YOUR PARTNER IN THE STEEL INDUSTRY

The best solutions for cutting and grinding applications

Premium grinding tools since 1919
www.tyrolit.com

TYROLIT Group
A global company

As one of the world's leading manufacturers of bonded grinding, cutting, sawing, drilling and dressing tools and 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

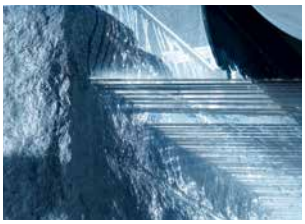
From precision machining in the engine and gearbox industry to the production of cut-off wheels with diameters up to 2,000 mm for the steel industry – the TYROLIT product range in the Metal & Precision business unit offers high-tech tools for a wide variety of applications.

Trade

With its global sales network, as well as premium product solutions in the three core areas of cutting, grinding and surface treatment, TYROLIT's Trade business unit guarantees truly customer-focused marketing support.

Construction

In the construction division, TYROLIT is the leading system supplier for drilling systems, wall- and wire saws, floor saws and surface treatment.



Stone – Ceramics – Glass

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

A competent partner **in the steel industry**

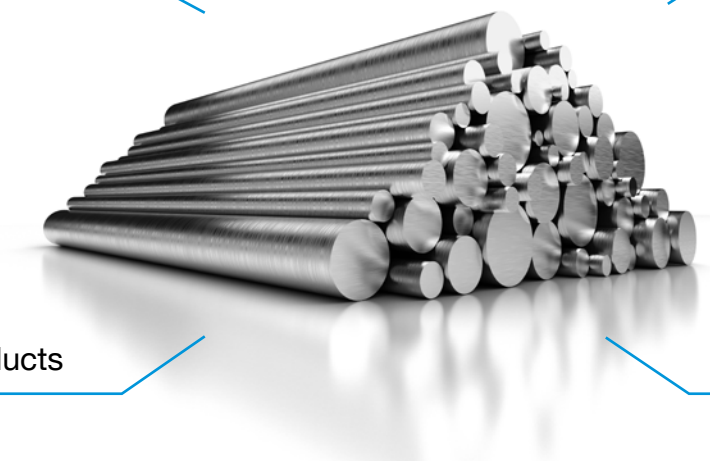
Requirements in the steel industry are becoming ever more stringent. The demand is for maximum product quality coupled with increased productivity. To bring this goal within reach, the requirements for the grinding tools used are also changing.

TYROLIT has long-standing experience in a huge range of applications and machining processes in the steel industry. With our broad product range and accustomed high product quality, processes can be optimised, productivity increased and maximum reliability guaranteed for your application.

