



# RAILROAD

## **SUSTAINABLE SOLUTIONS**

Railroad Manufacturing and Advanced Materials for a New Generation





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# RAILROAD

*Kennametal leads the way with innovation, engineering, and service in standard and custom tooling.*

## ENVIRONMENTAL SUSTAINABILITY: A CORE VALUE

At Kennametal, we are deeply committed to designing and manufacturing environmentally responsible products that deliver high performance and proven value. With decades of experience in tooling and manufacturing, the synergies of superior engineering, leading technology, and tailor-made solutions

offer customers some of the most effective opportunities for sustainable manufacturing in the industry. Our comprehensive range of products, convenient locations, and excellent customer service make Kennametal your complete supplier of sustainable railroad tooling solutions.

# RAILROAD

*Kennametal's intimate understanding of the economics of the railroad value chain enables us to offer unparalleled custom solutions tailored to your needs. We deliver superior value because we listen closely to you, our customer, and innovate based on your feedback. Our goal is to help you be more competitive — both at home and on a global scale.*

## BEST PRACTICES IN PRODUCTIVITY

As your trusted partner for optimized production, Kennametal offers customers a unique commitment to research and development excellence, leading to continued delivery of highly innovative ways to enhance your productivity. Certification to ISO 9001, QS 9000 TES, and VDA 6.4 guarantees the highest possible quality standards.

## BEST PERFORMANCE, LESS ENVIRONMENTAL IMPACT

With technology, we can do both. Kennametal helps customers focus on the root causes of unsustainable behavior in highly complex manufacturing systems, while at the same time improving cost structure, quality, and performance. In addition to offering the latest in metalcutting tools and technology, our Advanced Engineering Team will analyze your existing production processes and help you identify new methods to improve your overall performance.



# LESS ENVIRONMENTAL IMPACT

To learn more about our sustainable solutions for the railroad industry, contact your Kennametal Representative or Authorized Kennametal Distributor today.



# ***ADVANCED MATERIALS***

***For more than 70 years, Kennametal has been recognized as the leader in delivering advanced material solutions.***

***We have a long history of developing superior coatings — more than 2,500 proprietary material grades.***

***Kennametal has set the global standard for material and coating combinations that are as efficient as they are environmentally responsible.***

## **THE SUPERHARDS: PCD AND PCBN**

The rigorous conditions encountered in synthesizing and depositing Polycrystalline Diamond (PCD) and Polycrystalline Cubic Boron Nitrides (PCBN) require specialized materials and knowledge. With more than 1,100 highly trained research scientists and engineers in 4 global technology centers, our customers trust us to evaluate their special needs and tailor a superhard material solution for their individual applications.

By improving process efficiency, we not only save our customers money, but we also improve the use of our scarce resources.





## **KENNAMETAL TUNGSTEN CARBIDE: THE HALLMARK SOLUTION FOR EXTREME WEAR PROBLEMS**

Ideal for countless railroad applications, Kennametal tungsten carbides possess unique engineering properties that often outlast tool steel and other wear materials by as much as 10:1. They are used for parts that must withstand deflection, deformation, extreme wear, impact, corrosion, heavy loading, and high temperatures.

Because we process our own powders from well-known and trusted raw material sources, Kennametal tungsten carbides ensure the highest quality — from start to finish.

Our submicron grades have a fine grain and uniform structure resulting in high hardness and improved wear resistance, strength and toughness.

## **ULTRA-PURE MATERIALS: DELIVERING SERIOUS REFINEMENT TECHNOLOGY WITHOUT WASTE**

In manufacturing, one of the best ways to meet present needs without compromising the future is to control the raw material stream. Kennametal has taken this concept one step further.

Our proprietary processing methods enable us to remove impurities from raw materials that might otherwise be discarded. Aluminum, chromium, molybdenum, and other specialty metals are refined to perfection and never wasted.

# ***BEYOND™ FROM KENNAMETAL***

***A New Era in Tooling.***

## **HIGHER PRODUCTIVITY AND PROFITABILITY – UP TO 300% HIGHER**

- Lower cutting forces enable increased speeds and reduced cycle time.
- Extended tool life.

## **50% TIGHTER TOLERANCES**

- Better indexability.
- Less adjustment required during insert change.

## **RELIABILITY**

- Predictable tool life/uniform wear.
- Resists chip flow damage.
- Achieves consistent surface finish.

