

**CPC****COOPERATIVE PATENT CLASSIFICATION****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](#))

**NOTE**

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.

**WARNING**

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[B22F 3/035](#) covered by [B22F 3/03](#)

**B22F 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](#)})

- [B22F 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](#))}
- [B22F 1/0007](#) . . {Metallic powder characterised by its shape or structure, e.g. fibre structure}
- [B22F 1/0011](#) . . . {Metallic powder characterised by size or surface area only}
- [B22F 1/0014](#) . . . . {by size mixtures or distribution}
- [B22F 1/0018](#) . . . . {Nanometer sized particles}
- [B22F 1/0022](#) . . . . . {Dispersions or suspensions thereof}
- [B22F 1/0025](#) . . . . . {Nanofibres or nanotubes}
- [B22F 2001/0029](#) . . . . . {Hollow particles, including tubes and shells}
- [B22F 2001/0033](#) . . . . . {Flake form nanoparticles}
- [B22F 2001/0037](#) . . . . . {Complex form nanoparticles , e.g.. prism, pyramid, octahedron}
- [B22F 1/004](#) . . . {Fibre structure ([B22F 1/0025](#) takes precedence)}
- [B22F 1/0044](#) . . . {Nanometer size structures}

- B22F 1/0048 . . . {Spherical powder}
- B22F 1/0051 . . . . {Hollow particles}
- B22F 1/0055 . . . {Flake form powders}
- B22F 1/0059 . . {Metallic powders mixed with a lubricating or binding agent or organic material}
- B22F 1/0062 . . . {Powders coated with organic material}
- B22F 2001/0066 . . . {Organic binder comprising a mixture or obtained by reaction of more than one component other than solvent, lubricant}
- B22F 1/007 . . . {Non-organic or metal salt binders or lubricants}
- B22F 1/0074 . . . {Organic materials comprising a solvent e.g. for slip casting}
- B22F 1/0077 . . . {Mixtures obtained by warm mixing}
- B22F 1/0081 . {Special treatment of metallic powder, e.g. to facilitate working, to improve properties (coating with organic material [B22F 1/0062](#))}
- B22F 1/0085 . . {Thermal or thermo-mechanical treatment}
- B22F 1/0088 . . {Chemical treatment, e.g. passivation}
- B22F 2001/0092 . . . {Making a dispersion}
- B22F 1/0096 . . {Treatment resulting in the production of agglomerates}
- B22F 1/02 . {comprising coating of the powder {(coating with organic material [B22F 1/0062](#); chemical surface treatment [B22F 1/0088](#))}}
- B22F 1/025 . . {Metallic coating}
  
- B22F 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}**
- B22F 3/001 . {Starting from powder comprising reducible metal compounds (making ferrous alloys starting from compounds [C22C 33/0235](#))}
- B22F 3/002 . {Manufacture of articles essentially made from metallic fibres}
- B22F 3/003 . {Apparatus, e.g. furnaces (in general [F27B](#))}
- B22F 3/004 . {Filling molds with powder (feeding material to presses in general [B30B 15/302](#))}
- B22F 3/005 . {Loading or unloading powder metal objects (transport in general [B65G](#))}
- B22F 3/006 . {Amorphous articles}
- B22F 3/007 . . {by diffusion starting from non-amorphous articles prepared by powder metallurgy}
- B22F 3/008 . {Selective deposition modelling ([B22F 3/1055](#) takes precedence)}
- B22F 3/02 . Compacting only
- B22F 2003/023 . . {Lubricant mixed with the metal powder}
- B22F 2003/026 . . {Mold wall lubrication or article surface lubrication}
- B22F 3/03 . . Press-moulding apparatus therefor
- B22F 2003/031 . . . {with punches moving in different directions in different planes}
- B22F 2003/033 . . . {with multiple punches working in the same direction}
- B22F 3/04 . . by applying fluid pressure { e.g. by cold isostatic pressing [CIP]}
- B22F 3/045 . . . {Semi-isostatic pressure}
- B22F 3/06 . . by centrifugal forces
- B22F 3/08 . . by explosive forces {(generating shock waves in general [G10K 15/043](#))}

