

TUNGSTEN CARBIDE PARTS

Supply & Engineering Solutions

High-performance tungsten carbide components for demanding industrial applications.



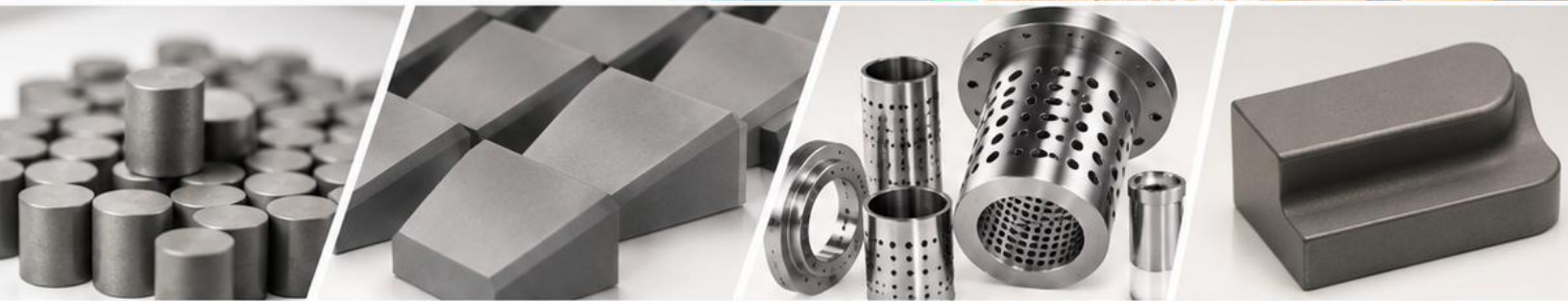
WEAR
RESISTANCE



RELIABLE
SUPPLY



ENGINEERING
SUPPORT



MINING &
MINERAL PROCESSING



OIL & GAS
PRODUCTION



METAL FORMING
& STAMPING



PUMP &
VALVE SYSTEMS

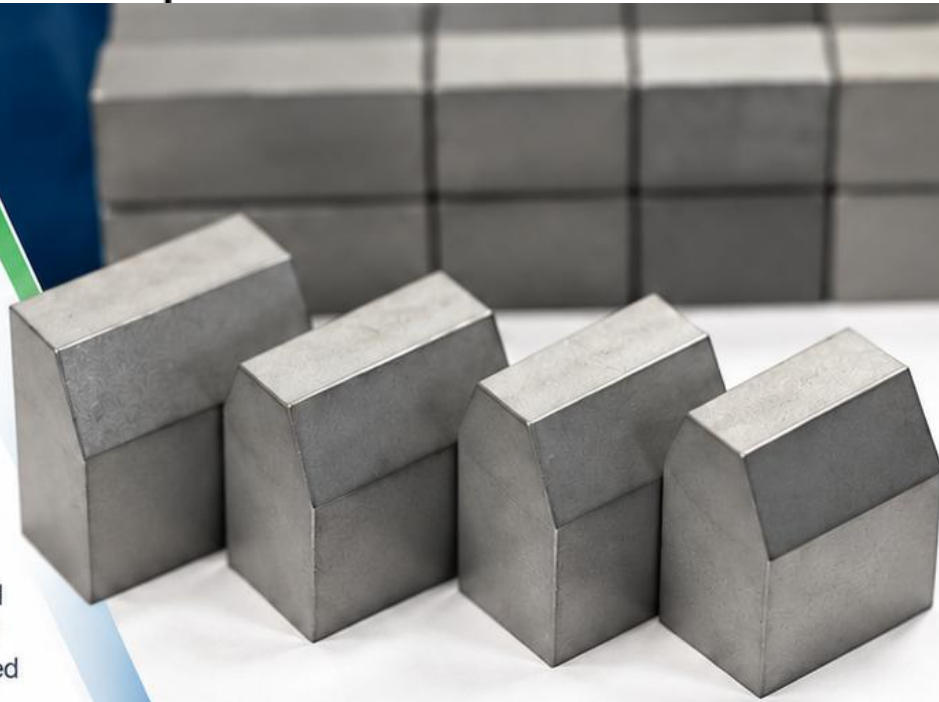


HEAVY
INDUSTRY

TUNGSTEN CARBIDE **WEAR PARTS**

BUILT FOR EXTREME WEAR CONDITIONS

Our tungsten carbide wear parts are engineered for severe abrasion, erosion, impact and high-pressure environments. Produced under controlled manufacturing conditions with consistent material quality and dimensional accuracy, they are designed to provide reliable performance and extended service life.



