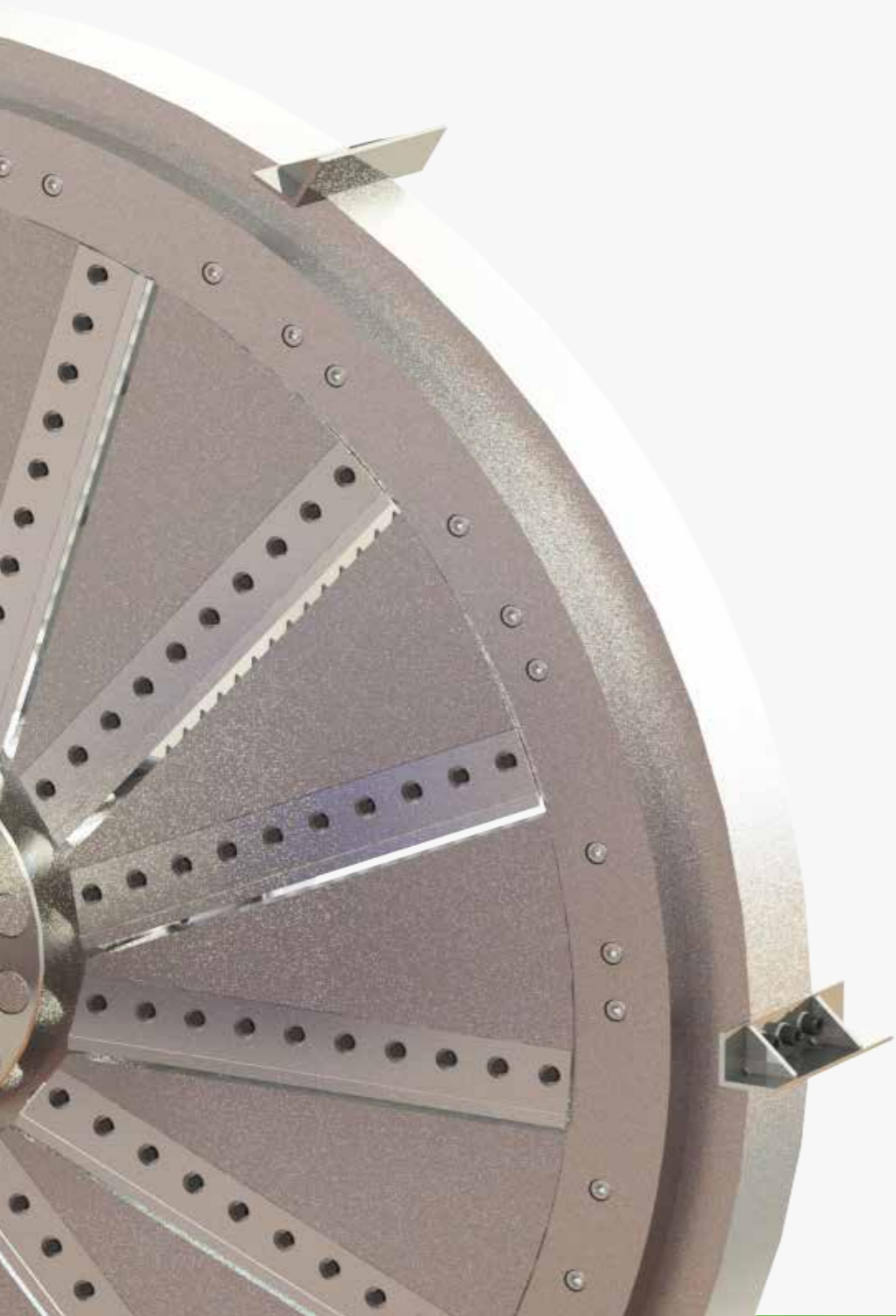


Product and Cutting Solutions
for the Pulp Industry



Precision and Perfection: For Optimal Cutting Performance, Surface Consistency and Longevity.

Our knowledge as well as an in-depth understanding of the requirements of “cutting” in various industries are the foundation of our products for the Pulp Industry.

Whether the parts are made of tool steel, special material, surface treated or refined, we produce highly efficient cutting tools and wear parts that prove their merit in precision and long-term use.

