Metal components getting too complex?
Start from the smallest particles!

SANDVIK

From powder to 15 tonnes of solid specialty steel

Steam turbine rotor (650 kg)
Courtesy of Siemens Industrial Turbomachinery AB, Sweden

Raiser tube diameter 600 mm, length 3800 mm

Valve body (2 tonnes)

Steamchest (1,5 tonnes)
Courtesy of Siemens Industrial Turbomachinery AB, Sweden

Sandvik Powdermet – Materials technology solutions

Sandvik Powdermet sells and supplies Hot Isostatic Processed (HIP), Powder Metallurgy (PM) components in Near Net Shape (NNS) worldwide. The company's business objective is to lead the way in expanding the market for HIP near net shape components in specified business areas. This will be achieved through:

- Active development and marketing of components with complex geometry
- Design flexibility and customised properties
- Production by hot isostatic processing of gas atomized powder
- Fast, reliable deliveries

In addition to its own resources, the company also has close links with and access to HIP production facilities, manufacturing and design services for

capsules, heat treatment and machining. Sandvik Powdermet is also networked with universities and research institutes.

Sandvik Powdermet – the best partner for:

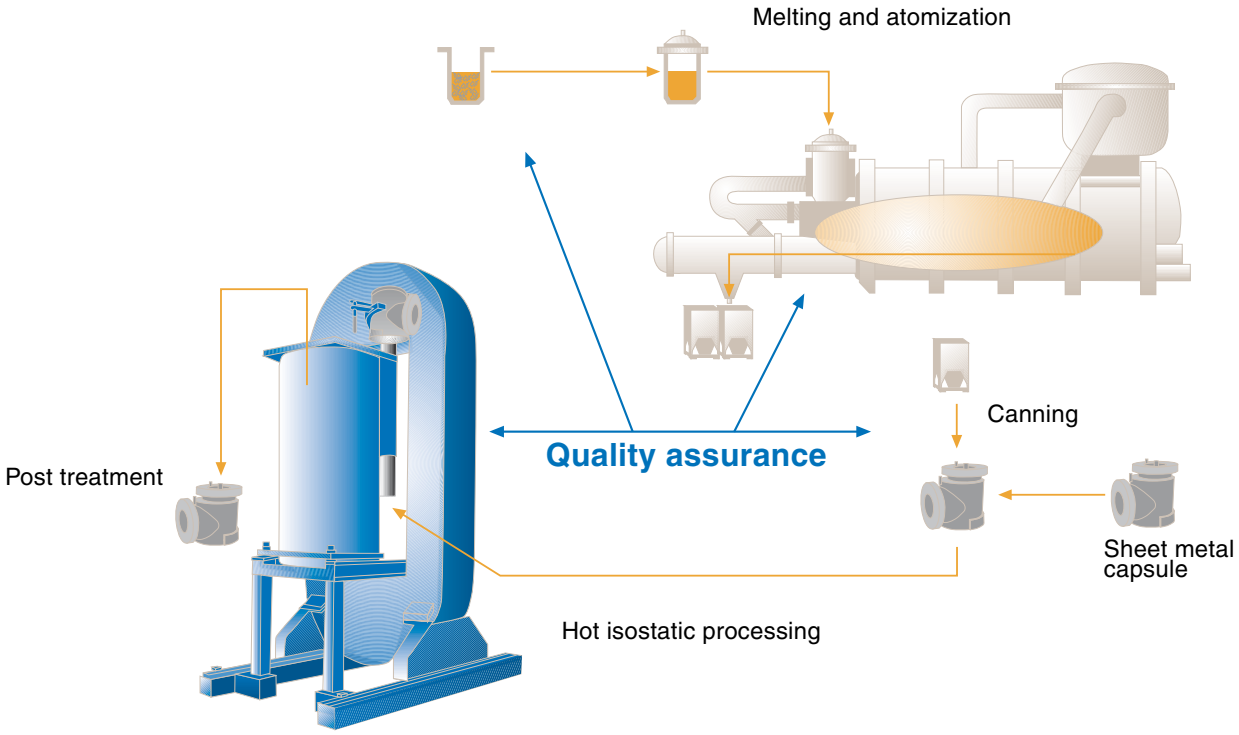
- Developing new PM materials and solutions
- Fabricating prototypes
- Producing and supplying HIP, PM Near Net Shape components