## **VERSATILITY**

- Can be applied across a wide range of applications.
- Can be used in both low- and high-speed applications.

## **COMPLETE PORTFOLIO OF PRODUCTS**

- Three new chipbreakers available to optimize chip control and surface finish in steel, cast iron, stainless steel, and high-temp alloy turning.







## TECHNICAL DETAILS – FEATURES

### POST-COAT TREATMENT

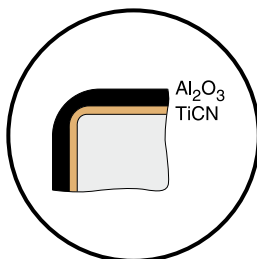
- Long predictable tool life.
- Reduces depth-of-cut notching.
- Wide range of applications.
- Reduces stresses.
- Reduces micro-chipping.
- Improves coating adhesion.

### MICRO-POLISHED EDGES

- Improves edge toughness.
- Provides smooth outer surface to reduce forces, friction, and workpiece sticking.

### POST-COAT GRINDING – BOTTOM

- Provides secure seating surface.



### FINE-GRAINED ALUMINA LAYER

- Provides coating integrity at elevated speeds.
- Higher productivity and dependability at high cutting temperatures.

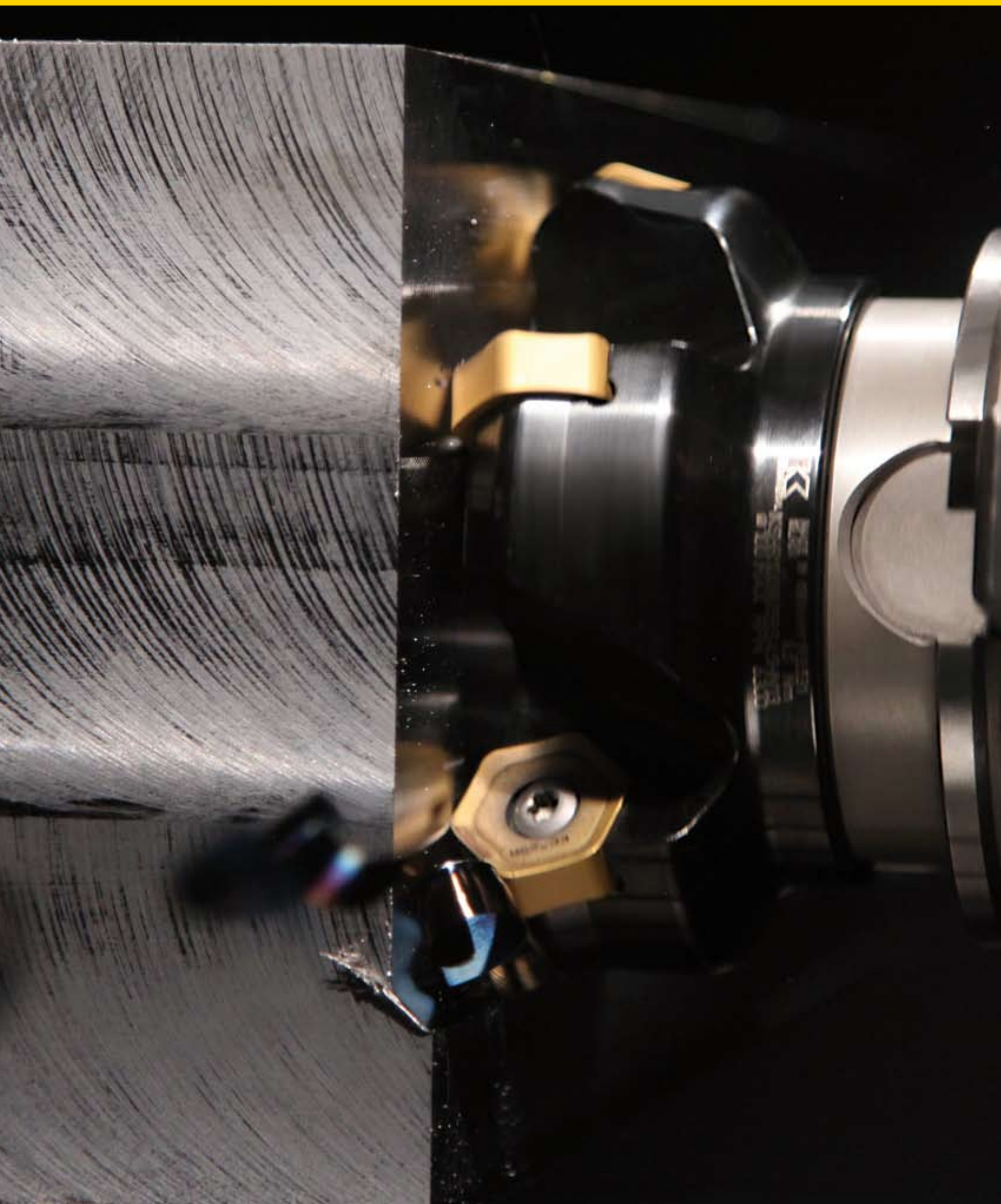
# ***NEW KENNAMETAL TOOLS FOR RAILROAD INDUSTRY***

