Metal powders for sintering technology

Quality through innovation.

Powder metallurgy

Product range for ferrous sintered parts

Product range for non-ferrous sintered parts
POMETON S.p.A. HAS OVER 70 YEARS EXPERIENCE IN METALLURGY, METAL POWDERS AND GRANULES. SUPPLY OF METALS IN POWDER AND GRANULES IS THE CORE BUSINESS OF THE GROUP WHICH CONSISTS OF TWO MANUFACTURING FACILITIES AND 5 SUBSIDIARIES.

Our Mission is to be the preferred partner in the market of high quality fine metal powders, enabling our customers to achieve greater efficiency. Our Values are: Respect for our people, our customers, our suppliers and the community. Integrity and to have the courage to make promises and to honour them. Flexibility, to adapt our products, processes, and organisation to the ever evolving marketplace.

To be the point of reference in the Metal Powders and Granules industry for product quality, technical support and delivery performance. To unlock the potential of Metal Powders through innovation, development and the support of new applications. To always value our customers, and to strive every day for a cleaner, safer and happier world.

Pometon powders
Powders and granules are produced by atomization and electrolysis. To achieve the required properties powders can be further processed by mechanical treatment, crushing, reduction/annealing, sieving, furnace bonding, mixing and homogenizing. Pometon metals are used worldwide for a variety of applications in Powder Metallurgy, wielding, chemical, blasting, friction compounds, metallurgy and machining tools; just to name a few. Sintering is the most demanding application because of complexity of technical and quality requirements, type and number of materials utilized.
**Powder metallurgy**

Powder Metallurgy is probably the most versatile technology to create metal components for mass production, with numerous advantages compared to traditional technologies:

- Production of parts with complex shapes;
- Production of parts with excellent structural and wear performance;
- Flexibility in the formulation of alloys to meet specific customers requirements;
- Excellent performance in stress and vibration absorption;
- High precision, tolerances and excellent surface finish;
- Ability to produce parts with tight tolerances;

Pometon supports the production and research of Ferrous and Non Ferrous sintered components with a comprehensive range of powders that include base metal materials to complex ready-to-press formulas, increasing production rates and cost efficiency. Our R&D department is always trying to develop alternative materials and solutions including the development of alternative metals and powders that are less price sensitive to fluctuation in the metals market.

**Product range for ferrous sintered parts**

- Iron based atomised powders;
- Iron phosphorous based atomised powders;
- Diffusion Bonded powders;
- Prealloyed atomised and Diffusion Bonded powders;
- Copper powders;
- Premix for Infiltration;
- Premix (ready to press) powders.

**Product range for non ferrous sintered parts**

- Copper and tin based powders;
- Brass and bronze powders;
- Non ferrous premix (ready to press) powders.
Fersint

Iron powders are used as base material for all types of ferrous sintered parts. Pometon produces five grades by the water atomisation of iron, followed by annealing which imparts to the material the correct shape, density and purity to meet the sintering requirements. Pometon produces a further two grades containing an addition of phosphorus (0.45% and 0.60%) which cost effectively increases mechanical strength.
Diffusion Bonded homogeneous powders are used to guarantee high mechanical characteristics. Due to a processing called diffusion bonding, iron particles are connected with small particles of alloying elements i.e. Ni, Cu, Mo. This bond is carefully controlled in order to guarantee that the powder maintains compressibility and flowability while maintaining homogeneity.

Diffusion Bonded powders offer a compressibility almost comparable to that of pure iron powder. When the Diffusion Bond treatment is applied to Iron based powder, the desired mechanical characteristics are not achieved. Pometon recommends Feralloy ST for applications that require higher mechanical strength. Feralloy ST family is based on a prealloy of Iron and Molybdenum. It can be supplied pure grade (ST0) or with other alloying elements added with Diffusion Bond process grades (ST1 – ST2 – ST3).
Pometon has developed grades of high strength and cost effective PM steels. These grades are a mix of alloying elements (e.g., Cr, Mo, Ni, Cu, Mn) in different and predetermined concentrations. The main purpose is to achieve an optimum balance between compressibility, hardenability and other sintered properties while minimising the use of high cost metals. ECOSint is the first PM grade using all these elements together, adequately combining them and taking full advantage of the multiple interactions among the alloying elements.

**ECOSint Powders**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Chemical composition (%)</th>
<th>Physical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>Cr</td>
</tr>
<tr>
<td>ECOsint A</td>
<td>&lt; 0.25</td>
<td>1.4</td>
</tr>
<tr>
<td>ECOsint B</td>
<td>&lt; 0.25</td>
<td>1.4</td>
</tr>
<tr>
<td>ECOsint C</td>
<td>&lt; 0.25</td>
<td>1.4</td>
</tr>
<tr>
<td>ECOsint HCr A</td>
<td>&lt; 0.25</td>
<td>2</td>
</tr>
</tbody>
</table>

**The lowest critical cooling rate for PM steels**

<table>
<thead>
<tr>
<th>Material</th>
<th>Total alloy content (without C and Fe)</th>
<th>Critical cooling rate (°C/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECOsint A + 0.6 C</td>
<td>2.8</td>
<td>1.5</td>
</tr>
<tr>
<td>ECOsint B + 0.6 C</td>
<td>3.3</td>
<td>0.8 - 1.0</td>
</tr>
<tr>
<td>ECOsint C + 0.6 C</td>
<td>4.3</td>
<td>0.45 - 0.8</td>
</tr>
<tr>
<td>ECOsint HCr A + 0.6 C</td>
<td>4.4</td>
<td>0.17 - 0.45</td>
</tr>
</tbody>
</table>

