



MINING

Tooling and Wear Protection Solutions for Mining Applications

Surface Mining
Underground Mining
Processing





Oil and Gas Wear Solutions



Construction Wear Solutions



Process Industries Wear Solutions

We Can Solve Your Most Challenging Wear Problems.

Kennametal is a global supplier of solutions for wear, heat, and corrosion problems, a world-class manufacturer of components, and a service provider to a wide range of industries. For years, we have helped customers in the Oil and Gas, Construction, and Mining industries, as well as those in process industries like Petrochemical, Food and Feed, and Plastics Extrusion.

Count on us for innovations that deliver productivity, reliability, and extended life in the harshest environments. Kennametal's commitment to providing solutions for the most demanding applications is unparalleled. We have a long history of helping our customers achieve success and a tradition of exceeding their expectations.

By matching our advanced material solutions and technologies to your applications, we can help you solve your biggest wear problems, avoid costly downtime and catastrophic failures, and achieve significant savings.

We are the wear problem experts.

Contact us today and we'll find the right solution for you.

OUR MISSION

Through the skill and innovation of our people, we deliver industry-leading tools and technologies that solve customer challenges and enable exceptional performance.

Our mission is all about performance for our customers. Our tools and wear-resistant solutions enable customers to run longer, cut faster, and machine with greater precision. We aren't setting the performance standard for our industry...we're resetting it even higher.



Mining Wear Solutions

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Count on Kennametal for High-Performance Wear Solutions

MATERIAL SCIENCE EXPERTISE

Kennametal's wear solutions begin with our material science expertise. Being a producer and supplier of raw materials enables us to maintain critical control over our materials.

Our primary portfolio of materials includes tungsten carbide, cobalt, nickel, and other specialty additives. We combine these materials to create unique formulas and grades to solve specific challenges.

PROVEN MANUFACTURING METHODS

Finding the right materials for your application is the first step, but you also need proven manufacturing methods to solve complex wear issues.

Kennametal's network of global manufacturing operations enables us to take our quality materials and turn them into products and solutions while maintaining the highest level of quality from the inside out.

BUILDING ON ADDITIVE MANUFACTURING

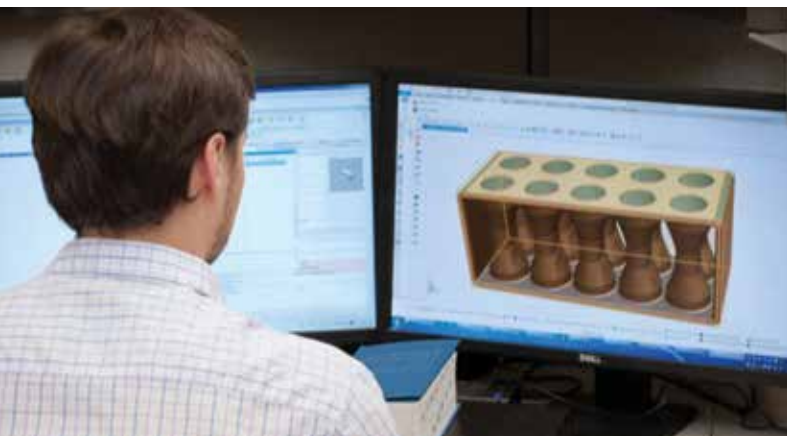
Metal additive manufacturing processes — metal 3D printing — represent the next generation in design freedom, manufacture cost reduction, and supply chain optimization. These proven processes are being leveraged across multiple industries and applications to quickly and efficiently develop and deploy high-performing parts.

Kennametal develops materials specific to additive manufacturing, offering additive metal powder feedstock materials and finished parts. Our gas atomization powder production capabilities supply cobalt, nickel, and iron powders optimized for specific additive manufacturing processes. Kennametal's expertise in sintering and post printing processes provide custom solutions in both tungsten carbide and Stellite™ materials.

AN UNDERSTANDING OF YOUR UNIQUE WEAR ISSUES

Quality materials and proven manufacturing methods are only part of the equation. At Kennametal, we are aware that our expertise is only beneficial if we truly understand your challenge.

Through close partnerships with our customers, we design, develop, and manufacture solutions that deliver exceptional value throughout the lifecycle of the components. At Kennametal, we leverage our extensive knowledge of materials technologies and manufacturing methods to develop your unique solution.