Our services for the steel industry at a glance

Global presence

Application technology



Innovative products

Customised solutions

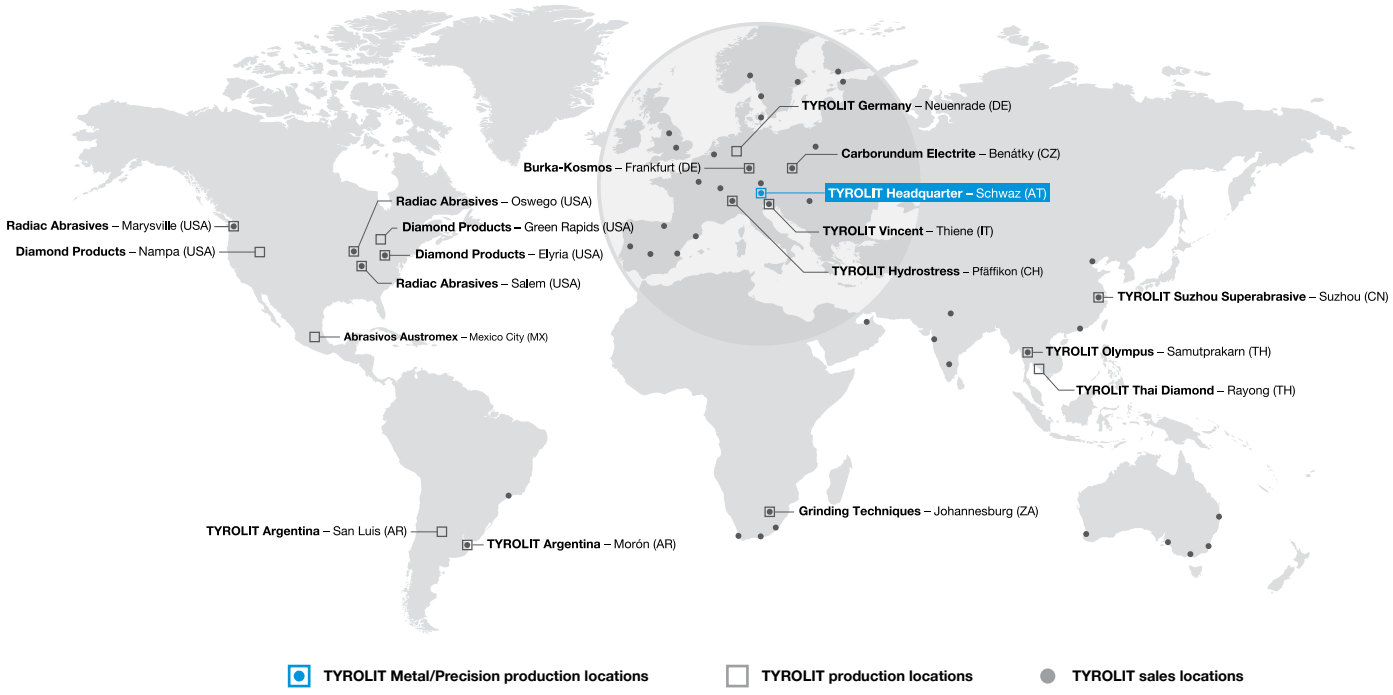
Worldwide presence
On your doorstep

A global presence
TYROLIT believes in thinking and acting globally. 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 on your doorstep. This is the principle we follow in dealing with our customers. Local contacts near your premises and a global team of specialist application engineers ensure optimum customer support and first-class service.

Advantages for you

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



Application technology
The best grinding solutions for your processes

Expertise in cutting and grinding – TYROLIT has excelled in this for a hundred years now. With the wealth of process expertise commanded by our specialist application engineers, we are able to provide our customers with long-term solutions that meet their demanding technical and financial expectations.

Our global team of specialist application engineers propose solutions individually tailored to your requirements. In many years of collaboration with end users and machine manufacturers, grinding processes such as cutting, roll grinding, centerless grinding and snagging have been further developed to the highest level.

Advantages for you

+ The global presence of our application engineers
+ Process solutions and optimisation for individual tasks
+ Cooperation with established machine manufacturers
+ Internal and external seminars and training courses

Innovative products
For cutting and grinding

Our ongoing drive towards further improvement and our close contact with our customers form the basis for new and innovative products. In recent decades TYROLIT products have repeatedly made a lasting impression on the industry and played a major role into enhancing reliability, efficiency and productivity.

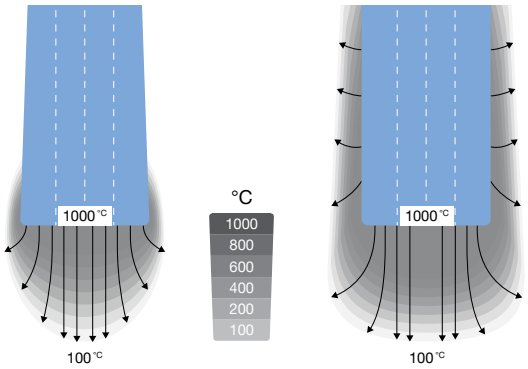
Way back in 1952, TYROLIT was the first manufacturer to offer the market fibre glass reinforced cut-off and grinding wheels to improve safety at work. With the first hot cutting trials in the 1970s, and the conical cut-off wheel, numerous TYROLIT innovations have permanently established themselves in the market, and continue to do so today.