**ECOSint powders are high performance PM steels but with the minimum alloying content in the market for sinter-hardening grades.** These novel PM steels, with enhanced hardenability, offer PM parts producers the opportunity to obtain the benefits of sinter-hardening with the added advantages of lower production cost economy through slower than normal cooling rates.
### Non Ferrous Powders

<table>
<thead>
<tr>
<th>Grade</th>
<th>Product group</th>
<th>Chemical composition</th>
<th>Total Oxygen (% max)</th>
<th>Flowability (s/50 g)</th>
<th>Apparent Density (g/cm³)</th>
<th>Typical use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu SE</td>
<td>Copper electrolytic powder</td>
<td>Cu 99.7% min</td>
<td>0.15</td>
<td>45 max</td>
<td>2.30 ± 0.10</td>
<td>Base material for Bronze sintering</td>
</tr>
<tr>
<td>Cu PM 100</td>
<td>Copper sintered powder</td>
<td>Cu 99.5% min</td>
<td>0.15</td>
<td>45 max</td>
<td>2.40 ± 0.10</td>
<td>Base material for Bronze sintering</td>
</tr>
<tr>
<td>Cu WRCF</td>
<td>Copper sintered and reduced powder</td>
<td>Cu 99.6% min</td>
<td>0.20</td>
<td>35 max</td>
<td>2.75 ± 0.10</td>
<td>Base material for Bronze sintering</td>
</tr>
<tr>
<td>Cu W 150</td>
<td>Copper sintered powder</td>
<td>Cu 99.6% min</td>
<td>0.20</td>
<td>-</td>
<td>3.40 ± 0.10</td>
<td>Additive to ferrous sintering</td>
</tr>
<tr>
<td>Cu SB</td>
<td>Copper electrolytic powder</td>
<td>Cu 99.8% min</td>
<td>0.15</td>
<td>40 max</td>
<td>2.45 ± 0.10</td>
<td>Additive to ferrous sintering</td>
</tr>
<tr>
<td>Sn 71F</td>
<td>Tin sintered powder</td>
<td>Sn &gt; 99.7%</td>
<td>-</td>
<td>-</td>
<td>3.70 ± 0.10</td>
<td>Alloying element for Bronze sintering</td>
</tr>
<tr>
<td>CuSn10 W210</td>
<td>Bronze sintered powder</td>
<td>Sn 10%</td>
<td>0.15</td>
<td>-</td>
<td>2.95 ± 0.15</td>
<td>Bronze sintering from prealloyed powder</td>
</tr>
<tr>
<td>CuSn10 U10</td>
<td>Bronze powder (Diffusion Bond)</td>
<td>Sn 10%</td>
<td>0.15</td>
<td>40 max</td>
<td>2.45 ± 2.70</td>
<td>Bronze sintering from prealloyed powder</td>
</tr>
<tr>
<td>CuZn30 OT 212</td>
<td>Brass sintered powder</td>
<td>Zn 30%</td>
<td>0.15</td>
<td>45 max</td>
<td>3.20 ± 0.10</td>
<td>Bronze sintering from prealloyed powder</td>
</tr>
</tbody>
</table>

Copper, Bronze and Brass powders are broadly used in sintering either to complement mixed powders for ferrous components and to produce bearing, plates, gears and other components requiring self lubrication, resistance to corrosion, shape complexity and reduced weight. Pometon offers an extensive range of base powders alloyed and prealloyed powders as well as premix (ready to press) solutions to reach performances, optimized costs and easy to use materials.

### Infiltrant grades

Pometon offers a range of ready to use copper grades specifically developed for the process of infiltration.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Product group</th>
<th>Chemical composition</th>
<th>Lubricant (%)</th>
<th>Flowability (s/50 g)</th>
<th>Apparent Density (g/cm³)</th>
<th>Typical use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu IN 200</td>
<td>Copper for infiltration</td>
<td>Mn 0.6% Fe 2%</td>
<td>0.4</td>
<td>45 max</td>
<td>3.00 ± 0.20</td>
<td>Standard infiltration powder</td>
</tr>
<tr>
<td>Cu IN L401</td>
<td>Copper for infiltration</td>
<td>Mn 0.8% Fe 3.5% Zn 0.4%</td>
<td>0.4</td>
<td>45 max</td>
<td>3.20 ± 0.10</td>
<td>Lower residues formation</td>
</tr>
<tr>
<td>Cu IN P401</td>
<td>Copper for infiltration</td>
<td>Mn 0.6% Fe 2.3% Zn 0.4%</td>
<td>0.4</td>
<td>-</td>
<td>2.35 ± 0.15</td>
<td>High green strength infiltration powder</td>
</tr>
</tbody>
</table>
Premix grades

PREMIX GRADES ARE BASED ON ELEMENTAL POWDERS WITH ALLOYING ELEMENTS, ADDITIVES AND GRAPHITE.

Pometon's range of Iron and Bronze powder includes Premix grades. These powders are supplied Ready To Press.

Each unique grade is as a result of co-operation with customers to develop a ready to use powder suitable for a particular component.

Range

- Ferrous premix based on elemental iron;
- Ferrous premix based on prealloyed and/or diffusion bonded powders;
- Premix of ferrous and non ferrous powders;
- Bronze premix;
- Premix of copper.

Our Technical Department is at the customer's disposal to develop new grades of powders.
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