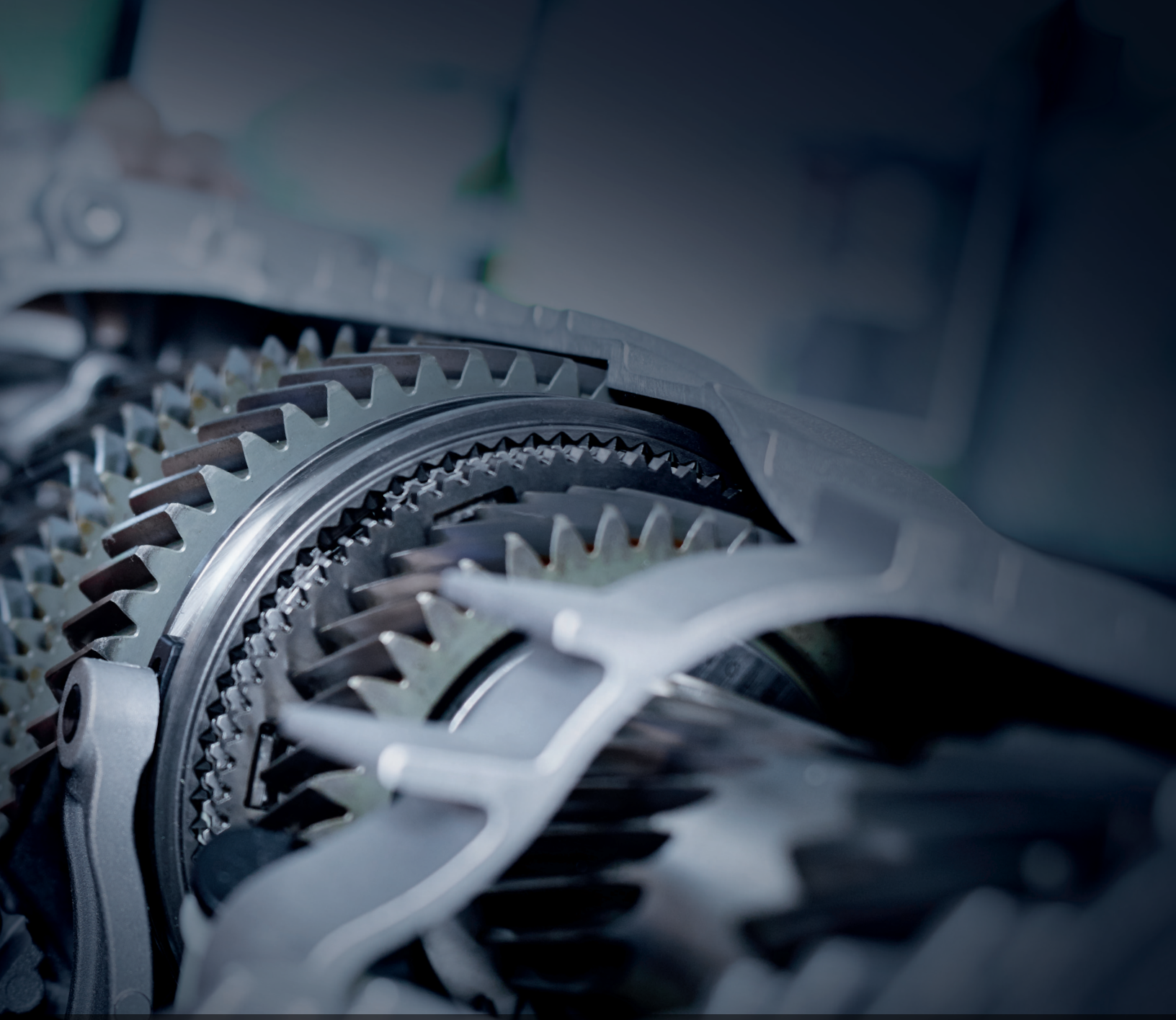

# YOUR PARTNER IN THE TRANSMISSION INDUSTRY

## TOOLS AND SYSTEM SOLUTIONS

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# TYROLIT Group
# **A global company**

As one of the world's leading manufacturers of bonded grinding, cutting, sawing, drilling and dressing tools as well as a system supplier of tools and machines for the construction industry, the family-run company TYROLIT has been synonymous with top quality products, innovative spirit and outstanding service since 1919.

Day in, day out, the experts at TYROLIT work on delivering tailor-made solutions for customers around the world, helping to make their businesses successful. Around 80,000 available products set the standards in a wide variety of industries.