Conical wheel geometry:

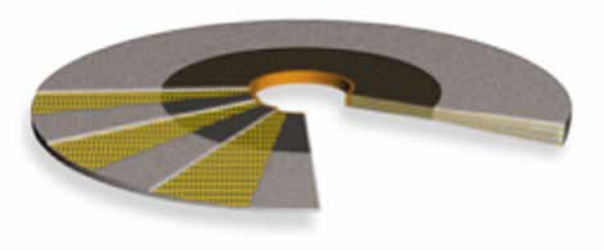
+ The conical wheel design reduces lateral friction during cutting
+ Clearly reduced thermal load on both tool and workpiece

Reinforced inner zone:

+ Optimised wheel stability
+ Especially suitable for powerful machines
+ Also suitable for traverse cutting systems



Temperature profile during the cutting process with a conical wheel geometry in comparison with a straight cut-off wheel



Schematic diagram of wheel design

2002
SECUR ST
Super-thin cut-off wheel with steel-reinforced core design for low cutting losses and low power consumption

2006
CSS Roll Star
Roll grinding wheel for hot and cold rolling mills

2010
CSS CENTERLESS
Centerless range for bar grinding with maximum stock removal and short dressing times

2013
SECUR Easy Cut
For cutting materials with high internal stresses with maximum process stability, thanks to a completely redefined wheel topography

2016
GENIS Roll Star
CBN roll grinding wheel for satisfying the most exacting quality and performance requirements

2018
SECUR XT
Extra thin cut-off wheel specially for wet cutting applications

2000
SECUR LAB
New generation of laboratory cut-off wheels with the cleanest cutting surface

2004
CSS Wire Roll
Diamond tool for wire roll grinding with supreme profile retention

2007
SECUR HP
Further development of the snagging wheel with maximum stock removal rates

2011
SECUR 1.8 & SECUR 2.0
TYROLIT's largest resin-bonded cut-off wheel is available in sizes 1,840 and 2,000 mm

2014
SECUR Warm
Cut-off wheels for warm cutting-off with maximum cutting performance and optimum profile design

2017
SECUR Hot
Cut-off wheels for hot cutting-off with optimum temperature resistance

Customised solutions
Tailored for your industry

Customers in the steel industry demand the very highest quality tool for their grinding and cutting applications.

In order to guarantee the optimum solution for your application, TYROLIT offers individually developed products for numerous different fields of application. Below you will find an overview of the available grinding tools for machining in the steel industry. Please see the following pages for detailed descriptions of these tools and their respective application.

Component	Grinding application	Our product recommendation
Steel bars, rods, pipes, electrodes	Cutting	**SECUR** **SECUR ST** **SECUR Easy Cut** **SECUR Warm** **SECUR Hot** **SECUR XT**
Slabs, blocks, billets, electrodes, pipes	Snagging	**SECUR HP**
Roll	Angular plunge grinding	**CSS Roll Star** **Genis Roll Star** **CSS Wire Roll**
Steel bars	Angular plunge grinding	**CSS Centerless** **CSS Regulator**

Cutting and grinding tools for the steel industry

SECUR cut-off wheels

The innovative solution for cut-off grinding

Cut-off grinding – a cutting process with undefined edges – is frequently used in steel mills due to its excellent performance and economic efficiency. With SECUR, TYROLIT offers the ideal tool for every cutting application. Available with a diameter of up to 2,000 mm.

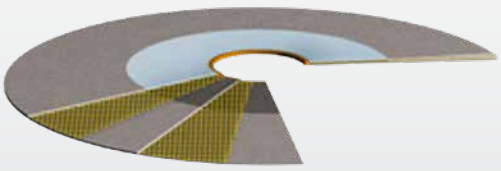
Advantages for you

+ Optimises your process costs
+ Enables innovative customised solutions
+ Achieves the best cutting quality
+ Ultimate product safety

Other versions

SECUR Super Thin

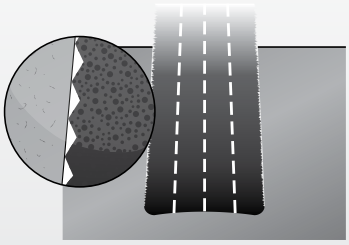
20% reduced wheel thickness for low cutting losses



The innovative wheel design with steel-reinforced inner zone promises high stability even with a small wheel thickness

SECUR Easy Cut

For large materials with high internal stresses

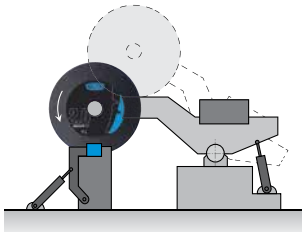


The precisely produced roughness of the lateral faces enables the cut-off wheel to "grind itself clean".