HIGH HARDNESS

Superior wear resistance



DIMENSIONAL STABILITY

Maintains accuracy in tough conditions



TAILORED SOLUTIONS

Standard and custom geometries



RELIABLE PERFORMANCE

Longer service life and reduced downtime

TYPICAL APPLICATIONS

- Mining & Mineral Processing
- Cement & Construction
- Aggregate Crushing
- Material Handling
- Wear Liner Systems
- General Industrial Equipment



CYLINDRICAL WEAR PARTS

High wear resistance and compressive strength for demanding applications.



PROFIED WEAR PINS

Custom profiles for specific operating conditions and equipment requirements.



SPECIAL SHAPED WEAR PARTS

Engineered geometries to suit your application needs.

MATERIAL & GRADE SELECTION

THE RIGHT BALANCE OF HARDNESS, TOUGHNESS & CORROSION RESISTANCE

Tungsten carbide performance is governed by the WC grain structure, binder type and content, and overall microstructural characteristics. Selecting the appropriate grade requires balancing wear resistance, toughness, corrosion resistance, and the specific operating conditions of the application.



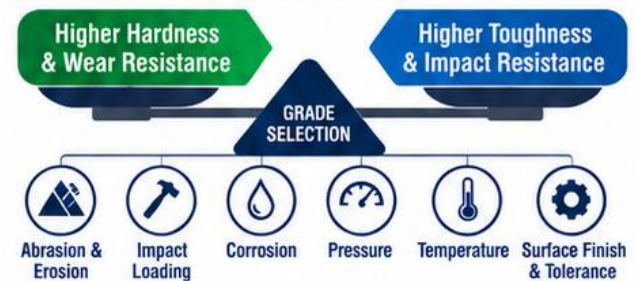
TUNGSTEN CARBIDE MATERIAL & MICROSTRUCTURE OPTIONS

Material / Structure	Key Characteristics	Advantages	Typical Applications
WC-Co	- WC with cobalt binder - Excellent wear resistance - Good hardness-toughness balance	- High wear resistance - Good fracture toughness - Widely used and well established	- Mining and mineral processing - Tooling, dies and wear parts - Heavy-duty components
WC-Ni	- WC with nickel binder - Enhanced corrosion resistance - Good wear resistance with moderate toughness	- Improved corrosion resistance in selected environments - Suitable for chemical and marine applications	- Seals, valves and pump components - Chemical and corrosive-service components - Food, marine and offshore applications
Fine-Grain WC	- Small WC grain size - Higher hardness and good edge/shape retention - Improved dimensional stability	- Higher hardness - Superior wear resistance for precision parts - Good surface finish and edge quality	- Precision components and cutting tools - Dies, wear inserts and small parts - Applications requiring high dimensional accuracy
Coarse-Grain WC	- Large WC grain size - Greater toughness - Better resistance to mechanical loading	- Higher fracture toughness - Better performance under impact and thermal shock - Suitable for heavy-duty wear conditions	- Heavy-duty wear and impact applications - Mining, construction and material handling - Components exposed to high mechanical loads