TYROLIT company headquarters in Schwaz, Austria

## TYROLIT business units

### Metal / Precision

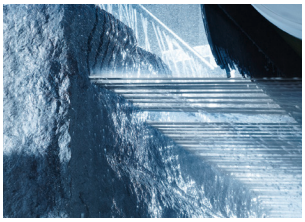
From precision machining in the engine and gearbox industry to the production of cut-off wheels with diameters up to 2,000 mm for the steel industry – the TYROLIT product range in the Metal & Precision business unit includes high-tech tools for a wide variety of applications.

### Trade

Thanks to its global sales network, in addition to premium product solutions in the three core areas of cutting, grinding and surface treatment, the trade business unit of TYROLIT guarantees truly customer-focused marketing support.

### Construction

In the Construction business unit, TYROLIT is a leading system supplier of drilling systems, wall and wire saws, floor saws and tools for the surface grinding of concrete motorways.



### Stone – Ceramics – Glass

Our tailored diamond tools and grinding solutions in the Stone – Ceramics – Glass business unit impress through their exceptional performance and quality.

# Neuenrade Competence Centre
# **The TYROLIT performance package at a glance**

The machining of gears poses enormous challenges in terms of the quality of the tools used. High levels of application expertise are also demanded, as well as fast, flexible customer service. The extensive range of services makes TYROLIT a competent partner for its customers in all questions regarding the hard-finishing of gears.

Expertise & experience

Global presence

Application engineering

Customer-specific tools

# Expertise & experience
# **Professional industry know-how**

TYROLIT underlines its position as a technology leader with the **Competence Centre Gearing** in Neuenrade. Here highly specialized industry expertise and ambitious innovation are brought together at a central location. Many years of experience, combined with the latest production technologies, guarantee our customers in the transmission industry reproducible, economically efficient grinding and honing processes.

The TYROLIT Competence Centre Gearing in Neuenrade, Germany.

## How you benefit

- Customer-specific system solutions from a single source
- Individually tailored tool specifications for machines and processes
- Optimum tool design for maximum economic efficiency
- Close cooperation with machine manufacturers
- Process simulation on in-house test equipment
- Hosting of workshops and training courses

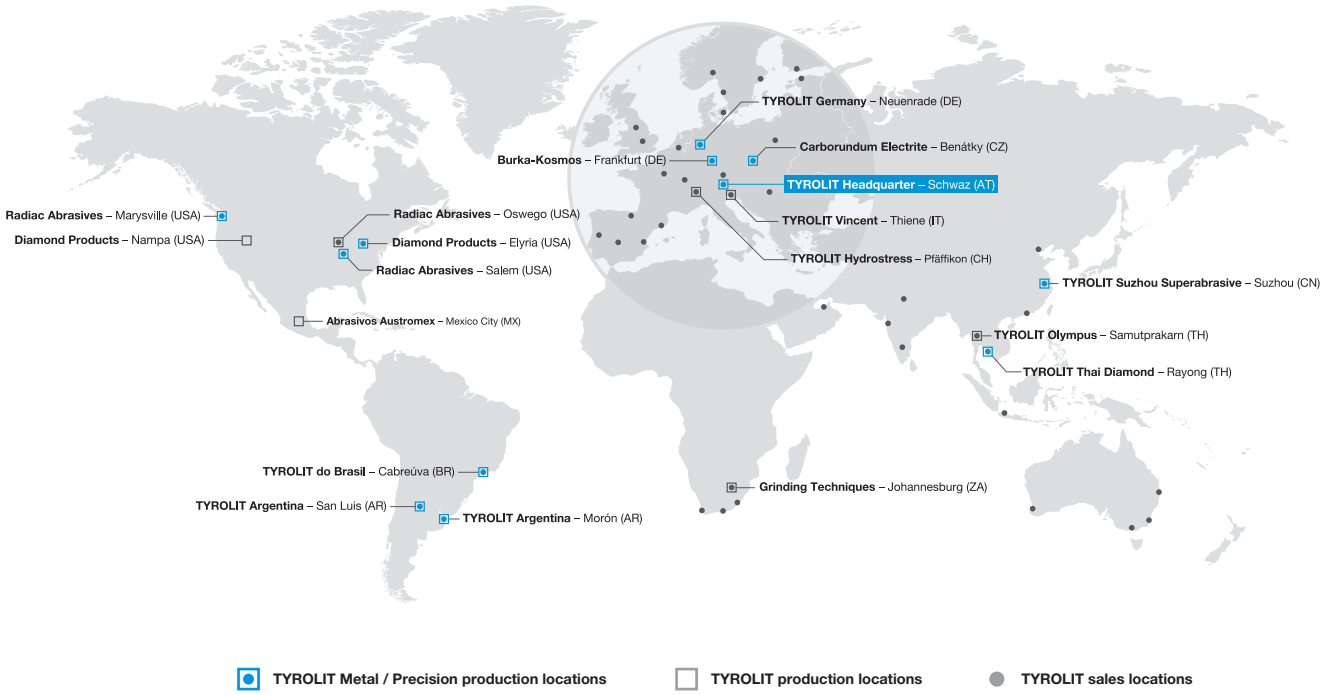
# Global presence
# **In your vicinity**

