

**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**

This subclass covers the making of metallic powder only insofar as powder with specific physical characteristics is made;

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**

1. 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](#)

**Guidance heading:**

- 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 }

**WARNING**

Groups [B22F 1/0011](#) and [B22F 1/0014](#) are not complete, see also [B22F 1/0007](#)

- B22F 1/0014**      .... {by size mixtures or distribution }
- B22F 1/0018**      .... {Nanometer sized particles }
- B22F 1/0022**      ..... { Dispersions or suspensions thereof } { WARNING: Not complete, see

		also <a href="#">B22F 1/0018</a> }
<a href="#">B22F 1/0025</a>	.....	{ Nanofibres or nanotubes } { WARNING: Not complete, see also <a href="#">B22F 1/0018</a> }
<a href="#">B22F 2001/0029</a>	.....	Hollow particles, including tubes and shells
<a href="#">B22F 2001/0033</a>	.....	Flake form nanoparticles
<a href="#">B22F 2001/0037</a>	.....	Complex form nanoparticles , e.g.. prism, pyramid, octahedron
<a href="#">B22F 1/004</a>	...	{ Fibre structure ( <a href="#">B22F 1/0025</a> takes precedence) }
<a href="#">B22F 1/0044</a>	...	{Nanometer size structures }
<a href="#">B22F 1/0048</a>	...	{Spherical powder }
<a href="#">B22F 1/0051</a>	....	{Hollow particles }
<a href="#">B22F 1/0055</a>	...	{ Flake form powders } { WARNING: Not complete, see also <a href="#">B22F 1/0007</a> }
<a href="#">B22F 1/0059</a>	..	{Metallic powders mixed with a lubricating or binding agent or organic material }
<a href="#">B22F 1/0062</a>	...	{ Powders coated with organic material }
<a href="#">B22F 2001/0066</a>	...	Organic binder comprising a mixture or obtained by reaction of more than one component other than solvent, lubricant
<a href="#">B22F 1/007</a>	...	{ Non-organic or metal salt binders or lubricants }
<a href="#">B22F 1/0074</a>	...	{ Organic materials comprising a solvent e.g. for slip casting }
<a href="#">B22F 1/0077</a>	...	{ Mixtures obtained by warm mixing }
<a href="#">B22F 1/0081</a>	.	{ Special treatment of metallic powder, e.g. to facilitate working, to improve properties (coating with organic material <a href="#">B22F 1/0062</a> ) }
<a href="#">B22F 1/0085</a>	..	{Thermal or thermo-mechanical treatment }
<a href="#">B22F 1/0088</a>	..	{Chemical treatment, e.g. passivation }
<a href="#">B22F 2001/0092</a>	...	Making a dispersion
<a href="#">B22F 1/0096</a>	..	{Treatment resulting in the production of agglomerates }
<a href="#">B22F 1/02</a>	.	comprising coating of the powder { (coating with organic material <a href="#">B22F 1/0062</a> ; chemical surface treatment <a href="#">B22F 1/0088</a> ) }
<a href="#">B22F 1/025</a>	..	{Metallic coating }
<b><a href="#">B22F 3/00</a></b>		<b>Manufacture of workpieces or articles from metallic powder characterised by the manner of compacting or sintering; Apparatus specially adapted therefor; {Presses and furnaces }</b>
<a href="#">B22F 3/001</a>	.	{Starting from powder comprising reducible metal compounds (making ferrous alloys starting from compounds <a href="#">C22C 33/0235</a> ) }
<a href="#">B22F 3/002</a>	.	{Manufacture of articles essentially made from metallic fibres }
<a href="#">B22F 3/003</a>	.	{Apparatus, e.g. furnaces (in general <a href="#">F27B</a> ) }
<a href="#">B22F 3/004</a>	.	{Filling molds with powder (feeding material to presses in general <a href="#">B30B 15/302</a> ) }
<a href="#">B22F 3/005</a>	.	{Loading or unloading powder metal objects (transport in general <a href="#">B65G</a> ) }
<a href="#">B22F 3/006</a>	.	{Amorphous articles }
<a href="#">B22F 3/007</a>	..	{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 \(B22F 3/1021 takes precedence\)](#) }
- B22F 3/101 .... { [Changing atmosphere](#) }
- B22F 2003/1014 ... Getter
- B22F 3/1017 .. { [Multiple heating or additional steps \(B22F 3/101 takes precedence\)](#) }
- B22F 3/1021 ... { [Removal of binder or filler \(removal of binder from ceramics C04B 35/638\)](#) }
- 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 \(B22F 3/001, B22F 3/23 take precedence\)](#) }
- 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 ([B22F 3/11 takes precedence](#)) ; { [by ultrasonic bonding \(B22F 3/115 takes precedence\)](#) }
- 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 \(selective sintering of powdered plastics B29C 67/0077\)](#) }
- 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 { WARNING: Subgroups of <a href="#">B22F 3/16</a> are not complete, see also <a href="#">B22F 3/16</a> }
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 } [WARNING: Not complete, see also <a href="#">B22F 3/22</a> ]
B22F 3/227	..	{ by organic binder assisted extrusion } { WARNING: Not complete, see also <a href="#">B22F 3/22</a> }
B22F 3/23	.	involving a self-propagating high-temperature synthesis or reaction sintering step { (making cermets by reaction sintering <a href="#">C22C 1/058</a> ) }
B22F 3/24	.	After-treatment of workpieces or articles { ( <a href="#">B22F 3/1146</a> 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 { ( <a href="#">making ferrous alloys by impregnation 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 ([B22F 3/1103](#) takes precedence; by using pressure rollers only see [B22F 3/18](#)) }
- B22F 5/007 . {of moulds }
- B22F 5/008 . { of engine cylinder parts or of piston parts other than piston rings (of piston rings [B22F 5/02](#)) }
- B22F 5/009 . { of turbine components other than turbine blades (of turbine blades [B22F 5/04](#)) }
- 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 } { WARNING: Not complete, see also [B22F 5/10](#) }
- B22F 5/12 . of wires { (of tubes [B22F 5/10](#)) }
- B22F 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](#) ) }**
- 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 { [\(B22F 7/062 takes precedence\)](#) }

## **B22F 8/00 Manufacture of articles from scrap or waste metal particles**

## **B22F 9/00 Making metallic powder or suspensions thereof**

- 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. B02C](#) )
- 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 B22F 9/14](#))
- 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 B22F 9/10](#)) }
- 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 }

#### Guidance heading:

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

B22F 2201/01	.	Reducing atmosphere
B22F 2201/013	..	Hydrogen
B22F 2201/016	..	NH3
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

**Guidance heading:**

**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

## **Guidance heading:**

## **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)

**Guidance heading:**

**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 (Al<sub>2</sub>O<sub>3</sub>)

B22F 2302/256 . . Silicium oxide (SiO<sub>2</sub>)

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

#### **Guidance heading:**

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

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

#### **Guidance heading:**

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