KEY PARAMETERS AFFECTING CARBIDE PROPERTIES

Parameter	Effect on Properties	General Trend
 Binder content (Co/Ni %)	Lower binder increases hardness and wear resistance; higher binder increases toughness.	 Toughness  Hardness & wear resistance
 WC grain size	Finer grains increase hardness; coarser grains improve toughness and impact resistance.	 Toughness (coarser)  Hardness (coarser)
 Binder type (Co, Ni)	Co: balanced hardness-toughness. Ni: improved corrosion resistance in selected environments.	Co: toughness & balance Ni: corrosion resistance
 WC content (wt%)	Higher WC content generally increases hardness and wear resistance; related to binder content.	 Hardness & wear resistance  Toughness
 Grain-size distribution	Influences microstructural uniformity, toughness and wear behavior.	Better uniformity → better performance
 Carbide additions (e.g., VC, Cr ₃ C ₂)	Can control WC grain growth and modify hardness, toughness and corrosion resistance.	 Strength and wear performance
 Porosity / microstructure	Low porosity improves strength, reliability and wear performance.	 Strength and reliability
 Carbon balance	Proper carbon control avoids undesirable phases that can reduce performance.	Optimized carbon → better properties
 Density	Used to verify material consistency and detect variations in composition or porosity.	Consistent density → reliable performance
 Surface finish	Influences friction, sealing performance, contact stresses and wear behavior.	Smoother finish → better performance (application dependent)
 Geometry & edge design	Radii, wall thickness and stress concentrations influence fracture and impact resistance.	Optimized design → higher durability
 Operating environment	Abrasion, erosion, impact, pressure, temperature, corrosion and lubrication determine the appropriate grade.	Select grade to match actual service conditions

ENGINEERING THE RIGHT BALANCE



TYPICAL PROPERTY RELATIONSHIPS

Binder Content (Co/Ni %)	 Toughness (Impact resistance)	 Hardness (Wear resistance)
WC Grain Size	 Toughness (when coarser)	 Hardness (when coarser)
Finer WC Grain Size	 Hardness (Wear resistance)	 Toughness

Carbide grade selection is a balance—not a single-property decision.

STANDARD TUNGSTEN CARBIDE GRADES

IntegriMat Grade Selection Guide

Select the right grade for your application

IntegriMat tungsten carbide grades are sourced from qualified manufacturers using controlled processing and high-quality raw materials to provide consistent microstructure and reliable performance in demanding wear applications. The grades below are based on ISO application groups and cover commonly used WC-Co grades for wear parts and tooling.



STANDARD WC-Co GRADES (ISO APPLICATION GROUPS)

Typical properties (minimum values)

IntegriMat Grade	ISO Application Group	Co Content (wt.%)	WC Grain Size (µm)	Density (g/cm³)	Hardness (HRA)	Transverse Rupture Strength (N/mm²)	Typical Applications
IM-K10F	K10	6	0.8 (Fine)	14.7 – 15.1	≥ 91	≥ 2700	Fine finishing dies, small wear parts, high wear resistance, limited impact.
IM-K10M	K10	6	1.6 (Medium)	14.7 – 15.1	≥ 90	≥ 2600	General wear parts, forming dies, abrasion resistant components.
IM-K20F	K20	8	0.8 (Fine)	14.6 – 14.9	≥ 90	≥ 2800	Forming dies, moderate impact, higher wear resistance.
IM-K20M	K20	8	1.6 (Medium)	14.6 – 14.9	≥ 89	≥ 2700	General purpose wear parts and tools.
IM-K40F	K40	10	0.8 (Fine)	14.3 – 14.7	≥ 88	≥ 2600	Wear parts with impact, mining, mineral processing.
IM-K40M	K40	10	1.6 (Medium)	14.3 – 14.7	≥ 88.5	≥ 2800	General wear components, chutes, liners, tools with impact.
IM-K40C	K40	13	1.2 (Medium)	14.0 – 14.3	≥ 87.5	≥ 3100	Heavy wear, high impact conditions.
IM-K40UF	K40	13	0.8 (Fine)	14.0 – 14.3	≥ 88.5	≥ 3300	High wear and impact, fine grain for improved toughness.
IM-K40H	K40	15	0.8 (Fine)	13.8 – 14.2	≥ 88.5	≥ 3400	Severe impact and high load applications.
IM-K40T	K40	15	1.6 (Medium)	13.8 – 14.2	≥ 86.5	≥ 3000	High impact wear parts, stamping and forming tools.
IM-K40SH	K40	18	0.8 (Fine)	13.6 – 14.0	≥ 86.5	≥ 3300	Punching, shear and heavy forming tools, abrasive and impact wear.
IM-K40C20	K40	20	1.0 (Medium)	13.4 – 13.8	≥ 85	≥ 3100	Very high impact conditions, mining and heavy-duty wear parts.
IM-K40C20C	K40	20	2.0 (Coarse)	13.4 – 13.8	≥ 83	≥ 3100	Maximum toughness for extreme impact and shock loading.
IM-K40C25	K40	25	1.6 (Medium)	13.0 – 13.2	≥ 82.5	≥ 2800	Severe impact, high toughness components.
IM-K40C25C	K40	25	2.0 (Coarse)	13.0 – 13.2	≥ 81	≥ 2600	Maximum toughness, very high impact and shock loading.