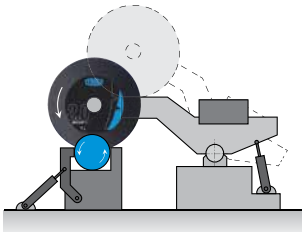
Cut-off grinding processes

No other method of cutting to length is as universal as cut-off grinding. This applies to both the dimension and temperature ranges of the component being machined and to the range of materials that can be processed.

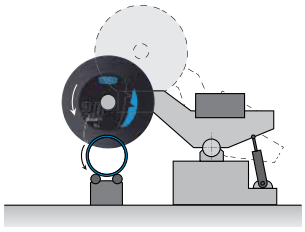
Type of cutting process:



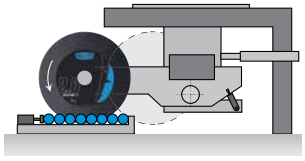
Chop cut



Index cut



Rotary cut



Traverse cut

Workpiece temperatures:

20-100 °C Cold cutting-off	100-600 °C Warm cutting-off	600-1100 °C Hot cutting-off

Diameter [mm]: 864 / 1000 / 1250 / 1380 / 1500 / 1600 / 1840 / 2000

General requirements for the cutting process:

As well as financial factors such as price-performance ratio and working times, the user's primary concern is process stability. High lateral forces or adverse cut-off wheel profiles can result in deviations during cutting.

Firstly, these impact on quality; secondly, deviations can lead to premature wheel changes or, in the worst case, wheel breakage. The continuous improvement of process stability and resulting more exacting standards are what have made us the Number 1 port of call for the industry.

CSS Roll Star

Roll grinding redefined

The rolls must be continually reground due to fire cracks, wear and peeling of the roll surface. Roll grinding is a special form of external cylindrical grinding. It is used in sheet mills and in roll production. With the CSS Roll Star, TYROLIT offers the optimum grinding tool for this application.

Advantages for you

+ Cuts costs – improves performance
+ Enables maximum lifetimes
+ Reduces your grinding times
+ Guarantees the best surface finishes
+ Universal for all roll materials and types

GENIS Roll Star

CBN grinding wheels for roll grinding

TYROLIT has developed a new generation of grinding wheels with CBN layer and innovative core for grinding rolls used in cold rolling mills. Ultra-hard rolls can be machined cost effectively for the first time thanks to the GENIS ROLL STAR, with its shorter grinding times and higher quality surface results. The newly developed core of the GENIS ROLL STAR is vibration-damped and can be disposed of when the grinding layer is worn down.

Advantages for you

+ Grinds ultra-hard materials
+ Greater process stability
+ Universal machine use
+ Universal use

CSS WIRE ROLL

The solution for grinding tungsten carbide wire rod rolls

Our “calibre” for the grinding of wire rod calibre rolls is called CSS WIRE ROLL - currently the best solution on the market. It is also a fully integrated system solution, including tools for retrueing the grinding wheel and roughing stones for exposing the abrasive grain.

