

for high-performance gears,
rely on the P/M industry leader.

With more than 7,000 employees in close to 40 locations on five continents, GKN Sinter Metals is the world's leading producer of powder metal components.

For engineers, buyers and other specifiers who are interested in high-performance gears, our size is in direct proportion to our strength. Consider these exclusives:

GKN Sinter Metals produces an unmatched selection of P/M products.

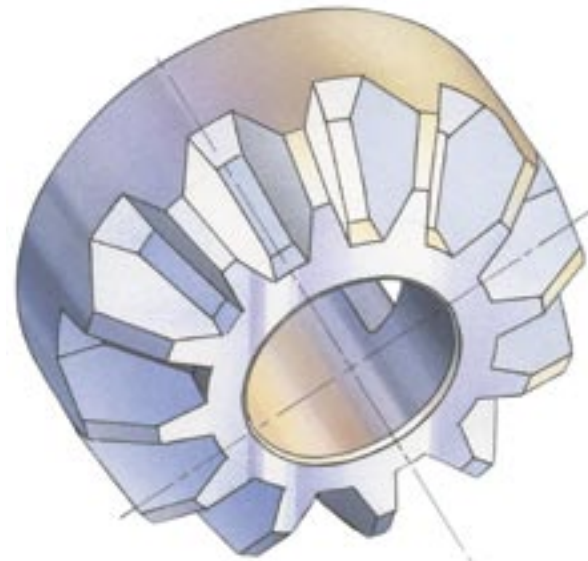
From gears and structural parts to self-lubricating bearings, powder-forged components, sintered metal filters and more, we offer the world's widest variety of P/M components. As a result, manufacturers can often source multiple components from a single supplier.

GKN Sinter Metals provides unequalled P/M compacting capabilities.

Powder metal compacting is a significant step in manufacturing gears at precise tolerances and with specialized qualities. Our industry-leading capabilities in this area include conventional and warm compacting as well as powder forging in Grade A and Grade B processes.

GKN Sinter Metals delivers greater flexibility in P/M sintering.

Sintering is another process within powder metallurgy that's key to achieving specific results. We offer the P/M field's greatest selection of capabilities, including conventional and vacuum sintering as well as high-temperature sintering and sinter hardening.



GKN Sinter Metals offers more expertise in more kinds of P/M materials.

Material selection is an important element in powder metallurgy – particularly given the potential to combine alloys to enhance characteristics for specific application requirements. With extensive experience in metal powders ranging from aluminum to tool steel and everything in between, our expertise exceeds that of any competitor.

GKN Sinter Metals features an unsurpassed P/M quality assurance program.

Our commitment to quality is underscored by acquiring state-of-the-art equipment, including a Klingelnberg Gear Measuring Center. This next-generation apparatus sets a new P/M industry standard for precision, and supports a program that features other sophisticated technologies as well as SixSigma processes.

And, to ensure continued superiority, GKN Sinter Metals operates a Center of Excellence for P/M Gears.

Our capabilities are continuously enhanced by a Center of Excellence for P/M Gears in Radevormwald, Germany. Focused on material development and process advancements, this center is supported by P/M gear engineers at GKN Sinter Metals facilities the world over.



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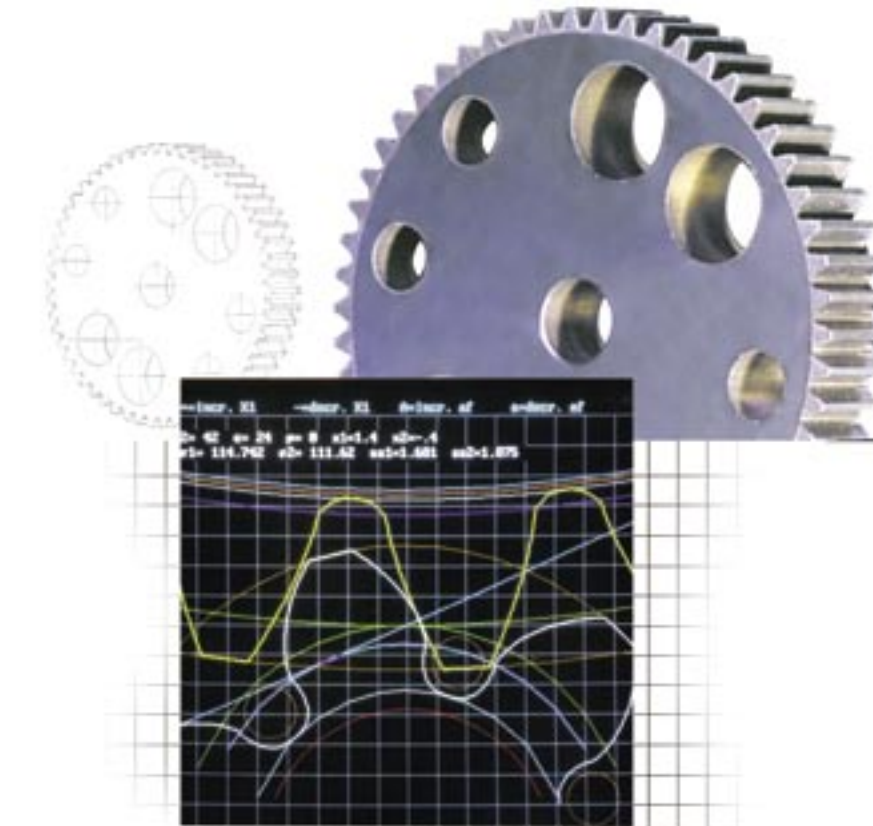
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Advanced Powder Metal Gears Worldwide