Take advantage of:

- Cost effective solutions
- Worldwide representation
- Expertise in PM, near net shape technology since 1985

End covers for CERN's new particle accelerator

No miracles – but the answer for complex designs and demanding environments



Four stages – from melt to final product

1 Inert gas atomization to produce powder

Atomization takes place when small metal droplets are solidified rapidly, forming spherical particles of high purity and low oxygen content. The fine-grained microstructure obtained, in comparison to conventional forging, originates from the rapid solidification of the melt during gas atomization. This gives totally isotropic properties in the final component.

2 Sheet metal capsules are filled with the powder

The capsules are designed according to the required shape for the end product and are made by forming and welding sheet metal. There is also the possibility of combining different materials, in powder or in solid shape, in the same product. It gives an optimization of the properties depending on the operating environment or performance.

3 The capsules are subjected to high isostatic pressure and high temperature to obtain full density

The necessary pressure, temperature and time for the process are optimized to give the material full density and the required properties. Maximum dimensions for the end product are 1200 mm diameter and 2850 mm height. The maximum weight for a single item is approximately 15 tonnes. It is, however, possible to produce larger components in sections.

4 Post treatment and quality assurance

The products are heat treated, machined, and subjected to materials testing and quality assurance. A comprehensive integrated, management system to ISO 9001, ISO 14001 and OHSAS 18001 standards applies throughout all processes.

Slitter knives for paper machine in fine microstructure PM tool steel

Superior materials, designs and products – performance beyond your expectations

Corrosion, wear, pressure, high temperatures, hostile environments …
With materials to withstand all these – Powder Metallurgy opens up new worlds of achievement.

Fast and flexible delivery times

- Components for offshore use: having powder in stock and no need for prototypes or tooling mean short delivery times.

Freedom of design

- Sub sea wye-piece (1-2 tonnes): major savings in weight
- Swivel: complex internal channelling
- Manifold (1-7 tonnes/section): less critical/reduced welding and reduced weight.

Improved material properties

- Suction roll shell for paper machine (30-40 tonnes): isotropic material properties and improved mechanical properties mean superior resistance to corrosion fatigue.
- CERN's new particle accelerator, end covers for dipole magnets: powder technology ensures 100% sealing and minimizes the need for welding. The mechanical properties are superior to other forming methods and reproducible with extremely small variation.

New materials and compound structures

- Raiser tube for oil refinery (3.8 m, ø 600 mm): metal matrix composite, thick cladding means superior wear resistance.

Virtually no restriction on size

- Fuel injection valve nozzle (about 100 g): improved hot corrosion resistance and machinability.
- Turbine rotors (up to 15 tonnes): steel compound with different material in the area around the bearing means reduced galling behaviour during operation.

Component for offshore use (4-15 tonnes)

Manifold (1-7 tonnes/section)

Sub sea wye-piece (1-2 tonnes)

Suction roll shell for paper machine (40 tonnes)
Courtesy of Metso Paper

Fuel injection valve nozzle (about 100 g)
Courtesy of MAN Diesel

High quality, added value and almost unlimited new opportunities

- high alloyed steels
- stainless steels
- superalloys
- tool steels and high speed steels
- compound structures
- composite materials, such as metal matrix composites (MMC)

HIP products are completely dense, homogeneous and isotropic.

Sandvik Powdermet has a wide range of materials and works constantly to develop customized materials and solutions.

Sandvik Powdermet is the global leader in powder metallurgical hot isostatic processed products in near net shape.

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