Advantages for you

+ Long lifetime
+ High profile retention
+ Increased process stability
+ Complete system in TYROLIT quality

Roll grinding

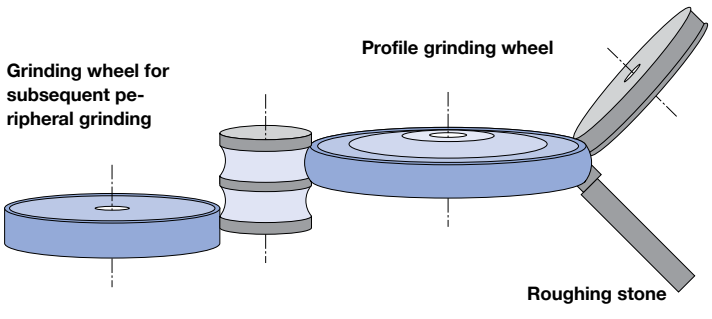
A rolling mill demands a great deal from its rolls where wear resistance and surface structure are concerned. The shortening of process chains in steel production and rolling mill technology is throwing up new challenges for the rolling process. What's more, the requirements for the end product are becoming ever more demanding, while roll intervals become ever shorter.

In the hot rolling mill, particular value is placed on high wear resistance, low susceptibility to fire cracking, insensitivity to the occurrence of surface indentations, high mechanical strength and a high coefficient of friction. The requirements in the cold rolling mill, on the other hand, are all about high operating safety, resistance to corrosive and abrasive wear, durability of the applied surface roughness, and low belt contamination. Despite all these demands and requirements, with TYROLIT grinding tools seamless grinding is guaranteed.

Since multiple-shift operation often requires machines to be operated by several employees, there is a growing need for a uniform grinding wheel quality in different production lots. As well as a long lifetime and short grinding times, TYROLIT grinding tools therefore also offer constant quality, which means no more additional adaptation of machine parameters due to fluctuations in quality.

Wire roll grinding:

In wire rolling mills, worn profiles of tungsten carbide rolling rings regularly have to be reground, and profiles and fire cracks ground out. Here, each profile size requires a dedicated diamond tool, which is why TYROLIT offers such a diverse range of products. Diamond tools with a metal, resin or electroplated bond are used, depending on what's needed, and are employed for wet grinding on external cylindrical grinding machines.



SECUR HIGH PERFORMANCE

Your choice for high performance

Many types of steel exhibit surface flaws, scale and areas of decarburisation after continuous casting. As a result, the semi-finished products cannot be conveyed to the rolling mill without the need for trimming beforehand. Here, the grinding wheel is an integrative element that comes into its own – it is vital for enabling cost-efficient trimming that conforms to technological requirements.

Advantages for you

- \+ Superior grinding power
- \+ Improved bright grinding capability
- \+ Optimised grinding costs
- \+ Problem-free working - maximum safety thanks to top quality

High-performance wheel with coarse-grained texture

At TYROLIT, high-performance wheels are resin-bonded grinding wheels that are compacted under high temperature and high pressure.

Standard dimensions

Ø	x	D	x	H
406	x	40 / 51	x	152,4
508	x	40 / 51 / 63	x	152,4 / 203 / 203,2
610	x	51 / 63 / 76 / 102	x	203 / 203,2 / 304,8 / 305

High pressure grinding

The principal reason for the success of the snagging process is the fast and precisely controlled machining of all semi-finished products, regardless of their quality. Here more than in other fields, the integrative nature of the grinding wheel is vital for cost-effective fettling that satisfies technological requirements.

High pressure grinding is the most frequently used process for fettling semi-finished products, and fulfils the most crucial requirements:

- Targeted, controlled stock removal
- High production output
- Controlled surface quality of semi-finished products
- High cost efficiency
- Easy handling
- Savings on manpower
- Environmentally friendly
- Option of chip recovery
- Low susceptibility to breakdown

CSS CENTERLESS

Your partner for bar grinding

With a grinding wheel, regulating wheel and dressing tool, TYROLIT offers the complete range. By continually further developing our products, we can guarantee the best stock removal per grinding pass, the strictest tolerances and finest surfaces.

Advantages for you

+ TYROLIT offers the complete system (grinding wheel, regulating wheel, dressing tools)
+ Reduced throughput times
+ Maximum stock removal rates
+ Lower dressing amounts
+ Maximum true running and shape accuracy

CSS REGULATOR

The regulating wheel for centerless grinding

Centerless grinding in through-feed and plunge cut processes enables round components to be produced with particular precision and efficiency. Here, the regulating wheel controls the grinding process and therefore has a decisive influence on the quality of the produced components. The extremely high compaction ensures uniform quality of the regulating wheel.

