2301/30 . Low melting point metals, i.e. Zn, Pb, Sn, Cd, In, Ga
2301/35 . Iron
2301/355 . . Rare Earth - Fe intermetallic alloys
2301/40 . Intermetallics other than rare earth-Co or -Ni or -Fe intermetallic alloys
2301/45 . Rare earth metals, i.e. Sc, Y, Lanthanides (57-71)

2302/00 Metal Compound, non-Metallic compound or non-metal composition of the powder or its coating
2302/05 . Boride
2302/10 . Carbide
2302/105 . . Silicium carbide (SiC)
2302/15 . Carbonitride
2302/20 . Nitride
2302/205 . Cubic boron nitride
2302/25 . Oxide
2302/253 . . Aluminum oxide (Al_2O_3)
2302/256 . . Silicium oxide (SiO_2)
2302/30 . Oxynitride
2302/35 . Complex boride, carbide, carbonitride, nitride, oxide or oxynitride
2302/40 . Carbon, graphite
2302/403 . . Carbon nanotube
2302/406 . . Diamond
2302/45 . Others, including non-metals

2303/00 Functional details of metal or compound in the powder or product,
2303/01 . Main component
2303/05 . Compulsory alloy component
2303/10 . Optional alloy component
2303/15 . Intermetallic
2303/20 . Coating by means of particles
2303/25 . Coating by means of fibres
2303/30 . Coating alloy
2303/35 . Molten metal infiltrating a metal preform
2303/40 . Layer in a composite stack of layers, workpiece or article
2303/405 . . Support layer
2303/45 . Part of a final mixture to be processed further

2304/00 Physical aspects of the powder
2304/05 . Submicron size particles
2304/052 . . Particle size below 1nm
2304/054 . . Particle size between 1 and 100 nm
2304/056 . . Particle size above 100 nm up to 300 nm
2304/058 . . Particle size above 300 nm up to 1 micrometer
2304/10 . Micron size particles, i.e. above 1 micrometer up to 500 micrometer
2304/15 . Millimeter size particles, i.e. above 500 micrometer

2998/00 **Supplementary information concerning processes or compositions relating to powder metallurgy**

2998/10 **.** Processes characterised by the sequence of their steps

2999/00 **Aspects linked to processes or compositions used in powder metallurgy**