- Values are typical minimum properties. Actual values may vary slightly depending on component size, geometry and processing conditions.
- Grain size classification: Fine ($\leq 1.0 \mu\text{m}$), Medium ($1.0 - 1.6 \mu\text{m}$), Coarse ($\geq 2.0 \mu\text{m}$) – average WC grain size.
- ISO application groups (K10, K20, K40) are used as a guideline for relative wear resistance and toughness, not as a single-property specification.
- Additional grades with other binder contents, grain sizes or WC-Ni binders (including non-magnetic grades) are available upon request.



Custom Grades Available

We can tailor binder content, grain size and properties to meet your specific application requirements.

APPLICATION SELECTION GUIDE



Abrasive Wear

Choose lower Co content and finer grain size for maximum wear resistance (e.g., K10, K20).



Impact & Shock

Choose higher Co content and/or coarser grain size for higher toughness (e.g., K40).



High Temperature

Consider higher Co content and fine/medium grain size for better thermal shock resistance.



Corrosive Environment

WC-Ni grades are available for improved corrosion resistance.



Typical Industries

- Mining & mineral processing
- Metal forming & stamping
- Oil & gas
- Construction & heavy equipment
- General industrial wear parts

TUNGSTEN CARBIDE SOLUTIONS FOR HPGR & MINING

IntegriMat
ENGINEERED MATERIALS.
INTEGRATED SOLUTIONS.

Engineered for Severe Wear, High Pressure and Impact

IntegriMat supplies high-performance tungsten carbide components for HPGR and other demanding mining applications. Our products are selected to meet application-specific material, dimensional and performance requirements, supporting reliable service in demanding mining environments.



HPGR TUNGSTEN CARBIDE STUDS

Precision manufactured studs for maximum wear resistance and long service life.



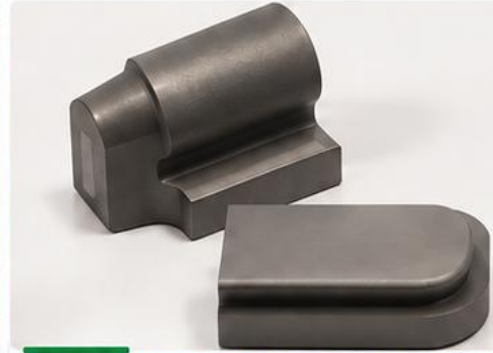
HPGR APPLICATION

Tungsten carbide studs and wear components for high-pressure grinding rolls.



HPGR TUNGSTEN CARBIDE STUDS

- ✓ High wear and impact resistance
- ✓ Optimized geometry and size
- ✓ Consistent quality and dimensional control
- ✓ Custom grades for each application



HPGR TUNGSTEN CARBIDE EDGE BLOCKS

- ✓ Designed for HPGR roller edges
- ✓ Excellent wear and chipping resistance
- ✓ Custom geometries and dimensions
- ✓ Stable performance in high-load conditions



TUNGSTEN CARBIDE WEAR BLOCKS

- ✓ Various shapes and sizes
- ✓ High hardness and wear resistance
- ✓ Standard and custom designs
- ✓ Suitable for mining, crushing and other abrasive environments

KEY ADVANTAGES



Longer Service Life



High Wear
and Impact Resistance



Custom Grades
and Geometries



Precision Components



Strict Quality Control



Proven Field Performance



Material grades, binder content, grain size and component geometry can be engineered according to application requirements.