Advantages for you

+ Excellent profile retention
+ High coefficient of friction
+ Constant grinding pressure

Centerless grinding

The Centerless grinding process enables cylindrical workpieces ranging from a few millimetres to several metres to be cylindrically ground – with maximum precision and cost efficiency!

As the first step of machining – bar grinding – a great deal of material needs to be removed. This requires rigid machine systems on the one hand, and a grinding wheel with the following properties on the other:

- High stock removal is built in
- Dimensional accuracy must endure over a certain period.
- Self-sharpening, i.e. dressing is only necessary on installation in the machine. Fresh abrasive grains are released as the grinding wheel wears.
- Different material qualities can be machined with one grinding wheel

Centerless grinding wheels are quite thick in relation to their diameter. Grinding wheels with a diameter of 300 mm are more than 500 mm thick, for example. As the grinding wheels are pressed axially during production, there is a risk that a wheel may fluctuate in density. To ensure the most homogeneous density distribution possible, special pressing techniques, adapted specifications and, sometimes, divided grinding wheels are required.

Grinding wheels are subjected to extreme load due to high grinding pressure, which frequently used to result in wheel breakage. Although this problem is not caused by faulty wheels, TYROLIT has taken this issue on board and, with a highly professional team of designers, has developed an "impact-resistant" centerless grinding wheel.

With a grinding wheel, regulating wheel and dressing tool, TYROLIT offers the complete range. By continually further developing our products, we can guarantee the best stock removal per grinding pass, the strictest tolerances and finest surfaces.

Steelwork **maintenance**

As well as innovation and technology, the regular maintenance of equipment and machines is vital for trouble-free production.

In-house workshops carry out minor and major repairs and maintain the entire plant. To ensure this thoroughly important work can be accomplished, here too we offer high-quality tools for perfect results.

In our Specialist Industry Catalogue, you will always find the right product for use in angle grinders, straight grinders, bench grinders, etc. from our portfolio of over 5,000 tools.

Cut-off wheels

The benefits of our cut-off wheels in terms of innovation and economy can be clearly seen when it comes to cutting thin metal sheets and profiles. Our super-thin PREMIUM products, in particular, offer you ultimate performance and lifetime, clean cutting areas and low thermal load. This means minimal rework, saving you time and money.

Rough grinding wheels, points and milling cutters

The TYROLIT range of rough grinding wheels meets the most stringent requirements for cost-effective working, high stock removal rates, simple handling and above-average lifetimes. Continuous developments, such as the introduction of the "Comfort Start" edge, with which every user can achieve optimum results right from the start, make our rough grinding wheels among the most advanced tools in the sector.

Our mounted points and tungsten carbide burrs are also manufactured in high quality, and always provide a solution for a large range of applications and challenges.

Brush tools

Brush tools are very universal and can be used for different applications such as deburring, cleaning welding seams or the surfaces of virtually any material. The wide TYROLIT range contains the right shape, wire type and specification for every job.

Precision tools

Bench grinding wheels are especially popular for machining materials in many workshops. They have universal specifications and their smooth running and easy handling are particularly impressive. You will find these tools, among many others, in the Precision Grinding section of our Specialist Industry Catalogue.

Coated abrasives

No tool portfolio is as versatile as coated abrasives. The assortment ranges from flap discs and polishing wheels to belts and fabric products. All products were always developed with cost efficiency and the user's comfort in mind. So in our range you will find the C-Trim flap disc with trimmable edge, for example, which enables the wheel to be used 100%. From coarse machining to the perfect mirror finish, we offer the optimum tool.

Diamond tools

No good tool assortment is complete without a high-quality diamond saw. Our dry cutting saws can handle plastics, fibre glass and bullet-proof glass in addition to countless standard materials such as hard stone, concrete and asphalt. Innovative products, such as ultra-thin saw blades and TGD technology, reflect the continuous further development and optimisation of our diamond products.

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