The focus of our service lies on intensive dialogs with our customers . Together we develop the most enhanced cutting tools and systems, which will fit perfect in your individual production-processes.

Thanks to uncompromising quality management – from the procurement of raw materials to delivery – we can guarantee that absolutely no tolerance deviations will impair the performance of our tools.

As a consequence, we offer customized solutions with measurable added value. TKM, The Knife Manufacturers.

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The Chipper is the heart of the wood handling process.

Chip quality is the key to total quality and economy in manufacturing both pulp and paper.

TKM TTT Finland OY is one of the leading manufacturers of high quality customized cutting tools and related services for various wood processing industries like sawmill-, plywood-, veneer- and of course the pulp industry.

Beside our own long-lasting experiences in these different cutting applications, it is also the unique company structure of the TKM Group, which enlarges and combines this knowhow even more by bringing it together with the knowledge of all our sister companies into one worldwide expertise.

In the Result all of our Customers benefit from a local like global knowledge about the manufacturing and application of industrial knives, wear parts and related services.

Out of this context our products and service solutions for the pulp industry are highly evolved and will optimize and maximize your production processes in view of performance, output quantity and quality and of course efficiency.

Application related Solutions for your Pulp Production:

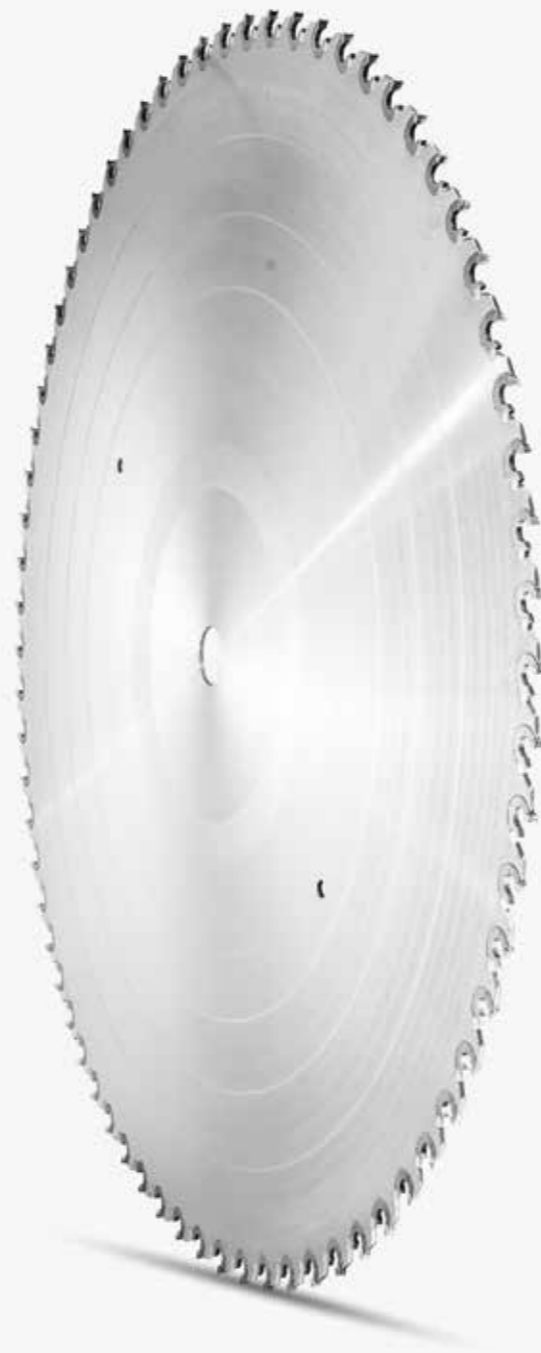
- Springtooth and Circular Saw Blades for Log Cutting
- Shredder and Crusher Knives for Debarking
- Chipper and Counter Knives
- Machine- and Wear parts for Chippers
- Cassette Knife System for Chippers
- Rotary Feeder Knives
- Sheeter, Slitter and Bed Knives for Sheet Cutting

Cross Cutting

Like in various wood processing industries, every production process starts with the basic “cut to length” -operation at the wood yard. At a first glance just a “simple” cross-cut, but it needs to be cut through various types of different wood species, with varying dimensions and permanently changing conditions due to the weather and the pre-treatment of the logs.

