Always One Gear Ahead

Synchronizer rings · Precision parts for the automotive industry
Economic growth and progress depend on mobility. By the year 2025, almost eight billion people will live on our planet. Every day, more and more people and goods are transported across ever increasing distances. The world is growing together but is also growing bigger.

This calls for people and companies who are willing and able to take on these challenges. The prerequisites for this involve the use of innovative products to improve the efficiency of existing technologies significantly and the ability to operate flexibly within an international production network.
At the heart of every mechanical transmission is the synchronizer ring.

Diehl Metall is the global market leader in the production of high-performance synchronizer rings made of brass and steel. Our products meet the highest requirements regarding exact geometry, high wear resistance and strength. We guarantee precision and reliability based on new material developments and in-house tool manufacturing.

OUR SOLUTIONS

Multiple-cone synchronizer ring assembly: patented Diehl-solution for optimum heat regulation.
The resilience of brass

Diehl Metall controls the entire production process for brass synchronizer rings - from integrated production using input materials supplied by our semifinished-product plant through to the delivery of the finished product.

Thanks to the continuous development of our high-performance synchronizer ring alloys, we are able to offer powerful solutions for modern transmission oils. Our wide range of alloys, which includes lead-free high-tensile brasses, already meets the future requirements of EU directives for old vehicles today.
The lightness of steel

We manufacture high-quality steel synchronizer rings on the latest punching and forming machines operating with total press forces of up to 8,000 kN.

Extremely powerful progressive and transfer tools guarantee high-quality formed parts. Depending on the customer’s specific application, these parts then undergo additional production processes, such as heat treatment. If required, we can also supply steel synchronizer rings with ground friction layers.

Synchronizer rings made of steel were added to the product portfolio in 2006.
Products of the future

Modern transmissions are increasingly using synchronizer rings with tribo-layers to improve the friction and wear performance. This applies equally to brass and steel synchronizer rings. For this purpose, we developed innovative friction materials that cover the entire performance range.

Friction layers for brass and steel synchronizer rings:

- Carbon coated synchronizer rings are used primarily in high-performance transmissions. Brass or steel synchronizer rings equipped with carbon friction layers offer considerable advantages compared with thermally sprayed molybdenum coatings normally used in the past.

- Iron-sinter coated synchronizer rings represent a cost-effective alternative to molybdenum coated synchronizer rings. Moreover, the performance capacity is significantly higher.

- Bronze-sinter coated synchronizer rings provide excellent gear shift comfort, especially when combined with certain transmission oils.

We cooperate closely with our customers to develop optimised economic and technical concepts.
Our ideas form the basis for customer-oriented products and services.

**Tool manufacturing**

All tools for forging, cutting and non-cutting operations as well as gauges and other equipment are being developed, designed and manufactured in-house.

The latest CAD/CAM systems and modern manufacturing methods such as EDM and 5-axis HSC milling not only guarantee high-quality but cost-effective tool manufacturing as well.

**Laboratory**

The service spectrum of our laboratory includes quality inspection (mechanical and physical characteristics, microstructure properties) and material tests for our customers. Special tests as part of the development process as well as consulting services for our customers concerning all material issues complete our portfolio.

We use approved test methods such as hardness testing (Brinell, Vickers, Rockwell) and micro hardness testing, tensile/force testing as well as metallography (microstructure testing, corrosion testing, layer assessment) and quantitative micro-structure analysis (image analysis system). Scanning-electron microscopy, EDX micro analysis (spot measurement, surface scan, spectral mapping) and chemical analysis complete our range of laboratory test procedures.
Research and development

We develop complex, efficient synchronizing systems in close cooperation with our customers in the automotive industry.

In the field of material development, we design our own patented high-performance brasses for synchronizer rings and special brasses for the automotive industry. Our research into innovative friction systems for synchronization includes detailed system analysis, geometrical construction and exact definition of the material.

Test benches

We carry out every stage of the inspection: from material to components and service life to the final functional tests in the gearbox. In this context, we use the following machines:

- Material wear test bench
- Diehl locking teeth wear test bench
- Diehl component test benches for friction coefficient and wear
- ZF/FZG standard synchronization test bench, type 180
- Gearbox test benches.
We take responsibility for climate protection and resource conservation.

**Sustainability**

Environmental thinking and actions are core elements of our corporate policy. Our goal is to achieve comprehensive and integrated environmental protection, in which environmental aspects are considered right from the first product idea. Our actions are based on national and European environmental regulations and certified to ISO 14001 standard.

We practice sustainability by conserving resources, promoting recycling and, as an energy-intensive company, by focusing in particular on energy efficiency and reducing CO2-emissions. By providing an optimised logistics system within our plants and en-route to our customers, we are creating the basis for sustainable products.

**Quality management**

We have a certified quality management system that complies with international standards, such as VDA 6.1 and ISO TS 16949.
We are all around you

As a comprehensive supplier of products made of brass, light metal alloys and steel, our clientele includes almost every well-known automobile and gearbox manufacturer.

We always offer „customized solutions“ for all types of vehicles. The requirements for the individual vehicle types are as varied as the philosophies of the major automotive manufacturers.
More than 1 billion synchronizer rings have been delivered all over the world since 1956. Previous VW models used Diehl Metall synchronizer rings made of brass.

**We set the standards for the future**


The innovative technological expertise of the entire Diehl Group delivers impulses from other technology fields for our developments in drivetrains.