*Developed to Meet the Unique Requirements of the Railway Industry.*

- Beyond™ grade technology.
- New geometries RU and UP for wheelset turning.
- RRP geometry for reprofiling of wheelsets.
- Dodeka Max™ for face milling application with 12 true cutting edges.
- New MEGA45™ and MEGA90™.
- Beyond Drill Fix™ DFS™ Square Outboard Inserts.







# ***BEYOND™ GRADE TECHNOLOGY***

*Increase the Productivity of Your Railroad Applications.  
Advanced Technology Delivers Superior Performance.*

## **TYPICAL INSERTS**

- Coating under stress.



## **POST-COAT TREATMENT**

- Reduces stresses.
- Minimizes micro-chipping.
- Improves coating adhesion.

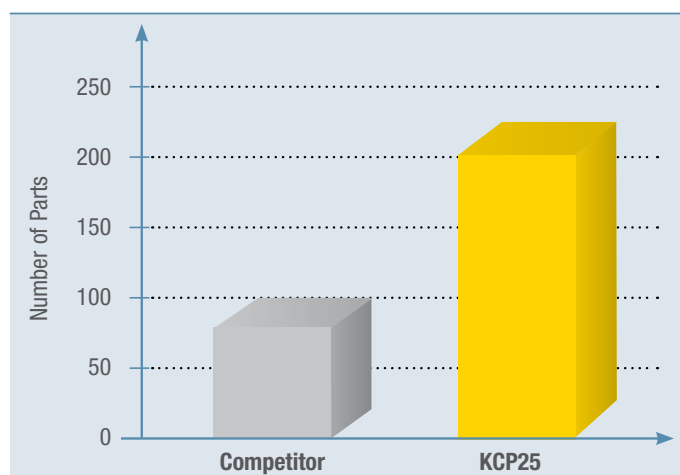


## **BEYOND INSERTS**

- Coating under stress.



## **RAIL WHEEL MACHINING WITH BEYOND KCP25™**







# WHEEL AND WHEELSET TURNING WITH BEYOND™ RU AND UP GEOMETRIES

*Designed for New Wheel Production and Wheel Re-Profiling  
for the Railroad Industry.*

- Increased operation security – low cutting forces and reduced load spikes.
- Longer tool life with Beyond™ grades.
- Excellent size control and surface finish.
- Reliability – consistent tool life and superior chip control.
- Developed for the railroad industry.
- Available in two clamping styles – Fix-Perfect™, and Pin clamping.