In Awareness of all these variables TKM produces high quality cross-cutting circular saw blades in a heavy duty specification, to ensure that every saw is able to cut every kind of log in any processing environment. Based on our long-lasting experience in circular saws and all relevant wood cutting operations, we offer our clients three main types of circular saw blades. Every type will be specifically adapted and set up for your individual production process and the different wood species you are processing.

In many cases of application we always recommend our unique “Spring tooth Circular Saw Blade Design” which is a TKM Innovation and setting up new standards for Cross Cutting according to output performance, economical production and reduced maintenance. Its special tooth design and the locking mechanism behind are the key to these performance advantages and enable a continuous and highly precised cutting result with maximum durability.



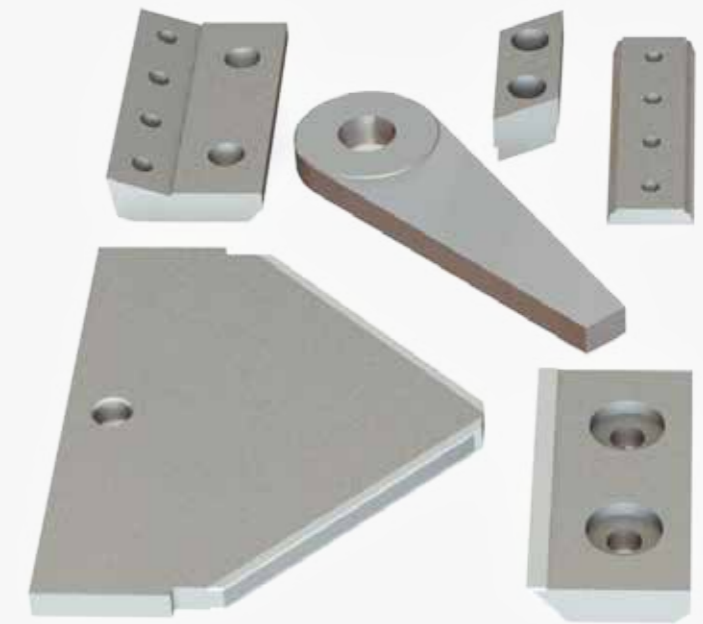
Bark Treatment

Debarking is a very important pre-process for the chipping operation and the final pulp quality. The preparation of the logs by removing the bark as well as all other disturbing foreign objects like mud, stones and sand is essentially for creating a well initial situation for the following chipping process. Due to the different wood species and the varying soiling conditions the debarking process always requires stable and highly wear resistant knives and guidance parts in order to achieve the desired log conditions.

In the sense of a complete product and cutting solution TKM as well supplies a wide range of high quality products for debarking:

- Shredder knives, Crusher knives
- Anvils
- Joint Pins, Shafts
- Hammers

All of our products are highly wear-resistance and can even be optimized by an extended hard coating finishing. In case of the assistance parts like the anvils or the shafts we also offer a special reconditioning service for worn out or broken parts. This exceeds the lifetime of our products for several times and is a part of our overall service solution for the pulp industry.



Technical Specifications

- CV-alloyed and hard chrome plated CV-alloyed (for setting and sharpening)
- Tungsten carbide tipped
- With inter changeable spring teeth (log cross cutting units)
- Various Surfaces
- Up to Ø 2400 mm

Technical Specifications

Material	Tool Steel, Stainless Steel, Carbon Steel
Hardness	42 - 65+-1 HRC or unhardened
Services	Reconditioning

Machine and Wear Parts for Chipper

The Chipping process is a very wear impelling issue. Its combination of a high speed cutting operation with the permanent feeding of complete wood logs, of different sizes and conditions, is creating a very challenging environment not only for the mentioned chipper knives. It is as well demanding for high grade wear resistant machine- and wear parts supporting the correct log feed and keeping them in the right place. Classical examples for these parts are:

- Wear plates and segments
- Knife clamps
- Knife holders
- Support plates
- Anvil or bed knives
- Knife discs and shafts
- Bearing units
- Chip cracker segments
- Tertiary knurled sorter rolls

All of these kinds of machine- and wear parts are produced by TKM, of course according to the customer's demands and the different chipper equipment they are using.

In Addition to that most of these parts we finalized by an in-house Thermal Sprayed Coating Operation, which again enlarges the wear resistance. Also it enables us to offer reconditioning service for existing and worn out wear parts.