**Global presence**
TYROLIT stands for global thinking and activities. With a worldwide sales network currently in 65 countries and with our own production plants in 12 countries on five continents, we offer our customers all the advantages of a globally operating company.

**Local availability**
Global thinking, local action – in your national language and in your vicinity. This is the principle we follow in dealing with our customers. Local contacts near your business and a global team of specialist application engineers ensure optimum customer support and first-class service.

## Your benefits

+ Global presence with local contacts
+ Short response and service times



# Application engineering
# **The best team for your application**

An experienced team of application engineers is available to our customers throughout the world and works to produce the most economically efficient solutions.

All employees in the various countries have excellent links to the Competence Centre Gearing in Neuenrade and receive intensive support from there in relation to all technical issues.

## How you benefit

- The global presence of our application engineers
- Process solutions and optimisations in close cooperation with customers
- Close cooperation with machine manufacturers
- Internal and external seminars and training courses

# Customer-specific tools
# **Top performance guaranteed**

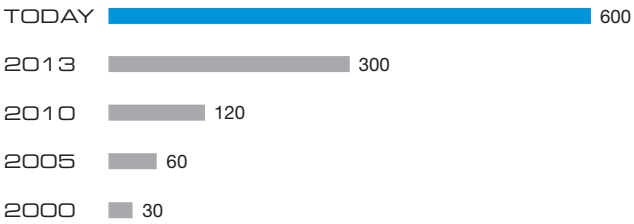
The name TYROLIT is synonymous with innovative products and tool quality at the highest possible level. In our Development Department we are constantly working on new and innovative products, aiming to make our customers' future processes even more efficient.

## How you benefit

- Continuous improvement of existing products
- Development of innovative products and solutions for optimizing economic efficiency
- Grinding and dressing tools system solutions from a single source
- Cooperation with machine manufacturers and university research institutions
- In-house test center for internal simulations and customer tests

## Continuous innovations increase economic efficiency on the customer side

**Number of components produced per dressing cycle***




* based on the example of vitrified bonded honing wheels for high-performance honing

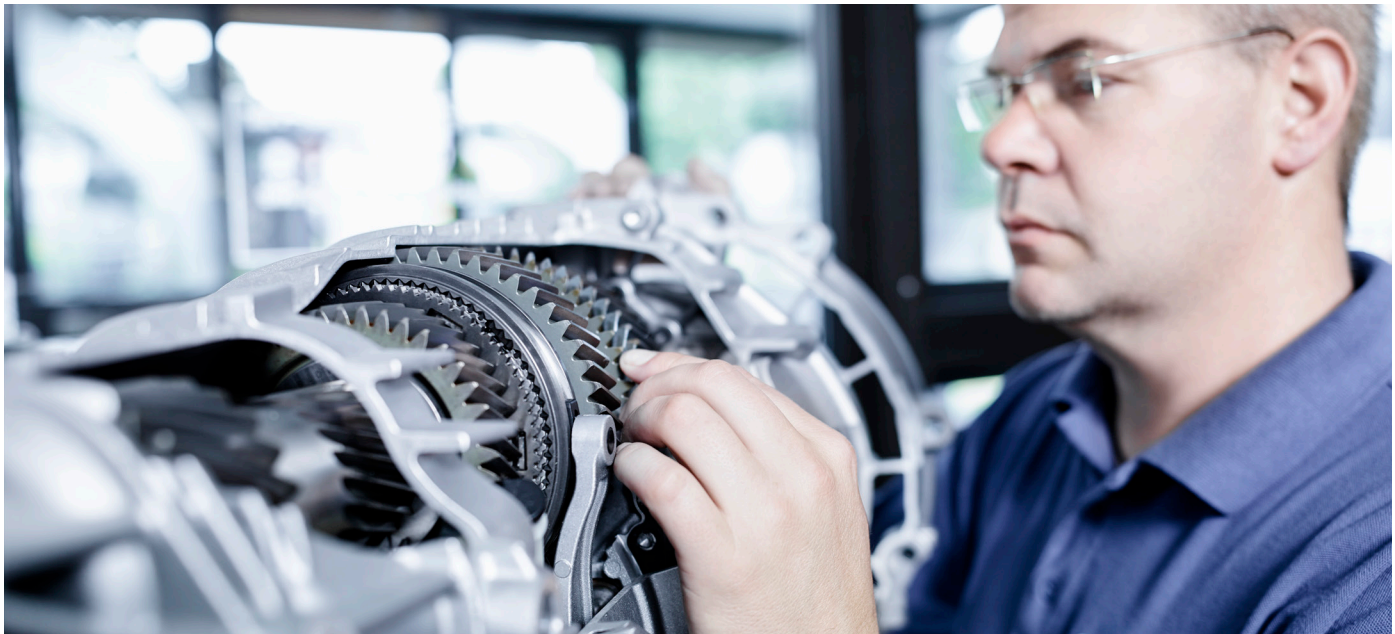
# Hard-fine machining
# **Requirements profile**