Kennametal Wear Protection Solutions Are Made from the Right Materials

		MATERIAL SYSTEMS OVERVIEW			
		Tungsten Carbide	KenCast™	Conforma Clad™	Stellite™
Wear Mechanism:	Abrasion Resistance	•••	•	••	••
	Corrosion Resistance	••	•	••	•••
	Erosion Resistance	•••		••	••
	High Temp Resistance	••	••	•••	•••
	Impact Resistance	••	•••	•	•••
Material Form:	Casting		X		X
	Coating	X		X	X
	Powder	X			X
	Sintered	X			X
	Wrought				X
Manufacturing Method:	Powder Compaction	X			X
	Green Forming	X			
	Casting		X		X
	Machining/Grinding	X		X	X
	Brazing/Assembly	X		X	
	Welding		X	X	X

Tungsten Carbide

Kennametal has been manufacturing tungsten carbide products since our inception.

Cemented tungsten carbide possesses unique engineering properties that makes it ideal for countless industrial applications. In addition to being more durable, it is often more economical than other materials. Tungsten carbide is used for parts that must withstand extremes of wear, including deflection, deformation, abrasion, erosion, galling, and corrosion.

Unlike some carbide manufacturers, Kennametal produces its own powders, assuring the highest quality tungsten carbide from start to finish.

KenCast

KenCast™ is composed of tungsten carbide particles that have been metallurgically bonded to air-hardened steel. The result is a tough, durable, and extremely wear-resistant material.

Carbide granules give KenCast exceptionally long-lasting protection. Various-sized tungsten carbide particles are blended to create a precise combination of carbide protection for your specific application. Both standard and custom shapes and geometries can be produced.

Conforma Clad

Conforma Clad™ incorporates two industry workhorse materials — tungsten carbide and Stellite™ cobalt-based alloys — into our unique cloth-based and Ultraflex™ slurry-based processes. This enables us to provide superior wear-resistant claddings in a wide variety of substrate materials and geometries for a range of industries and applications.

Stellite

The Stellite family of alloys has a long and distinguished history of delivering in the toughest of applications. Since its inception in 1912, the family of Stellite alloys has grown to more than 300 unique solutions, including known brands such as: Tribaloy™, Nistelle™, and others.

Stellite alloys are available as consumable powders, hardfacing materials and equipment, and wrought bar and sheet. Through complex casting and finished machined components, our engineers will work with you to provide the solution that best fits your need.

Tooling and Wear Protection Solutions in a Mining Environment

With our proven tooling and wear protection solutions, you can build and maintain best-in-class operations in any of your applications: surface mining, underground mining, and processing. We keep your high-value equipment running longer and performing better in the most demanding environments.

Processing

Component and Wear Protection Solutions for Processing Equipment

- Decanter Centrifuge
- Roll Crusher
- High-Pressure Grinding Roller (HPGR)

Bulldozer

Primary/Secondary Crushers

Underground Mining

Tooling and Wear Protection Solutions for Underground Mining Equipment

Roof Bolter

Drill

Longwall Shearer



Surface Mining

Tooling and Wear Protection Solutions
for Surface Mining Equipment



Blasthole Drill

Haul Truck

Shovel

Surface Miner

Road Header

Continuous
Miner

Feeder-Breaker

Surface Mining: Surface Miner and Haul Truck Solutions

TOOLING AND WEAR PROTECTION SOLUTIONS FOR SURFACE MINERS AND HAUL TRUCKS

Surface mining enables you to go beyond scratching the surface. With better size control and fewer hazards, it can simplify operations and save you management costs — there is no blasting considerations and no downtime related to transitioning operations. Whether you need tooling or wear protection solutions, we have high-performance products to make you even more productive and profitable.



1 Surface Miner: Cutting Tools with Retainers



1 Surface Miner: Tool Holders with Sleeves



1 Surface Miner: Tool Pullers



1 Surface Miner: KenCast™ Wear Protection



2 Haul Truck: KenCast Wear Protection



2

1

Surface Mining: Blasthole Drill and Shovel Solutions

TOOLING AND WEAR PROTECTION SOLUTIONS FOR BLASTHOLE DRILLS AND SHOVELS

Drilling effectiveness has a profound impact on the cost of a mine site's daily operations. Kennametal offers drilling solutions that increase your speed and efficiency, thus reducing the time between loading processes. We also offer wear protection solutions that can lengthen the service life of your shovels or trucks.