|                |       |  |
|----------------|-------|--|
| B22F 3/087     | ..    | using high energy impulses, e.g. magnetic field impulses   |
| B22F 3/093     | ..    | using vibrations {or friction}   |
| B22F 3/10      | .     | Sintering only   |
| B22F 3/1003    | ..    | {Use of special medium during sintering, e.g. sintering aid}   |
| B22F 3/1007    | ...   | {Atmosphere ( <a href="#">B22F 3/1021</a> takes precedence)}   |
| B22F 3/101     | ....  | {Changing atmosphere}  |
| B22F 2003/1014 | ...   | {Getter}   |
| B22F 3/1017    | ..    | {Multiple heating or additional steps ( <a href="#">B22F 3/101</a> takes precedence)}  |
| B22F 3/1021    | ...   | {Removal of binder or filler (removal of binder from ceramics <a href="#">C04B 35/638</a> )}   |
| B22F 3/1025    | ....  | {not by heating only}  |
| B22F 3/1028    | ...   | {Controlled cooling}   |
| B22F 2003/1032 | ..    | {comprising a grain growth inhibitor}  |
| B22F 3/1035    | ..    | {Liquid phase sintering}   |
| B22F 3/1039    | ..    | {by reaction ( <a href="#">B22F 3/001</a> , <a href="#">B22F 3/23</a> take precedence)}  |
| B22F 2003/1042 | ..    | {with support for articles to be sintered}   |
| B22F 2003/1046 | ...   | {with separating means for articles to be sintered}  |
| B22F 3/105     | ..    | by using electric current {other than for infra-red radiant energy}, laser radiation or plasma ( <a href="#">B22F 3/11</a> takes precedence); {by ultrasonic bonding ( <a href="#">B22F 3/115</a> takes precedence)} |
| B22F 2003/1051 | ...   | {by electric discharge}  |
| B22F 2003/1052 | ...   | {assisted by energy absorption enhanced by the coating or powder}  |
| B22F 2003/1053 | ...   | {by induction}   |
| B22F 2003/1054 | ...   | {by microwave}   |
| B22F 3/1055    | ...   | {Selective sintering, i.e. stereolithography (selective sintering of powdered plastics <a href="#">B29C 67/0077</a> )}   |
| B22F 2003/1056 | ....  | {Apparatus components, details or accessories}   |
| B22F 2003/1057 | ..... | {for control or data processing, e.g. algorithms}  |
| B22F 2003/1058 | ..... | {Support structures for the 3D object during manufacturing, e.g. using sacrificial material}   |
| B22F 2003/1059 | ..... | {for cleaning or recycling}  |
| B22F 3/11      | ..    | Making porous workpieces or articles   |
| B22F 3/1103    | ...   | {with particular physical characteristics}   |
| B22F 2003/1106 | ....  | {Product comprising closed porosity}   |
| B22F 3/1109    | ....  | {Inhomogenous pore distribution (composite layers of porous nature <a href="#">B22F 7/002</a> )}   |
| B22F 3/1112    | ....  | {comprising hollow spheres or hollow fibres}   |
| B22F 3/1115    | ....  | {comprising complex forms, e.g. honeycombs}  |
| B22F 3/1118    | ....  | {comprising internal reinforcements}   |
| B22F 3/1121    | ...   | {by using decomposable, meltable or sublimatable fillers}  |
| B22F 3/1125    | ....  | {involving a foaming process}  |
| B22F 2003/1128 | ..... | {Foaming by expansion of dissolved gas, other than with foaming agent}   |