A gearbox only reveals its maximum performance through the optimum interplay of all the individual components. Thus, the requirements for the machining of the individual components are extremely complex. Carriers, shaft components and the associated gearing all demand maximum finishing precision.

Optimized product qualities, low noise emissions, great running smoothness, long service life and optimized performance data play a key role when it comes to choosing the right tool.

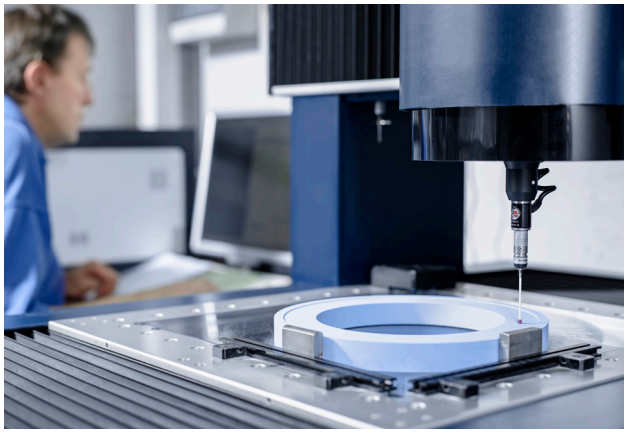
Hard-fine machining is enormously important in terms of tooth geometry and surface quality. Gear grinding and honing are cost-intensive processes whose economic efficiency can primarily be improved by optimizing processes and tools.

As a world market leader, TYROLIT offers a broad range of tools for the hard-fine machining of gears in the MIRA product line and the BURKA-KOSMOS product MIRA ICE. The assortment is rounded off by the CSS ULTRA, POLARIS and GENIS product lines, which are used in external cylindrical grinding and plunge grinding.



# Processes and tools
# **TYROLIT system solutions from a single source**

| Application | Process | Tools |
|---|---|---|
| **Gear grinding and dressing** | Profile gear grinding | BURKA-KOSMOS<br>**MIRA ICE** profile grinding wheels |
| | Continuous generating gear grinding | **MIRA** gear grinding wheels<br>**MIRA ULTRA** gear grinding wheels<br>**MIRA ICE** gear grinding wheels |
| | Bevel gear grinding | **MIRA** bevel gear grinding cup wheels |
| **Gear honing and dressing** | | **MIRA REX** honing wheels<br>**MIRA DDG** dressing gears |
| **External cylindrical grinding and plunge grinding** | | **CSS ULTRA** grinding wheels<br>**GENIS 2** vitrified bonded CBN grinding wheels<br>**POLARIS PLUS** electroplated CBN grinding wheels |

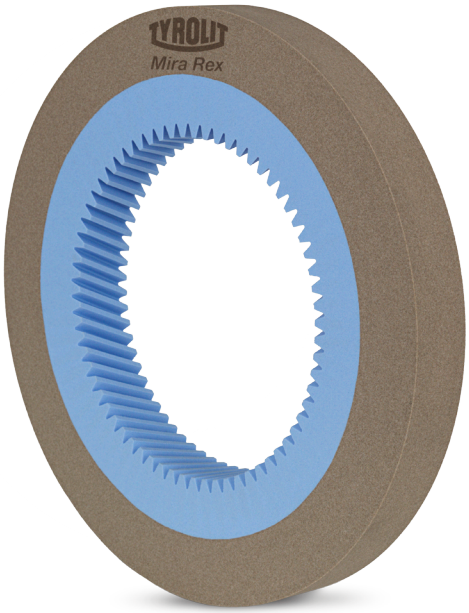


# MIRA REX honing wheels
# **Top quality tooth flank honing**

Over 25 years of experience makes TYROLIT the market and technology leader in the field of gear honing. As a professional partner, we guarantee our customers the highest product quality, intelligent system solutions, fast on-site service and reliable lead times.