**1**

Blasthole Drill: Cutting Tools
(auger drilling)

**1**

Blasthole Drill: Inserts/Compacts
(percussive drilling)

**1**

Blasthole Drill: Tool Pullers

**1**

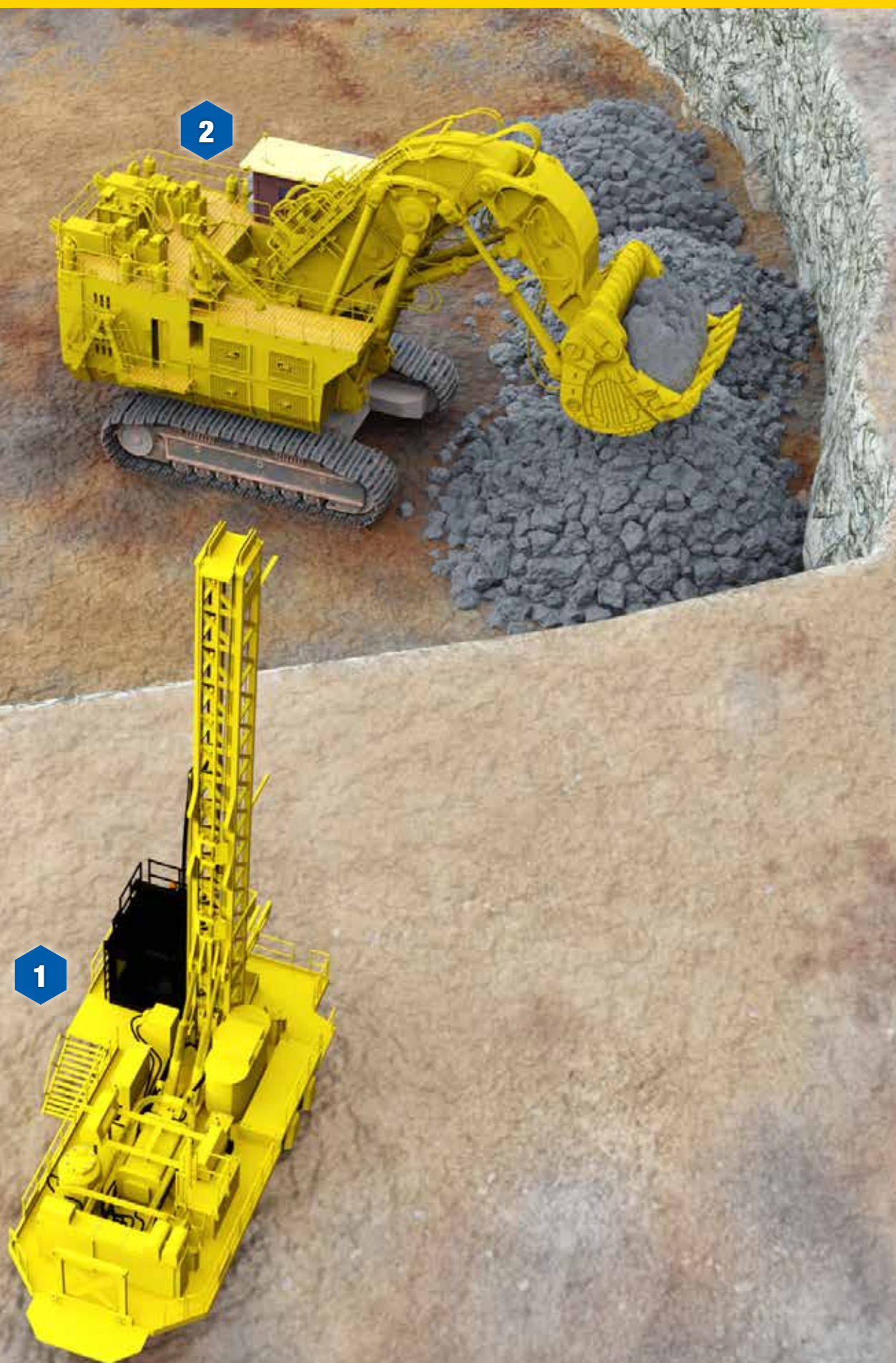
Blasthole Drill: Tool Holders
(auger drilling)