|                |       |   |
|----------------|-------|---|
| B22F 2003/1131 | ..... | {Foaming in a liquid suspension and decomposition}  |
| B22F 3/1134    | ....  | {Inorganic fillers (carbonaceous or paper filler <a href="#">B22F 3/1121</a> )}   |
| B22F 3/1137    | ....  | {by coating porous removable preforms}  |
| B22F 3/114     | ...   | {the porous products being formed by impregnation ( <a href="#">B22F 3/1137</a> , <a href="#">B22F 3/26</a> take precedence)}                 |
| B22F 3/1143    | ...   | {involving an oxidation, reduction or reaction step}  |
| B22F 3/1146    | ...   | {After-treatment maintaining the porosity ( <a href="#">B22F 3/114</a> takes precedence)}   |
| B22F 3/115     | .     | by spraying molten metal, i.e. spray sintering, spray casting {(also classified in <a href="#">C23C 4/121</a> , <a href="#">C23C 4/185</a> )} |
| B22F 3/12      | .     | Both compacting and sintering (by forging <a href="#">B22F 3/17</a> )   |
| B22F 3/1208    | ..    | {Containers or coating used therefor}   |
| B22F 3/1216    | ...   | {Container composition}   |
| B22F 3/1225    | ....  | {Glass}   |
| B22F 3/1233    | ....  | {Organic material}  |
| B22F 3/1241    | ....  | {layered}   |
| B22F 3/125     | ...   | {Initially porous container}  |
| B22F 3/1258    | ...   | {Container manufacturing}   |
| B22F 3/1266    | ....  | {by coating or sealing the surface of the preformed article, e.g. by melting}   |
| B22F 3/1275    | ....  | {by coating a model and eliminating the model before consolidation}   |
| B22F 3/1283    | ....  | {Container formed as an undeformable model eliminated after consolidation}  |
| B22F 3/1291    | ....  | {Solid insert eliminated after consolidation}   |
| B22F 3/14      | ..    | simultaneously  |
| B22F 2003/145  | ...   | {by warm compacting, below debinding temperature}   |
| B22F 3/15      | ...   | Hot isostatic pressing  |
| B22F 2003/153  | ....  | {apparatus specific to HIP}   |
| B22F 3/156     | ....  | {by a pressure medium in liquid or powder form}   |
| B22F 3/16      | ..    | in successive or repeated steps   |
| B22F 3/162     | ...   | {Machining, working after consolidation}  |
| B22F 3/164     | ...   | {Partial deformation or calibration}  |
| B22F 2003/166  | ....  | {Surface calibration, blasting, burnishing, sizing, coining}  |
| B22F 3/168     | ....  | {Local deformation}   |
| B22F 3/17      | .     | by forging  |
| B22F 3/172     | ..    | {Continuous compaction, e.g. rotary hammering (with axial pressure and without reduction of section <a href="#">B22F 3/204</a> )}             |
| B22F 2003/175  | ..    | {by hot forging, below sintering temperature}   |
| B22F 3/177     | ..    | {Rocking die forging}   |
| B22F 3/18      | .     | by using pressure rollers   |
| B22F 2003/185  | ..    | {by hot rolling, below sintering temperature}   |
| B22F 3/20      | .     | by extruding  |
| B22F 2003/202  | ..    | {with back pressure}  |
| B22F 3/204     | ..    | {Continuous compaction with axial pressure and without reduction of section}  |

|                  |  |
|------------------|--|
| B22F 2003/206    | .. {Hydrostatic or hydraulic extrusion}  |
| B22F 2003/208    | .. {Warm or hot extruding}   |
| B22F 3/22        | . for producing castings from a slip   |
| B22F 3/222       | .. {by freeze-casting or in a supercritical fluid}   |
| B22F 3/225       | .. {by injection molding}  |
| B22F 3/227       | .. {by organic binder assisted extrusion}  |
| B22F 3/23        | . involving a self-propagating high-temperature synthesis or reaction sintering step<br>{(making cermets by reaction sintering <a href="#">C22C 1/058</a> )} |
| B22F 3/24        | . After-treatment of workpieces or articles {(B22F 3/1146 takes precedence)}   |
| B22F 2003/241    | .. {Chemical after-treatment on the surface}   |
| B22F 2003/242    | ... {Coating}  |
| B22F 2003/244    | ... {Leaching}   |
| B22F 2003/245    | .. {Making recesses, grooves etc on the surface by removing material}  |
| B22F 2003/247    | .. {Removing material: carving, cleaning, grinding, hobbing, honing, lapping, polishing, milling, shaving, skiving, turning the surface}                     |
| B22F 2003/248    | .. {Thermal after-treatment}   |
| B22F 3/26        | .. Impregnating {(making ferrous alloys by impregnation <a href="#">C22C 33/0242</a> )}  |
| <b>B22F 5/00</b> | <b>Manufacture of workpieces or articles from metallic powder characterised by the special shape of the product</b>  |
| B22F 2005/001    | . {Cutting tools, earth boring or grinding tool other than table ware}   |
| B22F 2005/002    | . {Tools other than cutting tools}   |
| B22F 5/003       | . {Articles made for being fractured or separated into parts}  |
| B22F 2005/004    | . {Article comprising helical form elements ( <a href="#">B22F 5/085</a> takes precedence)}  |
| B22F 2005/005    | . {Article surface comprising protrusions}   |
| B22F 5/006       | . {of flat products, e.g. sheets ( <a href="#">B22F 3/1103</a> takes precedence; by using pressure rollers only see <a href="#">B22F 3/18</a> )}             |
| B22F 5/007       | . {of moulds}  |
| B22F 5/008       | . {of engine cylinder parts or of piston parts other than piston rings (of piston rings <a href="#">B22F 5/02</a> )}   |
| B22F 5/009       | . {of turbine components other than turbine blades (of turbine blades <a href="#">B22F 5/04</a> )}   |
| B22F 5/02        | . of piston rings  |
| B22F 5/04        | . of turbine blades  |
| B22F 5/06        | . of threaded articles, e.g. nuts  |
| B22F 5/08        | . of toothed articles, e.g. gear wheels; of cam discs  |
| B22F 5/085       | .. {with helical contours}   |
| B22F 5/10        | . of articles with cavities or holes, not otherwise provided for in the preceding subgroups  |
| B22F 2005/103    | .. {Cavity made by removal of insert}  |
| B22F 5/106       | .. {Tube or ring forms}  |
| B22F 5/12        | . of wires {(of tubes <a href="#">B22F 5/10</a> )}   |