The MIRA REX product line has made it possible to provide the most economically efficient solution for all honing processes. REX specifications for vitrified bonded and epoxy resin bonded and compound construction were developed to meet customer-specific requirements. Honing wheels with both internal and external gearing are available.

Our experienced design engineers calculate the profile pattern for honing wheels and diamond dressing gears and draw up individual system solutions. Thanks to the innovative machining methods used during pre-profiling, the effort involved in initial dressing is significantly minimized.




## MIRA REX

- Top quality honing wheels
- Maximum dressing cycles
- Broad product range
- MIRA REX system solution with MIRA DDG

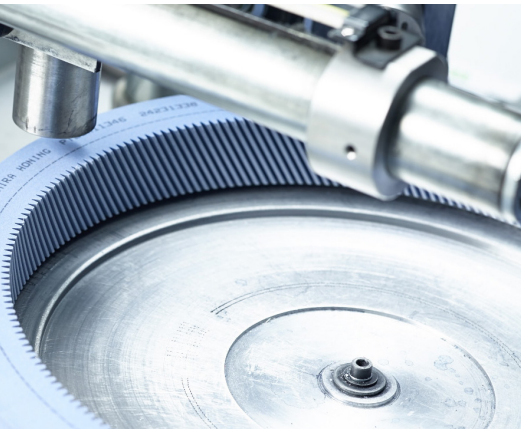
# MIRA DDG diamond dressing gears
# **Dressing honing wheels**

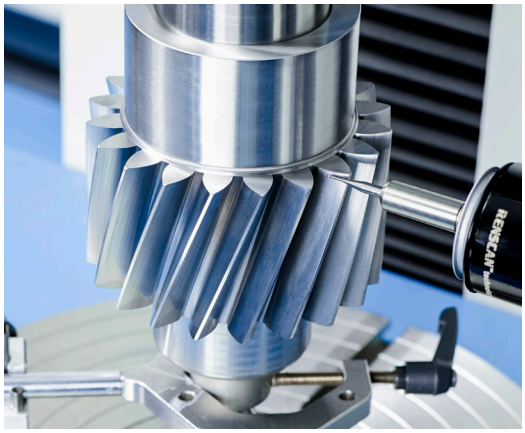
Honing wheels are trued and sharpened with maximum precision during the dressing process. Diamond dressing gears from the MIRA DDG product line are used for this purpose. These precision tools are manufactured using a positive electroplating process. It is also possible to replate worn tools.

MIRA DDG products guarantee optimum dressing results, the best possible toothwork and surface quality, as well as maximum service life.

## MIRA DDG

- Optimum dressing results
- Customer-specific profile modification
- MIRA DDG system solution with MIRA REX





# MIRA ULTRA gear grinding wheels
# **Gear flank grinding at the highest performance level**

Excellent economic efficiency and component quality make continuous generating gear grinding the leading machining process in the medium and large scale production of gears. The cylindrical gear grinding wheel lies at the heart of this process.

TYROLIT has developed the MIRA Ultra product line specifically for the continuous generating grinding of gears. All specifications are produced without the addition of sintered aluminium oxide and combine high performance data with optimum economic efficiency. The new type of grinding wheel structure was specially designed for operating speeds of up to 100 m/s, and allows reliable operation on modern high-speed machines.

## MIRA ULTRA

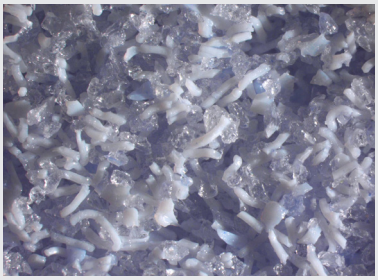
- Increased operating speed of up to 100 m/s
- Maximum process stability with homogeneous grinding wheel structure
- Cool grinding with highly porous bond system
- Optimized economic efficiency with high performance parameter
- Rapid availability with stock program

# MIRA ICE gear grinding wheels
# **Gear flank grinding with reduced processing time**

The MIRA ICE product line has been specially developed for the continuous generating grinding of gears. A new kind of development approach enables unprecedented results to be achieved in terms of economic efficiency and cool grinding.