RU – Roughing Universal



UP – Universal Positive

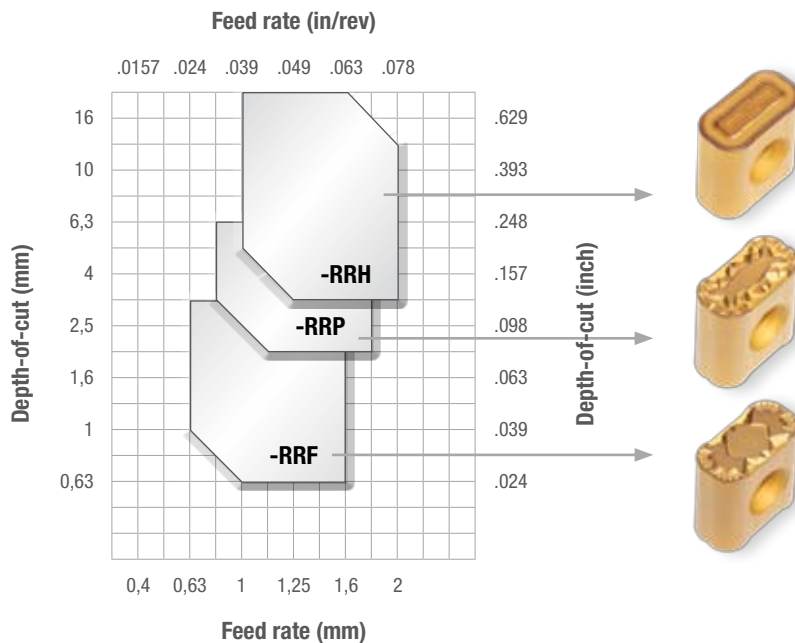
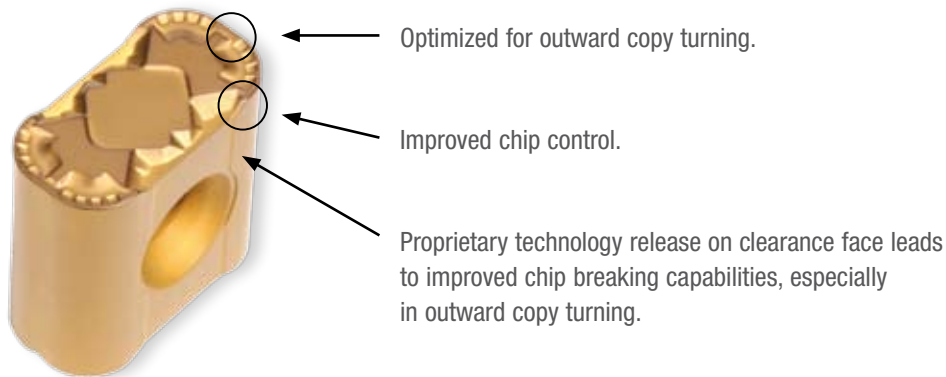
## A PERFECT TEAM: BEYOND™ RU-UP GEOMETRY WITH KM100™ TOOLS

- Specially developed for heavy-duty machining.
- Reduced setup time.
- Solid modular system.
- Extended tool life.
- ISO26622.



# NEW CHIP BREAKING GEOMETRY FOR RAIL WHEEL MACHINING – RRF

*Small D:O:C Re-Profiling.*





# ***DODEKA MAX 45°™ FOR RAIL AND SWITCH MACHINING***

***Productivity Booster in Heavy Duty Face Milling.***

- Productivity booster in heavy duty face milling with 12 true cutting edges per insert.
- Low cost per cutting edge and high productivity.
- Up to .03" (0,6mm) feed per tooth fully axial loaded to Ap1 max.
- Cutter standard offering D1= 3-12" (80-315mm).
- Precision pressed and sintered to size (PPSTS) inserts.
- Coarse and medium pitch styles.
- Hardened insert pocket seats.
- Through the body coolant; for larger diameters, through showercap.
- Four premium grades: KC520M™, KC725M™, KCK15™, and KCPK30™.



Laser-hardened pocket seats for perfect cutter-body protection.

# **MEGA45™ AND MEGA90™ FOR RAIL AND SWITCH MACHINING**

*The Real Superstars in Heavy-Duty Milling.*

- Four true cutting edges per heavy-duty MEGA45™ and MEGA90™ insert.
- Low cost per edge and high productivity.
- 30% lower cutting forces by soft cutting edge design.
- Up to 30% increased Metal Removal Rates.
- Performance leader in steel and cast iron materials.
- Excellent cutter body protection by carbide pocket shims.
- Integrated wiper facet for excellent floor finish.





# ***DRILL FIX™ DFS™ SQUARE OUTBOARD INSERTS FOR BOGIE MACHINING***

***New Generation of Drilling Inserts Boost Your Productivity.***

- Achieve up to 100% longer tool life at accelerated speeds.
- Fully utilize DFS drill body benefits in regard to stability, coolant supply and chip evacuation.
- Can be used in both low- and high-speed applications.
- Predictable tool life and uniform wear.
- Achieve consistent surface finish.
- Available in 2 x D, 3 x D, and 4 x D length-to-diameter ratios.