|                  |   |
|------------------|---|
| <b>B22F 7/00</b> | <b>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 <a href="#">C23C</a>)}</b> |
| B22F 7/002       | . {of porous nature}  |
| B22F 7/004       | .. {comprising at least one non-porous part}  |
| B22F 7/006       | ... {the porous part being obtained by foaming}   |
| B22F 7/008       | . {characterised by the composition}  |
| B22F 7/02        | . of composite layers {(B22F 7/002 takes precedence)}   |
| B22F 7/04        | .. with one or more layers not made from powder, e.g. made from solid metal   |
| B22F 2007/042    | ... {characterised by the layer forming method}   |
| B22F 2007/045    | .... {accompanied by fusion or impregnation}  |
| B22F 2007/047    | .... {non-pressurised baking of the paste or slurry containing metal powder}  |
| B22F 7/06        | . of composite workpieces or articles from parts, e.g. to form tipped tools {(B22F 7/002 takes precedence)}   |
| B22F 7/062       | .. {involving the connection or repairing of preformed parts}   |
| B22F 7/064       | ... {using an intermediate powder layer}  |
| B22F 2007/066    | ... {using impregnation}  |
| B22F 2007/068    | ... {repairing articles}  |
| B22F 7/08        | .. with one or more parts not made from powder {(B22F 7/062 takes precedence)}  |
| <b>B22F 8/00</b> | <b>Manufacture of articles from scrap or waste metal particles</b>  |
| <b>B22F 9/00</b> | <b>Making metallic powder or suspensions thereof</b>  |
| B22F 2009/001    | . {from scrap particles}  |
| B22F 9/002       | . {amorphous or microcrystalline}   |
| B22F 9/004       | .. {by diffusion, e.g. solid state reaction}  |
| B22F 9/005       | ... {Transformation into amorphous state by milling}  |
| B22F 9/007       | .. {Transformation of amorphous into microcrystalline state}  |
| B22F 9/008       | .. {Rapid solidification processing}  |
| B22F 9/02        | . using physical processes  |
| B22F 9/023       | .. {Hydrogen absorption}  |
| B22F 9/026       | .. {Spray drying of solutions or suspensions}   |
| B22F 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. <a href="#">B02C</a> }   |
| B22F 2009/041    | ... {by mechanical alloying , e.g. blending, milling}   |
| B22F 2009/042    | ... {using a particular milling fluid}  |
| B22F 2009/043    | ... {by ball milling}   |
| B22F 2009/044    | ... {by jet milling}  |
| B22F 2009/045    | ... {by other means than ball or jet milling}   |
| B22F 2009/046    | .... {by cutting}   |