**New approach to development**

- New grain qualities and geometry
- New high-strength bond system
- Increased porosity of grinding wheel



MIRA ICE grinding wheel structure

## MIRA ICE

- Shorter grinding times due to the significantly higher stock removal rates and fewer rough grinding passes
- Longer tool life due to reduced shift travel and increased dressing cycles
- Highest process stability with a completely homogeneous grinding wheel structure
- High-precision pre-profiling for module sizes 1 – 12 with one or more starts in maximum quality

# MIRA ICE profile grinding wheels
# **Grinding large and special gears**

The merger with BURKA-KOSMOS sees TYROLIT, one of the largest abrasives manufacturers in the world, expand its portfolio of high-quality products. BURKA-KOSMOS is an experienced specialist in the grinding of large gears and a technology and market leader in this sector.

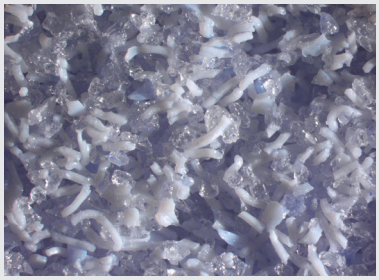
In the MIRA ICE product line, TYROLIT, together with BURKA-KOSMOS, has developed a new kind of tool that allows higher stock removal without risking burning.

The MIRA ICE product line was developed together with established TYROLIT experts in order to meet the requirements for grinding large gears.

A new kind of development approach enables previously unknown results to be achieved in terms of economic efficiency and cool grinding. MIRA ICE has been further optimised on the basis of the leading product line from BURKA-KOSMOS and sets new standards throughout the industry.

**New approach to development**

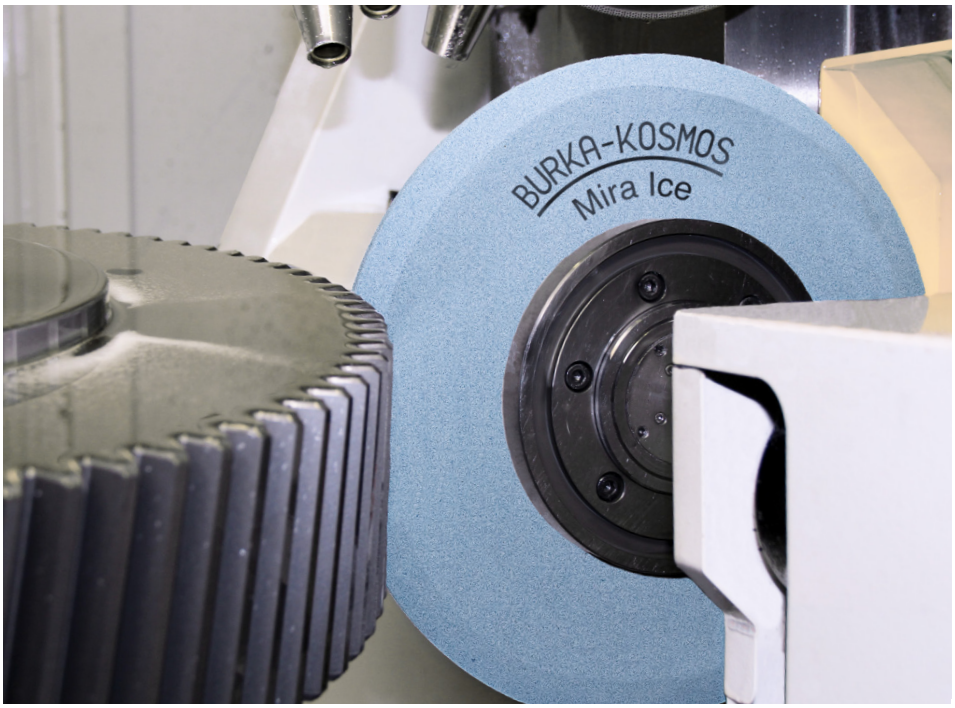
- New grain qualities and geometries
- New, high-strength bond system
- Increased porosity of the grinding wheel



MIRA ICE surface structure

## MIRA ICE

- Cool grinding with the use of new grit qualities
- Optimized economic efficiency with high performance parameter
- Maximum process stability with novel wheel structure