# ***SUSTAINABLE ENGINEERING***

***Kennametal leads the way with innovation, engineering,  
and service in standard and custom tooling.***

***A proven methodology and partnership.***

Successful project engineering requires planning, teamwork, and disciplined execution. Through our extensive experience in developing and implementing new project engineering strategies, Kennametal has pioneered a proven methodology to help you manufacture new products and bring them to market quickly. Service deliverables are carefully outlined and jointly agreed to before the project begins. We formally evaluate progress and results with you throughout the project through our stage-gate management system.

Kennametal can provide your engineering teams and machine tool builders with process engineering support, advanced metalcutting technologies, and project management expertise to help you achieve your sustainability goals. With our best-in-class process, you'll experience accelerated time-to-market, lower overall costs, and reduced risks to implement new technologies.

## DID YOU KNOW



*Kennametal has more than 1,100 highly trained and innovative research scientists and development engineers. They are creating new advanced materials for demanding applications and are designing proprietary components that deliver superior performance to our customers.*



### DISCOVERY AND PROPOSAL DEVELOPMENT

- Review project needs with customer and/or machine tool builder.
- Customer decision gate: Request proposal.

### PROPOSAL PRESENTATION

- Discuss how Kennametal can be of service.
- Customer decision gate: Request proposal.

### BUILT PROJECT PLAN

- Clarify technical and commercial aspects of projects.
- Develop engineering and project schedule.
- Approve drawings.

### PROJECT PLAN APPROVAL

- Present drawings and confirm order.
- Customer decision gate: Approve project plan and deliverables.

### EXECUTION

- Manufacturing
- Procurement
- Project management
- Assembly
- Pre-setting
- Balancing
- Inspection
- Shipping
- Training
- Run-off support

### ACCEPTANCE

- Review performance versus contract.
- Customer decision gate: Formal acceptance.

### PRODUCTION RAMP-UP ASSISTANCE

- Support program launch schedule by assistance in spare part and consumable procurement planning, and further process optimization.

# ***KENNAMETAL SERVICES OVERVIEW***

## **RECONDITIONING**

Optimize the total value of your high-performance drills and end mills throughout their life cycle.

- Kennametal certified coatings.
- Kennametal proprietary geometry specifications.
- Superior quality.
- Like-new performance.
- Fast turnaround time.
- Easy logistics through the Kennametal Blue Box™ program.
- Application support throughout the entire tool life cycle.

## **RECYCLING**

Systematically maximize the full value of your tooling investment while protecting the environment.

- Gain more shop space.
- Become more competitive.
- Get cash or credit, too!



## **DEBURRING, POLISHING, AND SURFACE FINISHING**

Through Extrude Hone, Kennametal offers a complete menu of deburring, polishing, and surface finishing solutions, including machine tools, contract finishing services, and development of advanced manufacturing processes for various global markets, including:

- Automotive
- Diesel Fuel Systems
- Aerospace and Gas Turbine
- Fluid Power
- Die and Mold
- Medical
- Power Generation and Turbines

## **NEW PROJECT ENGINEERING**

We provide simultaneous engineering experience, metalworking expertise, and project management in coordination with your engineering team and machine tool builders to help you most effectively machine new components.

- Accelerated time-to-market.
- Best-in-class processes.
- Lowest cost implementation.
- Reduced risk on new technology implementations.



## KENNAMETAL KNOWLEDGE CENTER

We can support your efforts to improve productivity and reduce costs by providing access to comprehensive engineering courses, industry- and application-specific courses, customized onsite programs, and e-learning.

- Increase productivity.
- Improve tool selection and application.
- Lower costs.
- Improve quality.



## PROCESS OPTIMIZATION

Our services apply metalworking expertise, LEAN best practices, and proven project management methodology to optimize tool applications, machines, cells, and lines.

- Tool selection, application, standardization, and design.
- Process sequencing to create flow.
- Operation consolidation to maximize value.
- LEAN principles to minimize waste.
- Programs for minimizing tool vibration to optimize spindle performance.



## SUPPLY CHAIN SERVICES

Kennametal's Supply Chain Services combines the industry's best practices with premier equipment and software solutions to help manage tools and supplies; reduce acquisition, possession, and usage costs; and increase operational effectiveness.

- Cut tooling inventory by 50% or more.
- Decrease tooling spend by up to 30%.
- Reduce administrative costs by as much as 90%.
- Decrease downtime by up to 60%.