Chipper and Counter Knives

We produce all of our chipper knives according to the specific demands of our customers and their requirements resulting out of their individual pulping process. Beyond the selection and special treatment of high-quality tool steels, we therefore mainly focus on the optimum knife design with the most effective cutting edge and angle to always achieve the desired and required chip size as well as continuously reducing the amount of pins and fines. In consequence TKM Chipper Knives enlarge your chipping output while simultaneously enabling high savings in annual wood and energy consumption at the same time. In order to keep this performance consistently available for the whole knife-lifetime we also do offer you a special regrinding- and resharpener training at your production site. Furthermore we can also check the adaption possibility of your existing knife-stock to our specialized knife design, in order to create a smooth and efficient transition process towards the use of your new customized chipper knife design.



With regard to the desired and required chip size as well as the continuous reduction of fines and pins an adapted Counter Knife is also highly required for an optimized chipping process. TKM Counter Knives therefore are produced with the same high quality standards and tight tolerances like our Chipper Knives in order to maximize the chipping output while on time reducing the wear to the critical machine parts like for example the knife holder.

Supported OEMs for example

- Andritz
- Acrowood
- Black Clawson
- Camura
- Carthage
- Fulghum
- KMW
- Metso
- Rauma Repola
- Söderhamn
- Sumner
- Precision Husky
- Valmet
- Wigger

Technical Specifications

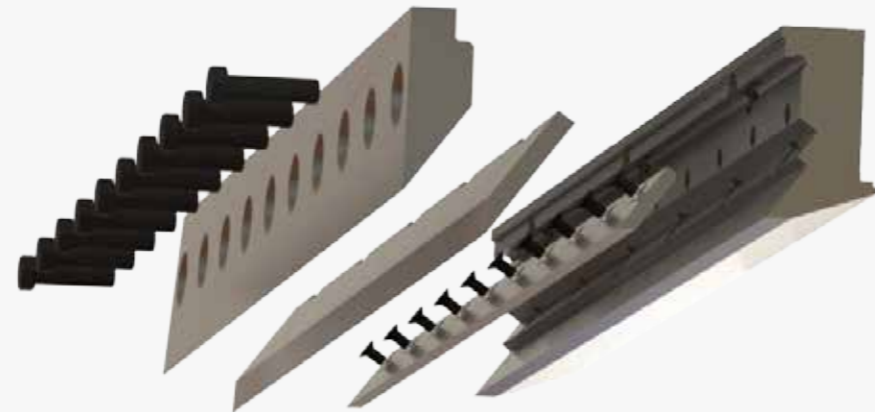
Dimensions	Length up to 1.500 mm, Width up to 295 mm
Tolerances	+/- 0,5
Surfaces	Standard Ra 0,8, as per request Ra 0,4
Material	1.2360 / SuperDur / SuperCut
Hardness	Depending on material, +/- 1 HRC / +/- 2 HRC

Cassette Knife System

In Consequence of our wide and specific product-range, we as TKM took the next step and developed our own cassette knife system. A unique combination of all our knowledge and all our products into one cutting- and service solution, which is tailor made to your personal chipping process and output requirements.

Our Cassette System consists of the following parts:

- Knife Holder
- Chipper Knife
- Counter Knife
- Knife Clamp
- Related Wear Parts



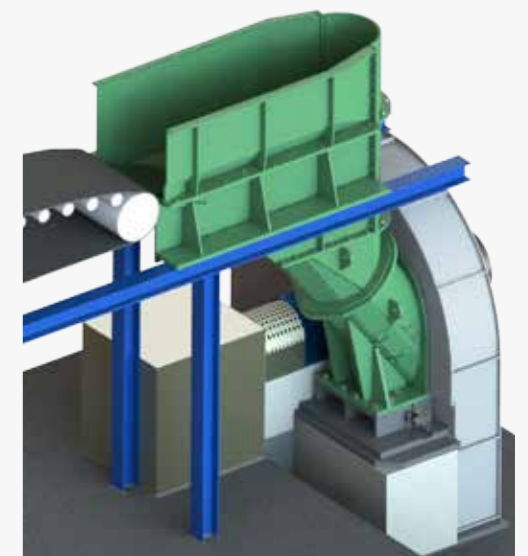
The outcome is a heavy duty version with a simple design, which is applicable for all wood species in all chipping conditions, frozen wood, hardwood and more. Equipped with regrindable high quality chipper knives of 90mm width, reliable running as well as sufficient wear resistance to foreign objects is guaranteed.