# MIRA bevel gear grinding cup wheels
# **Economically efficient grinding of bevel gears**

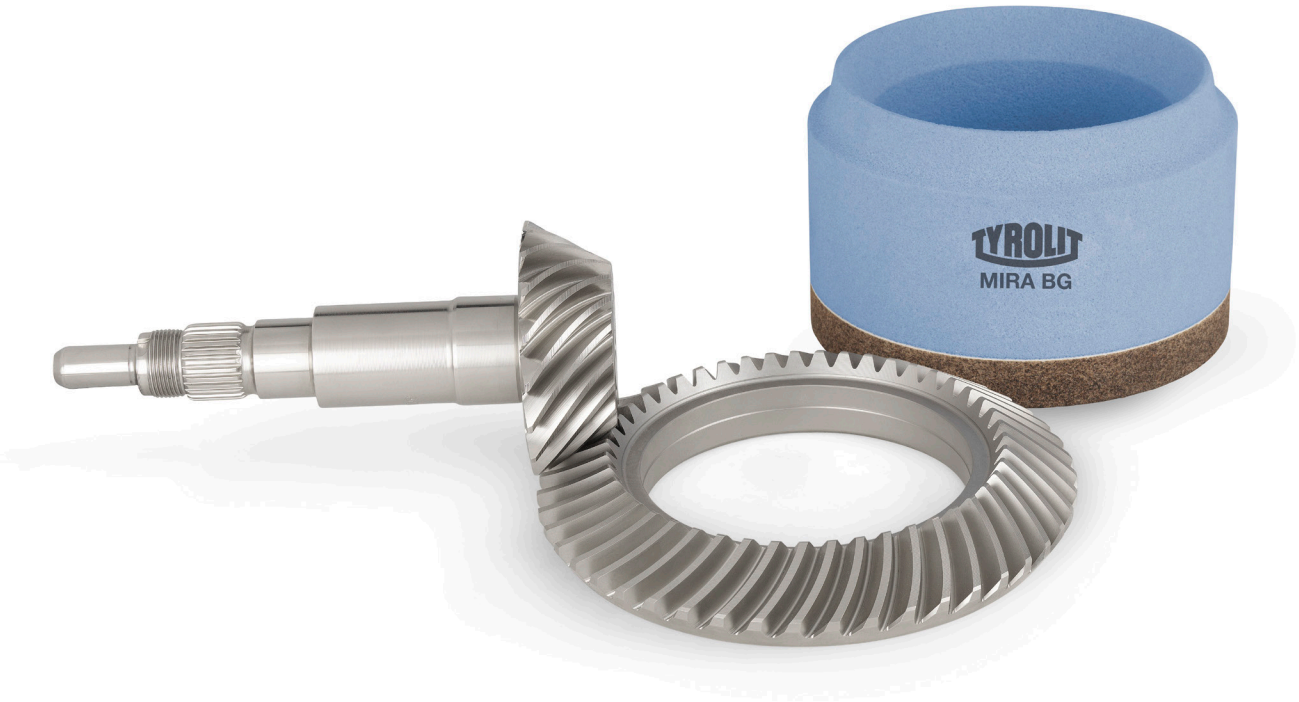
The higher quality requirements for the production of bevel gears demand hard-fine machining.

