

# 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 (making alloys by powder metallurgy [C22C](#)); APPARATUS OR DEVICES SPECIALLY ADAPTED FOR METALLIC POWDER

##### 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 term "powder" includes somewhat larger particles which are worked, obtained or behave in a manner similar to powder, e.g. fibres.
3. In this subclass, the expression "metallic powder" covers:
  - powders consisting of metal particles;
  - powders consisting of coated metal particles;
  - powders consisting of metal-coated non-metallic particles;
  - mixtures of powders of the kinds mentioned above;
  - powders of the kinds mentioned above as the main component mixed with or containing non-metallic material, e.g. lubricating or binding agents or organic material.
4. {In this subclass, combination sets (C-Sets) are used. Detailed information about C-Sets construction and the associated syntax rules is found in the definitions for [B22F](#).}

##### 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:  

<a href="#">B22F 3/035</a>	covered by	<a href="#">B22F 3/03</a>
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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.

<p><b>1/00</b> <b>Metallic powder; Treatment of metallic powder, e.g. to facilitate working or to improve properties</b></p> <p>1/05 . Metallic powder characterised by the size or surface area of the particles</p> <p>1/052 . . characterised by a mixture of particles of different sizes or by the particle size distribution</p> <p>1/054 . . Nanosized particles</p> <p>1/0545 . . . Dispersions or suspensions of nanosized particles</p> <p>1/0547 . . . {Nanofibres or nanotubes}</p> <p>1/0549 . . . {Hollow particles, including tubes and shells}</p> <p>1/0551 . . . {Flake form nanoparticles}</p> <p>1/0553 . . . {Complex form nanoparticles, e.g. prism, pyramid, octahedron}</p> <p>1/056 . . . {Submicron particles having a size above 100 nm up to 300 nm}</p> <p>1/06 . Metallic powder characterised by the shape of the particles (nanosized particles <a href="#">B22F 1/054</a>)</p> <p>1/062 . . Fibrous particles</p> <p>1/065 . . Spherical particles</p> <p>1/0655 . . . Hollow particles</p> <p>1/068 . . Flake-like particles</p>	<p>1/07 . Metallic powder characterised by particles having a nanoscale microstructure (nanosized particles <a href="#">B22F 1/054</a>)</p> <p>1/08 . Metallic powder characterised by particles having an amorphous microstructure</p> <p>1/09 . {Mixtures of metallic powders}</p> <p>1/10 . Metallic powder containing lubricating or binding agents; Metallic powder containing organic material</p> <p>1/102 . . Metallic powder coated with organic material</p> <p>1/103 . . containing an organic binding agent comprising a mixture of, or obtained by reaction of, two or more components other than a solvent or a lubricating agent</p> <p>1/105 . . containing inorganic lubricating or binding agents, e.g. metal salts</p> <p>1/107 . . containing organic material comprising solvents, e.g. for slip casting</p> <p>1/108 . . {Mixtures obtained by warm mixing}</p> <p>1/12 . Metallic powder containing non-metallic particles (containing lubricating or binding agents or organic material <a href="#">B22F 1/10</a>)</p> <p>1/14 . Treatment of metallic powder (mixing with lubricating or binding agents or with organic material <a href="#">B22F 1/10</a>)</p> <p>1/142 . . Thermal or thermo-mechanical treatment</p>
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- 1/145 . . Chemical treatment, e.g. passivation or decarburisation
- 1/147 . . . {Making a dispersion}
- 1/148 . . Agglomerating
- 1/16 . . Metallic particles coated with a non-metal (coated with lubricating or binding agents or with organic material [B22F 1/10](#))
- 1/17 . . Metallic particles coated with metal
- 1/18 . . Non-metallic particles coated with metal
- 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)**
- 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 moulds 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 infrared 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 sublimateable 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 debinding 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 1/051](#))}
- 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](#))}**
- . . . . {of porous nature}
- . . . . {comprising at least one non-porous part}
- . . . . {the porous part being obtained by foaming}
- . . . . {characterised by the composition}
- . . . . {of composite layers {(B22F 7/002 takes precedence)}
- . . . . {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	10/00	<b>Additive manufacturing of workpieces or articles from metallic powder (apparatus or devices therefor <a href="#">B22F 12/00</a>)</b>
2009/065	. . .	{Melting inside a liquid, e.g. making spherical balls}	10/10	. . . Formation of a green body
9/08	. . .	by casting, e.g. through sieves or in water, by atomising or spraying (using electric discharge <a href="#">B22F 9/14</a> )	10/12	. . . by photopolymerisation, e.g. stereolithography [SLA] or digital light processing [DLP]
2009/0804	. . . .	{Dispersion in or on liquid, other than with sieves}	10/14	. . . by jetting of binder onto a bed of metal powder
2009/0808	. . . .	{Mechanical dispersion of melt, e.g. by sieves}	10/16	. . . by embedding the binder within the powder bed