Its ingenious design combined with a customer specific angle adjustment is the key to homogenous chip quality, regardless of pulping process, whether it is chemical or mechanical based.

In addition to that the design also simplifies the handling of the chipper knives for adjusting, done just by 4 or 5 screws per knife, depending on its length. As well as for the knife change, which can be done by just one operator, due to better installation ergonomics and smaller and lighter system parts. And finally a frequent cleaning of the system is not required, whereby more time for chipping and less maintenance emerge.

Concerning the mentioned service solution, our "Knife System Service" takes care for your Cassette Knife System and always keeps it in best condition to ensure the mentioned performance advantages every time. It enables our customers to concentrate less on the chipping process and focus more on the downstream processes. Our service is applicable for all disc chippers and consists of the following elements:

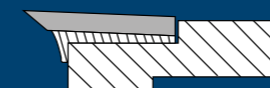
- Service of chipper knives and all related wear parts
- Scheduled service visits
- Local regrinding partners and sub-supplier support (additional)
- Complete "Knife Disc" and "Shaft Assembly" check- and set up (additional)



In consequence our TKM Cassette Knife System is the best solution for every disc chipper on the market. Its wide adaptability and high flexibility are the perfect preconditions to improve your chipping process, in the way you always want it to be!

The TKM TTT Cassette Knife System can be engineered to most of the existing disc chipper models.

Evolution of Knife Systems



Face mounted knife system



Conventional Knife System

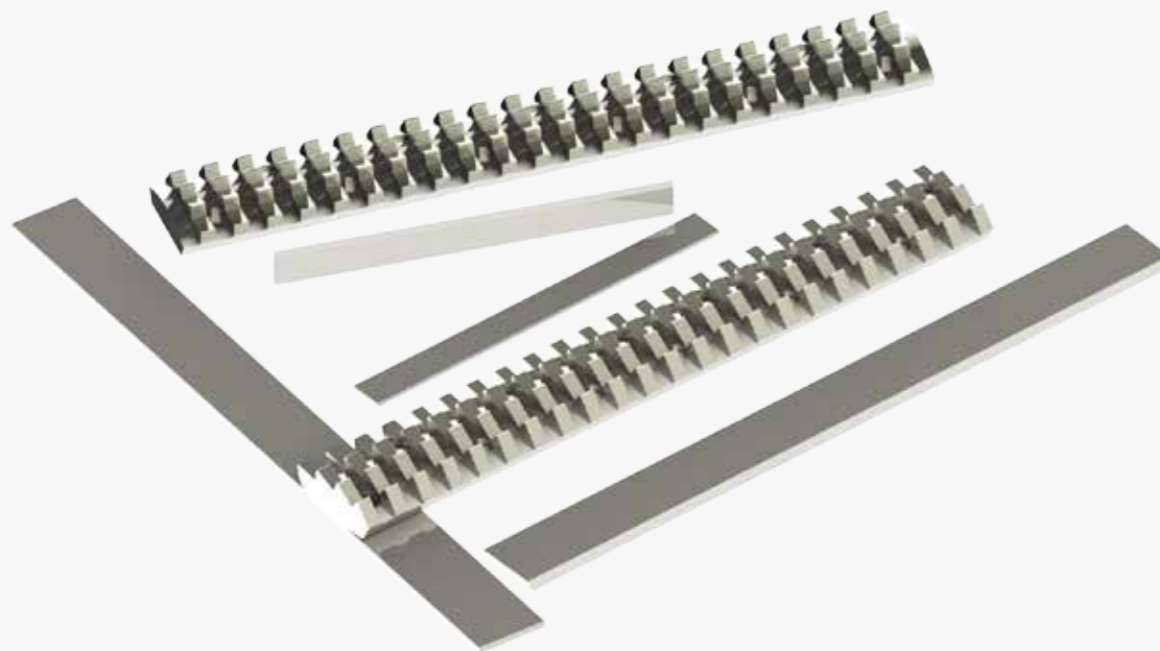


TKM Cassette Knife System

Rotary Feeder Knives

Continuing the “cutting”- process line in the pulp industry, TKM also focuses on products and wear parts solutions for the huge variety of rotary feeder systems. These systems manage the liquid-pulp transportation inside the pulp mill, ensuring a continuous process regarding the amount and the conveying speed towards the different production steps following.