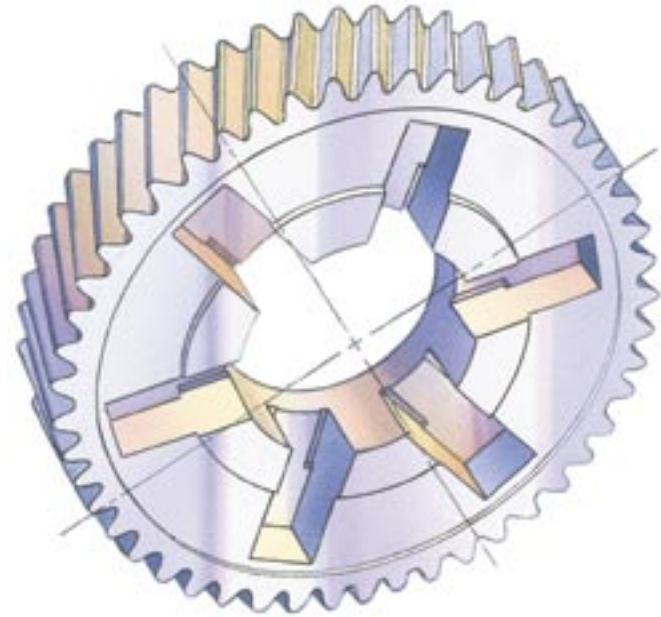
Higher Performance
Global Operations
Local Expertise
Dedication to Gears



discover the advantages of powder metallurgy.

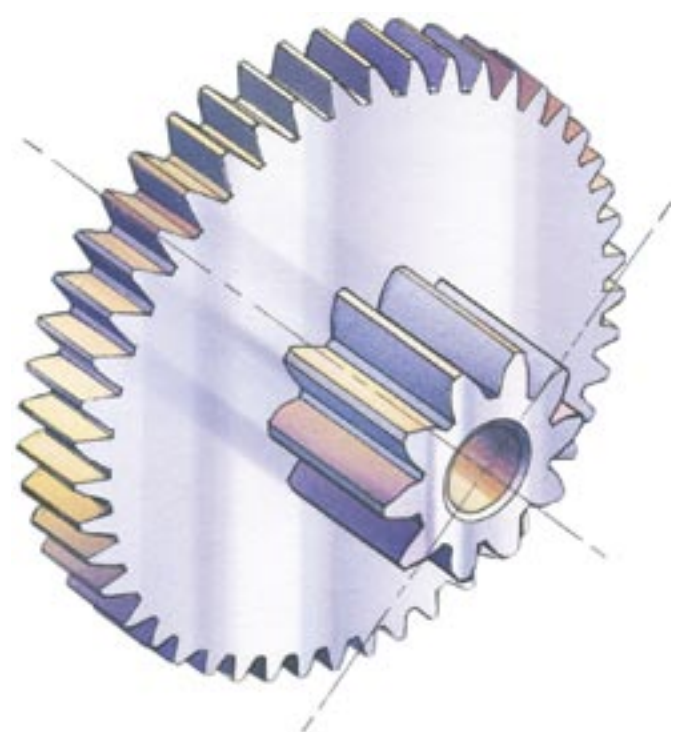
The demand for powder metal (P/M) components in gear applications is growing.

Why? ...



- Because of the many advantages powder metallurgy as a metal-forming process offers:**
- Perfected through decades of development and proven in hundreds of thousands of applications, P/M is extremely flexible and can meet specific strength and design characteristics with a high degree of accuracy.
 - In addition, P/M is efficient on a mass-production basis. Products with extremely close tolerances can be net-shape manufactured with virtually no waste and with relatively little, if any, secondary machining.
 - Finally, P/M offers isotropic material structure, which permits enormous design flexibility, tailored properties and, quite often, operational advantages.