2009/0812	. . . .	{Pulverisation with a moving liquid coolant stream, by centrifugally rotating stream}	10/18	. . . by mixing binder with metal in filament form, e.g. fused filament fabrication [FFF]
2009/0816	. . . .	{by casting with pressure or pulsating pressure on the metal bath}	10/20	. . . Direct sintering or melting
9/082	. . . .	{atomising using a fluid (using centrifugal force <a href="#">B22F 9/10</a> )}	10/22	. . . Direct deposition of molten metal
2009/0824	. . . .	{with a specific atomising fluid}	10/25	. . . Direct deposition of metal particles, e.g. direct metal deposition [DMD] or laser engineered net shaping [LENS]
2009/0828	. . . .	{with water}	10/28	. . . Powder bed fusion, e.g. selective laser melting [SLM] or electron beam melting [EBM]
2009/0832	. . . .	{Handling of atomising fluid, e.g. heating, cooling, cleaning, recirculating}	10/30	. . . Process control
2009/0836	. . . .	{with electric or magnetic field or induction}	10/31	. . . Calibration of process steps or apparatus settings, e.g. before or during manufacturing
2009/084	. . . .	{combination of methods}	10/32	. . . of the atmosphere, e.g. composition or pressure in a building chamber
2009/0844	. . . .	{in controlled atmosphere}	10/322	. . . of the gas flow, e.g. rate or direction
2009/0848	. . . .	{Melting process before atomisation}	10/34	. . . of powder characteristics, e.g. density, oxidation or flowability
2009/0852	. . . .	{Electroslag melting}	10/36	. . . of energy beam parameters
2009/0856	. . . .	{Skull melting}	10/362	. . . for preheating
2009/086	. . . .	{Cooling after atomisation}	10/364	. . . for post-heating, e.g. remelting
2009/0864	. . . .	{by oil, other non-aqueous fluid or fluid-bed cooling}	10/366	. . . Scanning parameters, e.g. hatch distance or scanning strategy
2009/0868	. . . .	{by injection of solid particles in the melt stream}	10/368	. . . Temperature or temperature gradient, e.g. temperature of the melt pool
2009/0872	. . . .	{by water}	10/37	. . . of powder bed aspects, e.g. density
2009/0876	. . . .	{by gas}	10/38	. . . to achieve specific product aspects, e.g. surface smoothness, density, porosity or hollow structures
2009/088	. . . .	{Fluid nozzles, e.g. angle, distance}	10/385	. . . {Overhang structures}
2009/0884	. . . .	{Spiral fluid}	10/39	. . . Traceability, e.g. incorporating identifier into a workpiece or article
2009/0888	. . . .	{casting construction of the melt process, apparatus, intermediate reservoir, e.g. tundish, devices for temperature control}	10/40	. . . Structures for supporting workpieces or articles during manufacture and removed afterwards
2009/0892	. . . .	{casting nozzle; controlling metal stream in or after the casting nozzle}	10/43	. . . characterised by material
2009/0896	. . . .	{particle transport, separation: process and apparatus}	10/47	. . . characterised by structural features
9/10	. . . .	using centrifugal force	10/50	. . . Treatment of workpieces or articles during build-up, e.g. treatments applied to fused layers during build-up
9/12	. . .	starting from gaseous material	10/60	. . . Treatment of workpieces or articles after build-up
9/14	. . .	using electric discharge	10/62	. . . by chemical means
9/16	. . .	using chemical processes	10/64	. . . by thermal means (control of energy beam parameters for post heating <a href="#">B22F 10/364</a> )
2009/165	. . .	{Chemical reaction in an Ionic Liquid [IL] ( <a href="#">B22F 2009/245</a> takes precedence)}	10/66	. . . by mechanical means
9/18	. . .	with reduction of metal compounds	10/68	. . . Cleaning or washing
9/20	. . .	starting from solid metal compounds	10/70	. . . Recycling
9/22	. . . .	using gaseous reductors	10/73	. . . of powder
9/24	. . .	starting from liquid metal compounds, e.g. solutions	10/77	. . . of gas
2009/245	. . . .	{Reduction reaction in an Ionic Liquid [IL]}	10/80	. . . Data acquisition or data processing
9/26	. . . .	using gaseous reductors	10/85	. . . for controlling or regulating additive manufacturing processes
9/28	. . .	starting from gaseous metal compounds	12/00	<b>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</b>
9/30	. . .	with decomposition of metal compounds, e.g. by pyrolysis	12/10	. . . Auxiliary heating means
9/305	. . .	{of metal carbonyls}		

- 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<sub>3</sub>
- 2201/02 . Nitrogen
- 2201/03 . Oxygen
- 2201/04 . CO or CO<sub>2</sub>
- 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

## B22F

- 2302/20 . Nitride
- 2302/205 . Cubic boron nitride
- 2302/25 . Oxide
- 2302/253 . . Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>)
- 2302/256 . . Silicium oxide (SiO<sub>2</sub>)
- 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**

#### **NOTE**

In this group, C-Sets are used. Detailed information about C-Sets construction and the associated syntax rules is found in the Definitions.

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

#### **NOTE**

In this group, C-Sets are used. Detailed information about C-Sets construction and the associated syntax rules is found in the Definitions.

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

#### **NOTE**

In this group, C-Sets are used. Detailed information about C-Sets construction and the associated syntax rules is found in the Definitions.