In Consequence rotary feeder systems always require high precision components to enable an accurate regulation of these parameters. Therefore our TKM rotary feeder knives and their related wear parts like (feeder-) anvils, bed knives and (rotary feeder-) segments are always individually adapted to the operating machine type, the in use application and the hence resulting requirements like tight tolerances, high tensile strength and an increased wear resistance.



The several times mentioned possibility of a specific refinement by an additional Thermal Sprayed Coating layer is also available for these products and of course provides an useful enhancement to the above listed high quality features of our knives and wear parts for rotary feeder systems.

Technical Specifications

Dimensions	Length up to 1.500 mm, Width up to 295 mm
Tolerances	+/- 0,05 (thickness) / 0,01 (flatness)
Surfaces	Standard Ra 0,8, as per request Ra 0,4
Material	1.2360
Hardness	Depending on material, +/- 1 HRc / +/- 2 HRC

Sheeter, Slitter and Bed Knives

As the final (cutting-) process the pulp sheet cutting is a simple but very important production step, which defines the dimensions of the final pulp sheets according to the demands of the further processing production, for example in the print and paper-, tissue or board industry. This demand for a highly précised and continuous cut to generate a perfect leading edge on the final product by at same time limiting and separating waste to a minimum.

The requirement profile for TKM knives therefore is totally clear:

- Tight tolerances for thinnest cutting curves
- High tensile strength for maximum cutting time
- Finest surfaces for minimum friction and fewer deposits
- Outstanding quality in length- and cross cut operation

To achieve and guarantee this TKM Sheeter and Slitter knives are produced with the most up to date manufacturing standards and technologies. Resulting in a highly efficient production process according to the most effective inputs – our customer’s individual needs! Additionally like with every TKM cutting solution, we are not only focussing on the Knife itself, we are also concentrating on the directly assisting parts like the anvils and the bed knives too.

An inseparable combination, which by all means needs to be considered, to achieve the best cutting result as characterized several times before.



Technical Specifications

Surfaces	Ra 0,03 – 0,10 µ
Material	Tool Steel, Chrome Steel, Powdermetallurgical Steel
Hardness	Depending on Material, +/- 1 HRc / +/- 2 HRc
Service	Regrinding, resharpening and polishing

Thermal Sprayed Coating

The Process of Thermal Sprayed Coating for us is one of the most important aspects to give our customers a real advantage by using our refined products. Through this coating, the properties of different materials are modified, combined and improved.

The technique is equally suitable for pre-treating new parts or reconditioning used components. It is also possible to restore the original dimensions to worn parts.

Our expert technical staff will gladly help you to ap-

ply the best thermal sprayed coating technology to satisfy your requirements. Our personal, methods and equipment are the finest available in the techniques of:

- High Velocity Oxy-Fuel Spray (HVOF)
- Plasma Spray
- Combustion Powder Spray
- Electric Arc Wire Spray
- Abrasive Blasting
- MultiCoat High Performance
- Thermal Spray Controller



Technical Specifications

Products	Wear Plates, Knife Holders, Friction Coatings, Repair Works
Material	Metal Alloys & Powders, Cobalt, Nickel, Oxide Ceramic
Thickness	Min. 0.05 to max. 3.0 mm
Advantages	Wear resistance, prevention of corrosion, less or more friction, reconditioning,

Service and Reconditioning

TKM TTT provides tailored maintenance and re-grinding services for knives and blades as well as reconditioning services for wear plates and other wear parts, including complete knife systems. All this translates into lower costs and improved profitability for the customer. Our service program can make sure that you get the most out of your machinery investment.

Maintaining good tool performance requires regularly scheduled servicing. Appropriate ser-

vice intervals vary depending on your equipment and the quality of wood. TKM TTT's experts can help to optimize your service intervals. Systematic professional maintenance performed by TKM TTT will extend the useful life of your cutting tools considerably.

Our complete service Package provides also brand new replacements for your old tools and wear parts promptly upon request.