**1**

Blasthole Drill: Thrust Buttons
(percussive drilling)

**2**

Shovel: KenCast™ Wear Protection



Underground Mining: Continuous Miner and Road Header Solutions

TOOLING AND WEAR PROTECTION SOLUTIONS FOR CONTINUOUS MINERS AND ROAD HEADERS

Underground mining is always a demanding environment, and innovative solutions and best practices are required to build and maintain best-in-class operations. For maximum capacity and increased production rates, equip your continuous miners and road headers with Kennametal tooling and wear protection solutions.



1 Continuous Miner: Cutting Tools with Retainers



1 Continuous Miner: Loading Arms and Corebreakers



1 Continuous Miner: Tool Holders with Sleeves



1 Continuous Miner: KenCast™ Wear Protection

1 Continuous Miner: Drum Custom Solutions



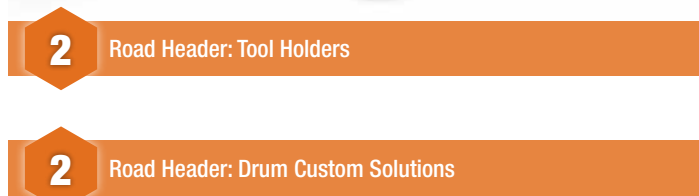
2 Road Header: Cutting Tools with Retainers



2 Road Header: Clip Pullers



2 Road Header: Tool Holders



2 Road Header: Drum Custom Solutions



2 Road Header: KenCast™ Wear Protection

Underground Mining: Longwall Shearer and Feeder-Breaker Solutions

TOOLING AND WEAR PROTECTION SOLUTIONS FOR LONGWALL SHEARERS AND FEEDER-BREAKERS

Achieve greater gains in underground coal mining with Kennametal tooling and wear protection solutions. Kennametal can increase safety, productivity, and efficiency of your longwall shearers and feeder-breakers.



1 Longwall Shearer: Cutting Tools with Retainers



1 Longwall Shearer: KenCast™ Wear Protection



1 Longwall Shearer: Tool Holders with Sleeves

1 Longwall Shearer: Drum Custom Solutions



2 Feeder-Breaker: Cutting Tools with Retainers



2 Feeder-Breaker: Tool Holders with Sleeves

Underground Mining: Drill and Roof Bolter Solutions

TOOLING AND WEAR PROTECTION SOLUTIONS FOR DRILLS AND ROOF BOLTERS

When drilling underground, you need fast, accurate holes and tooling that provides you with the best value. Kennametal drill bits are fast, efficient, and recyclable. Kennametal has been making high-quality mining tools for 70 years, and our roof bit recycling program is unmatched. Eighty percent of our recovered dust hog bodies can be retipped and perform as new. All of our recovered tungsten carbide can be reclaimed and repurposed in Kennametal's other operations. This gives you the best scrap value for your used tools.

**1**

Drill: Cutting Tools

**1**

Drill: Auger

**2****2**

Roof Bolter: Cutting Tools



1



2

Roof Bolter: Drill Steel



2

Roof Bolter: Drill String Components

Processing: Bulldozer and Primary/Secondary Crusher Solutions

TOOLING AND WEAR PROTECTION SOLUTIONS FOR BULLDOZERS AND PRIMARY/SECONDARY CRUSHERS

We proactively address wear, abrasion, and corrosion problems to deliver productivity, reliability, and extended life of equipment used in processing. Our metallurgical and material science expertise enables us to formulate, design, and deliver the best solution to combat processing's biggest challenge: wear.