Mining & Minerals



Crushing & Grinding



Cement



Aggregates



Bulk Material Processing

TUNGSTEN CARBIDE COMPONENTS FOR OIL & GAS

IntegriMat
ENGINEERED MATERIALS.
INTEGRATED SOLUTIONS.



Engineered Solutions for Drilling, Flow Control and Severe Service Environments

IntegriMat provides engineered tungsten carbide solutions for oil & gas exploration, drilling and production, with material grades, geometries and specifications selected to meet demanding wear, erosion and corrosion service conditions. We work with trusted global suppliers to deliver high-performance tungsten carbide components and custom parts for critical applications.



TUNGSTEN CARBIDE SLEEVES

Wear, erosion and corrosion resistance for downhole and surface applications. Various sizes, geometries and grades available.



MWD/LWD COMPONENTS

Precision tungsten carbide components for Measurement While Drilling (MWD) and Logging While Drilling (LWD) tools.



TUNGSTEN CARBIDE THREADED NOZZLES

Wear and erosion resistant threaded nozzles for drilling and production applications.



NON-STANDARD NOZZLES

Custom tungsten carbide nozzles for special applications. Complex geometries and precise machining.



VALVE TRIM

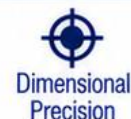
Tungsten carbide components for chokes, control valves and severe service flow control applications.



VALVE CORE & SEAT / BEAN & SEAT ASSEMBLIES

Precision tungsten carbide valve cores, seats and bean & seat assemblies for reliable sealing and extended service life.

**ENGINEERED FOR
DEMANDING
SERVICE CONDITIONS**





IntegriMat

IntegriMat Inc.

Surface Engineering Solutions Division

TUNGSTEN CARBIDE PARTS & COMPONENTS

Precision Components for Demanding Applications

High-performance tungsten carbide components engineered for exceptional wear resistance, reliability and long service life in the most demanding environments.



FORMING DIES

Precision tungsten carbide forming dies engineered for high wear resistance, dimensional stability and extended service life.



BLADES, KNIVES & CUTTING TOOLS

Precision carbide blades and knives for demanding cutting, slitting and shearing applications, offering high wear resistance and durable cutting edges.



CUSTOM TUNGSTEN CARBIDE COMPONENTS

Custom and non-standard carbide components supplied to customer drawings, samples and application requirements, with selectable grades, dimensions and geometries.



BUSHINGS & SLEEVES

Wear-resistant carbide bushings, sleeves and precision components for demanding service conditions.



WEAR BLOCKS

Engineered carbide blocks and inserts for abrasive and high-wear applications.



OTHER INDUSTRIAL COMPONENTS

Custom and application-specific carbide components for demanding wear environments.

TYPICAL INDUSTRIES



Mining & Mineral Processing



Construction & Earthmoving



Cement & Aggregates



Steel & Metal Processing



Oil & Gas and Drilling



Pulp & Paper



Chemical & Other Industries



IntegriMat

IntegriMat Inc.

Surface Engineering Solutions Division

ENGINEERED AROUND YOUR APPLICATION

From material selection to
custom carbide components.

Every wear application is different. IntegriMat works with customers to define the appropriate tungsten carbide grade, geometry and component configuration based on operating conditions, wear mechanisms and performance requirements.



CUSTOM & MADE-TO-DRAWING SOLUTIONS

Tungsten carbide components can be supplied according to customer drawings, samples or application requirements, with selectable grades, dimensions and geometries.



FOR QUOTATION OR TECHNICAL REVIEW, PLEASE PROVIDE:

-  Drawing or dimensional requirements
-  Application and component function
-  Operating and wear conditions
-  Required material grade, if specified
-  Quantity or estimated annual demand
-  Existing component/sample information, when available

ENGINEERING SUPPORT



Grade
Selection



Material
Selection



Application
Review



Custom
Component
Sourcing

IntegriMat Inc.

Engineered Materials. Integrated Solutions.



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