## COMPREHENSIVE SERVICES PROGRAM

Through the Kennametal Comprehensive Services Program, we build partnerships that focus on delivering year-over-year productivity improvements through integration into your engineering and production processes via:

- Continuous onsite optimization.
- Tool crib management.
- Tool presetting.
- In-plant logistics.
- Cost-per-part reporting.
- Concurrent new product/project engineering.
- Education and certification.

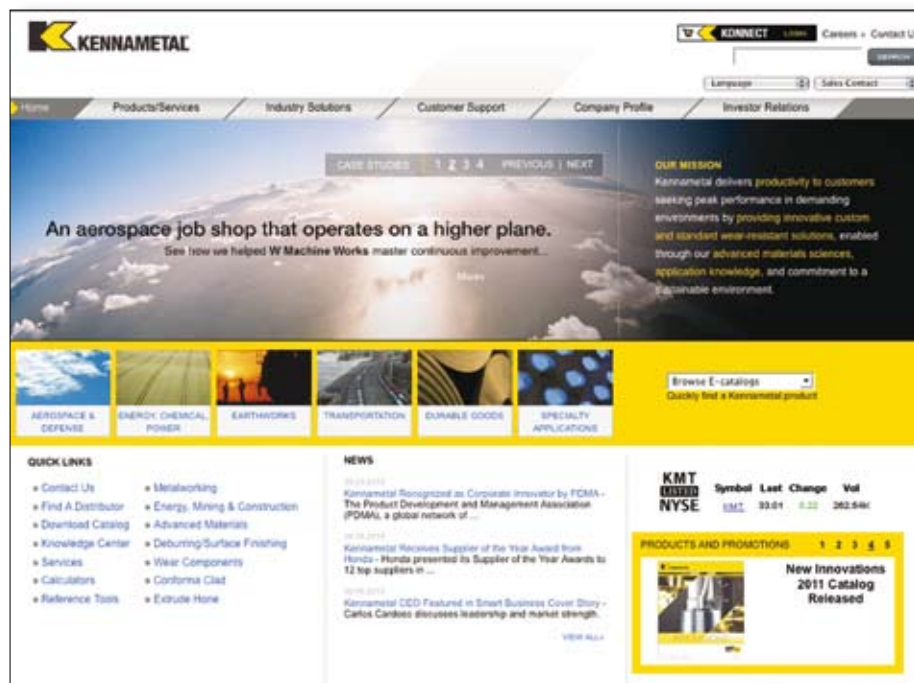
# ON THE WEB

*Fast. Free. Easy.*



YouTube

twitter



**KENNAMETAL KCONNECT**  
*The power to outperform goes online*

## FAST, FREE, AND EASY REGISTRATION

Kennametal Kconnect is our custom-crafted, dynamic online sourcing, ordering, and order management tool that features the industry's best products, knowledge, and, ultimately, power. To learn more and register online, visit us at [www.kennametal.com](http://www.kennametal.com).

## CONVENIENCE

Access our website 24 hours a day, 7 days a week. No need to carry a catalog when you travel. Just go to [www.kennametal.com](http://www.kennametal.com) and you're there.

## TIMELY UPDATES

Looking for the latest updates on tooling solutions? The measurements and specifications for a series of high-performance metalworking tools? Or do you need to determine the right insert with the best geometry and coating for a specific workpiece material? You'll find this information and more on [www.kennametal.com](http://www.kennametal.com).

## E-CATALOG

Our e-Catalog is driven by images, and our products are broken out exactly as they are in our trusted print catalogs. Check price, availability, and place orders instantly with e-Catalog. Even download detailed CAD drawings at a product level.





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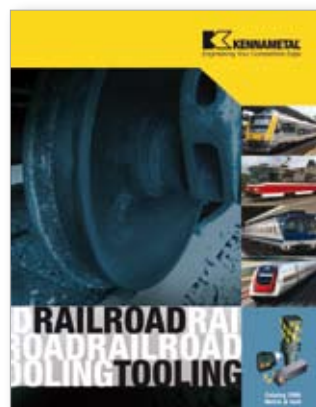
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***To find more detailed product and order information, please see our Railroad catalog 7090, Innovations 2011 and 2012 catalogs or go to [www.kennametal.com](http://www.kennametal.com).***

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