**1**

Primary/Secondary Crusher: Cutting Tools

**3**

Primary/Secondary Crusher: VSI Centerfeed Disk

**2**

Primary/Secondary Crusher: Tool Holders

**4**

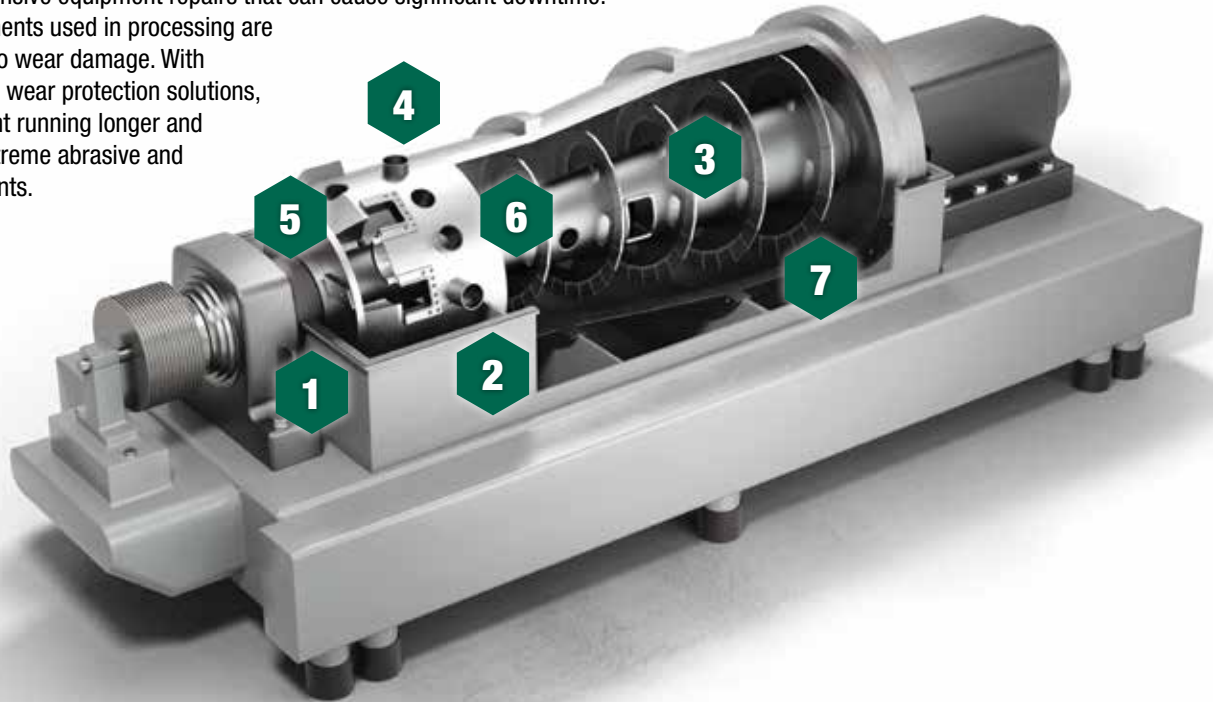
Bulldozer: KenCast™ Wear Protection



Processing: Separation and Comminution Solutions

COMPONENT AND WEAR PROTECTION SOLUTIONS FOR DECANTER CENTRIFUGES, ROLL CRUSHERS, AND HIGH-PRESSURE GRINDING ROLLERS

Wear translates to expensive equipment repairs that can cause significant downtime. Equipment and components used in processing are especially susceptible to wear damage. With Kennametal's extensive wear protection solutions, you can keep equipment running longer and performing better in extreme abrasive and high-impact environments.

**1**

Wipers

**2**

Discharge Nozzles

**3**

Feed Nozzles

**4**

Discharge Ports

**5**

Wear Liners

**6**

Discharge Nozzles

**7**

Flight Tiles

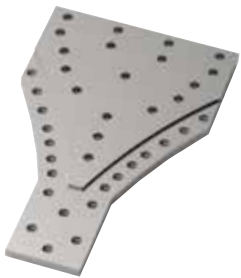
8 Roll Crusher: Custom Wear Solutions



9 HPGR: Studs/Pins



10 HPGR: Edge Segments



11 HPGR: Cheek Plates

Roll Crusher

HPGR


8

9

10

11





Kennametal is your ideal partner for the development of next-generation wear components.

In addition to our long tradition as a cemented carbide producer, we are also trusted by OEM manufacturers to supply them with engineered wear solutions required for demanding mining operations. Kennametal doesn't just manufacture the components and materials. We also provide customers with unmatched expertise and dedicated collaboration.

***Contact us today so we can help find the right solution for your application: 1-833-379-1506
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Kennametal is the Global Leader for Wear Protection Solutions.

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