|                |       |   |
|----------------|-------|---|
| B22F 2009/047  | ....  | {by rolling}  |
| B22F 2009/048  | ...   | {by pulverising a quenched ribbon}  |
| B22F 2009/049  | ...   | {by pulverising at particular temperature}  |
| B22F 9/06      | ..    | starting from liquid material   |
| B22F 2009/065  | ...   | {Melting inside a liquid, e.g. making spherical balls}  |
| B22F 9/08      | ...   | by casting, e.g. through sieves or in water, by atomising or spraying (using electric discharge <a href="#">B22F 9/14</a> ) |
| B22F 2009/0804 | ....  | {Dispersion in or on liquid, other than with sieves}  |
| B22F 2009/0808 | ..... | {Mechanical dispersion of melt, e.g. by sieves}   |
| B22F 2009/0812 | ..... | {Pulverisation with a moving liquid coolant stream, by centrifugally rotating stream}                                       |
| B22F 2009/0816 | ....  | {by casting with pressure or pulsating pressure on the metal bath}  |
| B22F 9/082     | ....  | {atomising using a fluid (using centrifugal force <a href="#">B22F 9/10</a> )}  |
| B22F 2009/0824 | ..... | {with a specific atomising fluid}   |
| B22F 2009/0828 | ..... | {with water}  |
| B22F 2009/0832 | ..... | {Handling of atomising fluid, e.g. heating, cooling, cleaning, recirculating}   |
| B22F 2009/0836 | ..... | {with electric or magnetic field or induction}  |
| B22F 2009/084  | ..... | {combination of methods}  |
| B22F 2009/0844 | ..... | {in controlled atmosphere}  |
| B22F 2009/0848 | ..... | {Melting process before atomisation}  |
| B22F 2009/0852 | ..... | {Electroslag melting}   |
| B22F 2009/0856 | ..... | {Skull melting}   |
| B22F 2009/086  | ..... | {Cooling after atomisation}   |
| B22F 2009/0864 | ..... | {by oil, other non-aqueous fluid or fluid-bed cooling}  |
| B22F 2009/0868 | ..... | {by injection of solid particles in the melt stream}  |
| B22F 2009/0872 | ..... | {by water}  |
| B22F 2009/0876 | ..... | {by gas}  |
| B22F 2009/088  | ..... | {Fluid nozzles , e.g. angle, distance}  |
| B22F 2009/0884 | ..... | {Spiral fluid}  |
| B22F 2009/0888 | ..... | {casting construction of the melt process, apparatus, intermediate reservoir e.g. tundish, devices for temperature control} |
| B22F 2009/0892 | ..... | {casting nozzle; controlling metal stream in or after the casting nozzle}   |
| B22F 2009/0896 | ..... | {particle transport, separation: process and apparatus}   |
| B22F 9/10      | ....  | using centrifugal force   |
| B22F 9/12      | ..    | starting from gaseous material  |
| B22F 9/14      | ..    | using electric discharge  |
| B22F 9/16      | .     | using chemical processes  |
| B22F 2009/165  | ..    | {Chemical reaction in an Ionic Liquid [IL] ( <a href="#">B22F 2009/245</a> takes precedence)}                               |
| B22F 9/18      | ..    | with reduction of metal compounds   |
| B22F 9/20      | ...   | starting from solid metal compounds   |
| B22F 9/22      | ....  | using gaseous reductors   |



- B22F 9/24 . . . . . starting from liquid metal compounds, e.g. solutions
- B22F 2009/245 . . . . . {Reduction reaction in an Ionic Liquid [IL]}
- B22F 9/26 . . . . . using gaseous reductors
- B22F 9/28 . . . . . starting from gaseous metal compounds
- B22F 9/30 . . . . . with decomposition of metal compounds, e.g. by pyrolysis
- B22F 9/305 . . . . . {of metal carbonyls}

**B22F 2201/00****Treatment under specific atmosphere**

- B22F 2201/01 . . . Reducing atmosphere
- B22F 2201/013 . . . Hydrogen
- B22F 2201/016 . . . NH<sub>3</sub>
- B22F 2201/02 . . . Nitrogen
- B22F 2201/03 . . . Oxygen
- B22F 2201/04 . . . CO or CO<sub>2</sub>
- B22F 2201/05 . . . Water or water vapour
- B22F 2201/10 . . . Inert gases
- B22F 2201/11 . . . Argon
- B22F 2201/12 . . . Helium
- B22F 2201/20 . . . Use of vacuum
- B22F 2201/30 . . . Carburising atmosphere
- B22F 2201/32 . . . Decarburising atmosphere
- B22F 2201/40 . . . Metal compounds
- B22F 2201/50 . . . air

**B22F 2202/00****Treatment under specific physical conditions**

- B22F 2202/01 . . . Use of vibrations
- B22F 2202/03 . . . Treatment under cryogenic or supercritical conditions
- B22F 2202/05 . . . Use of magnetic field
- B22F 2202/06 . . . Use of electric fields
- B22F 2202/07 . . . by induction
- B22F 2202/09 . . . Use of non-gravitational conditions
- B22F 2202/11 . . . Use of irradiation
- B22F 2202/13 . . . Use of plasma
- B22F 2202/15 . . . Use of fluidised beds
- B22F 2202/17 . . . use of centrifugal or vortex forces

**B22F 2203/00****Controlling**

- B22F 2203/01 . . . To-be-deleted with administrative transfer to [B22F 2203/00](#)
- B22F 2203/03 . . . for feed-back
- B22F 2203/05 . . . thermal expansion
- B22F 2203/11 . . . temperature, temperature profile