TKM TTT Finland Services

- Knife and Chipper Maintenance
- Regrinding Service
- Chipping Geometry Modification
- Wear Parts Reconditioning
- Engineering for all the parts related to Chipping
- Optimization of the Chipper and processes
- Tool Maintenance & Training Programs for Clients

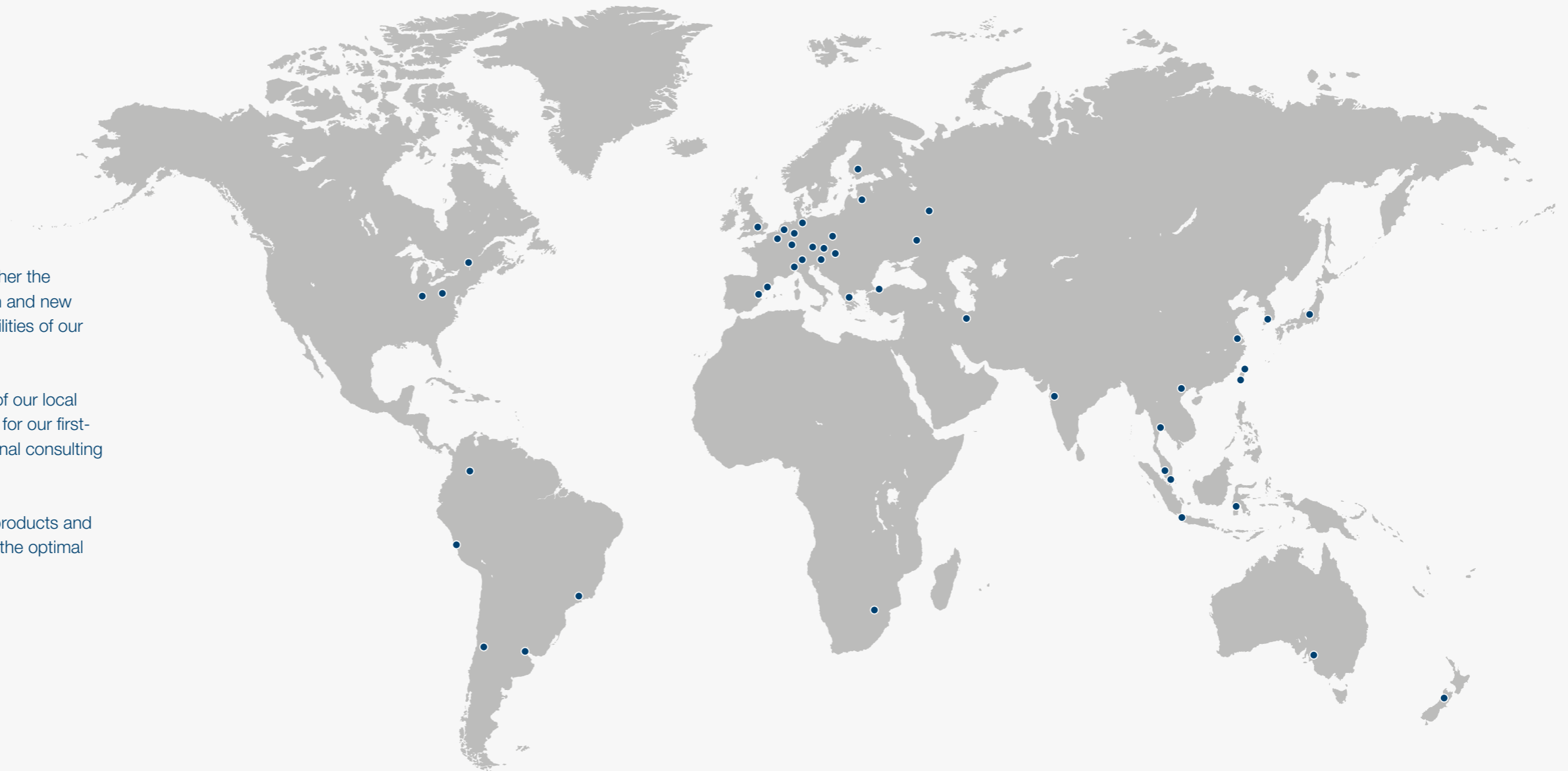
Close by – Worldwide.