The bottom line? ...



- P/M enables the manufacture of parts, or combinations of parts, that otherwise may be impossible or too costly to produce using more conventional metal-forming techniques such as casting, fine blanking, hot forging and machining.
- In addition, P/M provides repeatable dimension characteristics and good surface finish without requiring substantial finishing processes. Whether the P/M process is press and sinter, powder forging, or metal injection molding (MIM), there is a high probability that P/M can fulfill your application requirements.

gears manufactured through the world's most advanced P/M processes.

Backed by decades of powder metal component production experience and extensive P/M gear engineering expertise, GKN Sinter Metals offers:

Price and performance advantages over competitive technologies

- The benefits provided by net- or near-net shape P/M gears from GKN Sinter Metals over cut gears are many. Consider that:
- The P/M process often offers a better cost-to-performance ratio.
 - The P/M process allows for truer involute gear forms.
 - In many cases, secondary operations can be eliminated.
 - The P/M process permits complex shapes that are not attainable with other technologies.
 - The P/M process utilizes a fixed die to form the gear profile. As a result, tooth-to-tooth errors decrease.

Powder metal gears in all types and sizes

- For manufacturers and product assemblers worldwide, GKN Sinter Metals produces all types of:
- Dual-material gears
 - Face gears (straight, straight bevel and spiral bevel)
 - Helical gears (internal and external)
 - Hypoid gears
 - Miter gears
 - Multi-level gears
 - Spur gears (internal and external)
 - Sprockets

Cost-efficient alternatives to special gear requirements

- To meet the specialized needs of our P/M gear customers, GKN Sinter Metals:
- can produce gears in sizes up to 40 sq. in. of surface area
 - manufactures single-level and multi-level gears, as well as gear assemblies and special gears



New technologies that deliver new solutions

- Among our many advanced capabilities, GKN Sinter Metals:
- achieves gear densities up to 7.4g/cm³ in just one pressing through P/M warm compaction which, in turn,
 - allows for the greater cost efficiencies afforded by green machining;
 - creates gears at density levels from 7.6 g/cm³ to fully dense through precision powder forging (e.g., hot forging); and
 - employs sinter furnace hardening (SFH) as a means by which to manufacture cleaner gears with reduced distortion and tighter dimensional control, when compared with cut gears with conventional (quench and temper) heat treating.

Engineering and technology support on a global scale

- From facilities worldwide, GKN Sinter Metals engineers work to:
- define functional technical requirements
 - perform simultaneous engineering with customers
 - assess mechanical interaction with other components and the application environment
 - define required materials and manufacturing processes
 - formulate essential shapes and designs
 - evaluate loads occurring in service
 - optimize designs through gear optimization software
 - verify final designs



Multiple heat treatments to impart special properties

GKN Sinter Metals heat-treating methods for P/M gears include the following:

- Sinter furnace hardening
- Steam treating
- Other comprehensive heat treating capabilities, such as:
 - Carbonitriding
 - Nitriding
 - Carburizing
 - Thru hardening
 - Induction heat-treating

More secondary capabilities for more types of gears

To meet varied specifications, GKN Sinter Metals also performs these operations "in-house:"

- Drilling
- Grinding (face, ID and OD)
- Milling
- Oil impregnation
- Tapping
- Turning



Superior gear solutions across the spectrum of world industries

From production facilities around the globe, GKN Sinter Metals supplies P/M gears to the manufacturers and assemblers of:

- Automobiles, trucks and RVs
- ATVs, motorcycles and snowmobiles
- Business machines
- Home appliances
- Industrial equipment and machinery
- Lawn and garden products, including small engines
- Marine engines and transmissions
- Off-road equipment
- Shop tools and outdoor power tools



Six reasons why GKN Sinter Metals should be your P/M gear supplier

- When considering global supply partners, remember that GKN Sinter Metals offers:
- the industry's widest range of advanced P/M technologies and products to increase performance and reduce costs
 - world-class innovation that comes from close working relationships with our customers and suppliers
 - extensive experience in powder metals development and processing on a global basis
 - global standards for engineering, manufacturing, finishing and product certification
 - a worldwide presence combined with local support
 - dedicated technology centers that focus on advancing P/M processes ... and maximizing value for our customers

To benefit from the experience, expertise and resources of a world leader in P/M gears, contact your nearest GKN Sinter Metals representative, or call our Gear Hot Line at 1-262-255-9050, ext. 122.