

PRESS RELEASE

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Production of metal components:

Huge saving potentials by powder compaction

Faced with the financial crisis, the opening up of saving potentials becomes central. A cost-efficient and high grade alternative to the conventional production of metal components is powder compaction. An increasing number of companies makes use of this technique. Dansk Sintermetal A/S with its headquarters and production in the Danish town Haderslev, is one of the leading European providers of powder compaction.

Complex and heavily loaded mechanical components, self-lubricating bearings, filters or components with soft magnetic properties: the application possibilities for powder compaction are manifold. However, it is barely known that this technique is also cost-efficient when only producing small quantities. Compared to conventionally produced components, the costs for powder compacted parts are significantly lower without suffering from a reduction in quality. This is especially the case for components with a complex geometry.

Well-proven system

The high grade of quality is secured by a well-proven system. The base material here is always metal powder.

Dansk Sintermetal works with a number of different alloys, from soft magnetic materials to stainless steel to heavy duty steel, as well as copper-based alloys like bronze and nickel silver. Although there are several methods for powder compaction, the conventional powder compaction in fixed tools has prevailed to a large extent. In this process the powder is placed in the powder holder at the top of the press, which can be both, hydraulic or mechanical. A specific amount of powder drops by gravity into the filling shoe, which distributes the powder in a hollow in the die. An average pressure of five to seven tons per square centimeter of projected surface area is applied across the pressure face, the powder is compacted between a set of upper and lower punches to a density of 85 to 90 percent of the solid material. As the powder grains are extremely irregular in shape they lock into each other during compaction, thus clinging together mechanically, while there is cold welding between the contact surfaces on the individual powder grains.

Thus the compressed grains form an imprint of the tool, a so-called "green component", which is then expelled from the tool and pushed away by the filling shoe while the next filling is taking place. The green component is of a size and shape roughly similar to that of the finished component and strong enough to be handled and conveyed on to the next process, which is sintering.

Sintering is a type of heat treatment which is typically carried out in a controlled atmosphere, for example in a belt conveyor furnace at a temperature a few hundred degrees below the melting point of the base material. Thus, steel is generally sintered at 1120 °C. The purpose of sintering is the generation of the final mechanical properties. Sintering brings to an end the basic powder metallurgical process. Depending on the requirements they have to comply with, the finished components are often subjected to one or more after-treatment processes.

High flexibility

Powder compaction can be applied in manifold ways: it offers a solution to almost any requirement. Says Pernille Bonde Christiansen, degreed engineer at Dansk Sintermetal: „It is crucial, however, that the client include the manufacturer at an early stage in the development process so that ideal conditions for the emerging powder compaction system can be generated.”

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