The TKM group forms a system of cutting expertise. We create additional value – far beyond cutting.

Throughout the world, we share together the consistently pursued aim of innovation and new technologies, as is reflected by the abilities of our workers and employees.

As a network, we utilize the potential of our local companies, which lay the foundations for our first-class service, high flexibility and personal consulting on site.

As developers and manufacturers of products and systems, we will passionately look for the optimal solution for you.



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TKM, the internationally leading corporate group, manufactures and sells high-quality industrial knives, saws, doctor blades and precision consumable parts for industrial applications.

Our technologies, products and industrial services are applied and appreciated worldwide across many industries. As an independent family company, we have been setting the standards in quality and innovation,

technical expertise and close cooperation for over 100 years.

Reliability, integrity and commitment are the hallmarks of our collaboration. We define our claims to excellence in terms of these fundamental values by being:

Innovative, precise and close by.

Innovative:

We strive for new technology and continuously develop products and processes, in order to produce the highest performing Industrial machine knives and cutting tools.

Precise:

Our products, services and technical ability all help benefit our customers processes, productivity and finally finished product to assist in their operational development.

Close by:

Our philosophies are sustainable and stand for a balance between environmental measures, economic development and social engagement.

No matter where you are in the world a TKM subsidiary or partner is never far away.

TKM TTT Finland

TKM TTT Finland is one of the leading manufacturers of high-quality Saws, Knives and Consumables for the wood industry.

For more than 50 years our partners from the sawmill-, pulp-, plywood and veneer industry trust in the tools from TKM.

Our tools are worldwide in around 35 countries in use.

A modern machine park with the latest heat treatment equipment and high motivated employees ensure the quality from today - and tomorrow.



TKM TTT Finland

- 111 workers – 10% trainees
- 105 machine tools
- 11,900 m² total production and storage area
- Main areas of production: Wood, Paper, Machine parts
- Production batch sizes: 1 bis 2500
- Production volume: 100.000 precision parts per year

TKM Austria

At our Austrian production site, in Böhlerwerk, we develop and produce products for cutting applications for the metal, paper, wood, stone, rubber and plastic industries. In the last couple of years, we have developed the Böhlerwerk site into a competent partner for the production of complex components for mechanical engineering.

Equipped with state-of-the-art machinery, we design and deliver all industrial knives and machine elements required for current applications. In this way, we can ensure the efficiency of your systems.

With our know-how and substantial in-house production depth, we'll find the right solutions for your manufacturing processes.



TKM Austria – Böhlerwerk

- 180 workers – 10% trainees
- 75 machine tools, including: 5-axis milling, precision grinding, chamber, inductive and vacuum heat treatment ovens, straightening shop
- 11,000 m² total production and storage area
- Main areas of production: metal, wood, paper, machine elements, plastics/recycling
- Production batch sizes: 1 to 500

TKM Geringswalde

In Geringswalde we concentrate on the development and production of tools for cutting applications in the metal and paper industries. We create customized tools and solutions for systems, machines and services over production and storage areas totaling around 6,500 m².

On the basis of innovative ideas and consistent standards around the world, we strive

for innovative development together with our customers – down to the last detail.

The high number of trainees provides an important foundation for our corporate development. By opening perspectives to young people and promoting their talents, we afford professional and international development opportunities for their future and for TKM.



TKM Geringswalde

- 135 workers – 10% trainees
- 74 machine tools (70% CNC machines)
- 6,500 m² total production and storage area
- Main areas of production: 90% metal, 10% paper
- Production batch sizes: 1 to 2,500
- Production volume: 250,000 to 300,000 precision parts per year

TKM Diacarb

Based in Rotterdam, TKM DIACARB is the service center of the TKM Group and system supplier for high-tech services in the maintenance and repair of industrial cutting tools.

The combination of optimized processes and logistic performance offer you comprehensive and cost-effective repair management.



TKM Diacarb

- Approx. 45 employees
- Production area: 2000 m²
- 23 CNC machines
- Approx. 30,000 service jobs per year

Technologies

- Patented grinding technologies:
- New Wave
 - Hyper Wave



TKM
TKM Geringswalde
TKM Meyer
TKM Diacarb
TKM France
TKM Austria
TKM TTT Finland
TKM US
TKM Canada
TKM China
TKM Blades Malaysia
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