- B22F 2203/13 . pressure
- B22F 2203/15 . weight

**B22F 2207/00****Aspects of the compositions, gradients**

- B22F 2207/01 . Composition gradients
- B22F 2207/03 . . of the metallic binder phase in cermets
- B22F 2207/05 . . . eta-phase
- B22F 2207/07 . . Particles with core-rim gradient
- B22F 2207/11 . Gradients other than composition gradients, e.g. size gradients
- B22F 2207/13 . . Size gradients
- B22F 2207/15 . . Temperature gradients
- B22F 2207/17 . . density or porosity gradients
- B22F 2207/20 . Cooperating components

**B22F 2301/00****Metallic composition of the powder or its coating**

- B22F 2301/05 . Light metals
- B22F 2301/052 . . Aluminium
- B22F 2301/054 . . Alkali metals, i.e. Li, Na, K, Rb, Cs, Fr
- B22F 2301/056 . . Alkaline metals, i.e. Ca, Sr, Ba, Ra
- B22F 2301/058 . . Magnesium
- B22F 2301/10 . Copper
- B22F 2301/15 . Nickel or cobalt
- B22F 2301/155 . . Rare Earth - Co or -Ni intermetallic alloys
- B22F 2301/20 . Refractory metals
- B22F 2301/205 . . Titanium, zirconium or hafnium
- B22F 2301/25 . Noble metals, i.e. Ag Au, Ir, Os, Pd, Pt, Rh, Ru
- B22F 2301/255 . . Silver or gold
- B22F 2301/30 . Low melting point metals, i.e. Zn, Pb, Sn, Cd, In, Ga
- B22F 2301/35 . Iron
- B22F 2301/355 . . Rare Earth - Fe intermetallic alloys
- B22F 2301/40 . Intermetallics other than rare earth-Co or -Ni or -Fe intermetallic alloys
- B22F 2301/45 . Rare earth metals, i.e. Sc, Y, Lanthanides (57-71)

**B22F 2302/00****Metal Compound , non-Metallic compound or non-metal composition of the powder or its coating**

- B22F 2302/05 . Boride
- B22F 2302/10 . Carbide
- B22F 2302/105 . . Silicium carbide (SiC)
- B22F 2302/15 . Carbonitride
- B22F 2302/20 . Nitride
- B22F 2302/205 . Cubic boron nitride

- B22F 2302/25 . Oxide
- B22F 2302/253 . . Aluminum oxide ( $\text{Al}_2\text{O}_3$ )
- B22F 2302/256 . . Silicium oxide ( $\text{SiO}_2$ )
- B22F 2302/30 . Oxynitride
- B22F 2302/35 . Complex boride, carbide, carbonitride, nitride, oxide or oxynitride
- B22F 2302/40 . Carbon, graphite
- B22F 2302/403 . . Carbon nanotube
- B22F 2302/406 . . Diamond
- B22F 2302/45 . Others, including non-metals

**B22F 2303/00****Functional details of metal or compound in the powder or product,**

- B22F 2303/01 . Main component
- B22F 2303/05 . Compulsory alloy component
- B22F 2303/10 . Optional alloy component
- B22F 2303/15 . Intermetallic
- B22F 2303/20 . Coating by means of particles
- B22F 2303/25 . Coating by means of fibres
- B22F 2303/30 . Coating alloy
- B22F 2303/35 . Molten metal infiltrating a metal preform
- B22F 2303/40 . Layer in a composite stack of layers, workpiece or article
- B22F 2303/405 . . Support layer
- B22F 2303/45 . Part of a final mixture to be processed further

**B22F 2304/00****Physical aspects of the powder**

- B22F 2304/05 . Submicron size particles
- B22F 2304/052 . . Particle size below 1nm
- B22F 2304/054 . . Particle size between 1 and 100 nm
- B22F 2304/056 . . Particle size above 100 nm up to 300 nm
- B22F 2304/058 . . Particle size above 300 nm up to 1 micrometer
- B22F 2304/10 . Micron size particles, i.e. above 1 micrometer up to 500 micrometer
- B22F 2304/15 . Millimeter size particles, i.e. above 500 micrometer

**B22F 2998/00****Supplementary information concerning processes or compositions relating to powder metallurgy**

- B22F 2998/10 . Processes characterised by the sequence of their steps

**B22F 2999/00****Aspects linked to processes or compositions used in powder metallurgy**