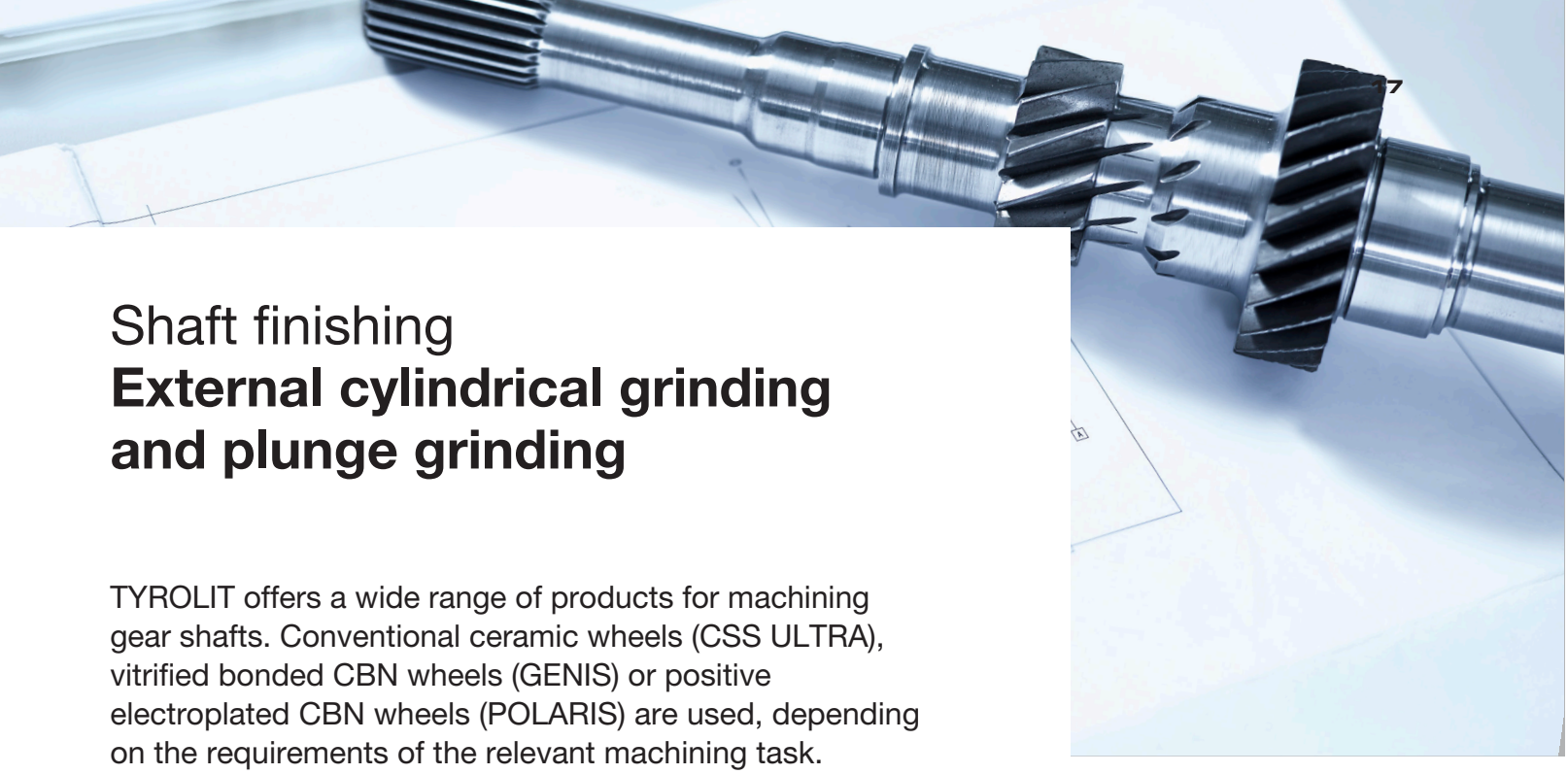
In the MIRA BG product line TYROLIT offers an optimum solution for grinding bevel gears. Maximum profile holding in conjunction with reduced thermal stress on workpieces allow a larger number of units to be machined in each dressing cycle.

The steel cores used can be processed more than once, enabling them to be reused. Alternatively, less expensive one-way cores can be used.

## MIRA BG

- High productivity
- Low heat build up
- Highest profile retention
- Available with or without mounting plate





# Shaft finishing
# **External cylindrical grinding and plunge grinding**

TYROLIT offers a wide range of products for machining gear shafts. Conventional ceramic wheels (CSS ULTRA), vitrified bonded CBN wheels (GENIS) or positive electroplated CBN wheels (POLARIS) are used, depending on the requirements of the relevant machining task.

# CSS ULTRA grinding wheels
# **External cylindrical grinding of gear shafts**

With the CSS ULTRA product line, TYROLIT has succeeded in sustainably optimising the micro-architecture for a vitrified-bonded grinding wheel using new high-quality components and an innovative sintering technology. This improvement has proven itself in practice in the high performance grinding process.

## Application range

+ External cylindrical grinding
+ Angular plunge grinding

## CSS ULTRA

+ High profile holding
+ Cooler grinding
+ Low wear

# GENIS 2 grinding wheels
# **External cylindrical grinding of gear shafts**

With the GENIS 2 product line, TYROLIT defines a new performance level and a wider range of applications for external cylindrical grinding with vitrified-bonded CBN tools. GENIS 2 is characterized by a high-strength bond with excellent moistening properties, which securely binds the CBN grain. Low bond volumes enable very porous, cool-grinding and extremely easy-cutting specifications with a long lifetime.

## GENIS 2

- Optimum grain utilisation
- High economic efficiency
- High running precision
- Wide range of applications

# POLARIS PLUS grinding wheels
# **Pluge grinding of gear shafts**

With its POLARIS product line, TYROLIT is the market and technology leader in the production of galvanic bonded grinding tools. Cutting-edge production equipment, manufacturing know-how and application expertise are essential for maximum tool lives. Even the smallest amount of axial and radial run out or the slightest imbalance can reduce the service life of the tool. Additionally with the POLARIS PLUS variant, the zones with the highest levels of tool wear can be specifically reinforced, extending the life of the grinding wheel even further.

## POLARIS PLUS

- Individual production
- Maximum lifetimes
- Replating-compatible
- Maximum profile accuracy
- Constant optimization

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