

Tungsten Carbide Grinding Bowl Laboratory Pulverizing Dish Milling Vessel Set

Item Number: KT-TH



Introduction

Engineered for contamination-free sample grinding, this premium tungsten carbide bowl delivers extreme hardness, high impact durability, and rapid particle reduction. Perfect for demanding geological, mining, and advanced ceramic laboratory workflows.

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Application	Description	Key Benefit
Geological Exploration & Geochemistry	Rapid pulverization of bulk rock samples, core drillings, river silts, and silicate minerals for comprehensive trace element mapping. The milling system breaks down resistant quartz, feldspar, and granite cores without introducing iron background noise that distorts sensitive spectroscopic measurements.	Eliminates Fe and Cr interference while achieving <40 µm analytical fineness for precise XRF, ICP-OES, and ICP-MS geochemical surveys.
Mining Ore Assay & Grade Control	Continuous comminution of high-grade run-of-mine ores, concentrates, and tailings, including chromite, ilmenite, bauxite, and gold-bearing pyrite. The dense carbide milling elements crush heterogeneous mineral rocks into fine, homogenous test specimens required for reliable daily assaying.	Withstands aggressive 24/7 abrasive wear, maintaining consistent volume capacity and zero sample retention across extreme test regimes.
Cement, Clinker & Raw Meal Analytics	Daily quality control grinding of hard Portland cement clinker, gypsum, limestone, and raw feed materials prior to automated pellet pressing and X-ray analysis. The high-energy disc action pulverizes unground nodules into uniform micro-particulate powders in under two minutes.	Delivers exceptionally narrow particle size distributions essential for repeatable fusion beads, pressed pellets, and ASTM/ISO standard compliance.
Ferrous & Non-Ferrous Metallurgy	Pulverization of brittle ferroalloys, blast furnace slags, electric arc furnace (EAF) dust, and metal-matrix composites for production heat analytics. The high kinetic impact easily disintegrates difficult materials like ferrosilicon, ferromanganese, and titanium sponge.	High impact toughness prevents puck shattering when processing extremely tough, dense ferroalloy chunks up to 15 mm starting size.
Advanced Ceramics & Superhard Materials	Processing of raw technical ceramic formulations, including silicon carbide, boron nitride, alumina, and zirconia precursor powders. The milling chamber facilitates both intensive dry comminution and wet solvent-based blending to disperse micro-additives homogeneously.	Ultra-high hardness (HRA >90.5) resists rapid groove gouging, preserving sample stoichiometry and preventing unwanted phase contamination.
Environmental Waste & Incineration Ash	Preparation of municipal solid waste bottom ash, incinerator fly ash, vitrified waste, and heavy-metal-laden soils for hazardous material leaching tests. The hermetic sealing system protects operators from toxic respirable particulates and volatile compounds.	Complete seal integrity prevents aerosol dust escape and ensures complete recovery of toxic trace metals for EPA regulatory validation.
Glass, Glaze & Enamel Manufacturing	Comminution of raw silica sands, cullet glass, ceramic frits, and enamel fluxes to verify batch composition and melting kinetics. The non-porous tungsten carbide interior prevents moisture entrapment and cross-color contamination across diverse formulations.	Super-smooth ground interior allows rapid mechanical brush-down and solvent rinsing, ensuring zero cross-batch contamination in fast-paced QC labs.

Parameter	KT-TH-50	KT-TH-100	KT-TH-250	KT-TH-500
Item Number	KT-TH-50	KT-TH-100	KT-TH-250	KT-TH-500
Nominal Capacity	50 ml	100 ml	250 ml	500 ml
Recommended Sample Feed Volume	10 – 35 ml	20 – 70 ml	50 – 180 ml	100 – 350 ml
Maximum Initial Feed Particle Size	< 5 mm	< 8 mm	< 12 mm	< 15 mm
Final Particle Size (D90)	< 40 µm	< 40 µm	< 40 µm	< 40 µm
Internal Grinding Elements	1 Solid Puck	1 Puck + 1 Ring	1 Puck + 1 Ring	1 Puck + 2 Rings

Parameter	KT-TH-50	KT-TH-100	KT-TH-250	KT-TH-500
Outer Dimensions (Diameter × Height)	130 × 75 mm	145 × 85 mm	200 × 105 mm	240 × 125 mm
Typical Grinding Duration	30 – 90 seconds	45 – 120 seconds	60 – 180 seconds	90 – 240 seconds
Outer Protective Shell Material	AISI 304 Stainless Steel	AISI 304 Stainless Steel	AISI 304 Stainless Steel	AISI 304 Stainless Steel
Gasket Sealing Type	Viton Double O-Ring	Viton Double O-Ring	Viton Double O-Ring	Viton Double O-Ring
Applicable Grinding Medium	Dry or Wet (Solvent/Water)	Dry or Wet (Solvent/Water)	Dry or Wet (Solvent/Water)	Dry or Wet (Solvent/Water)

Material Property	Nominal Value	Standard / Test Method
Matrix Composition (Tungsten Carbide, WC)	94.0 wt% (±0.5%)	ASTM B760 / EDX Spectroscopy
Binder Composition (Cobalt, Co)	6.0 wt% (±0.5%)	ASTM B760 / EDX Spectroscopy
Average Carbide Grain Size	0.8 – 1.2 μm (Submicron Grade)	Metallographic Scanning Electron Microscopy
Surface Hardness	≥ 90.5 HRA (≥ 1450 HV30)	ASTM E18 / ISO 3738
Sintered Material Density	14.85 – 15.05 g/cm ³	ASTM B311 Archimedes Principle
Transverse Rupture Strength (TRS)	≥ 2400 MPa	ASTM B406 / ISO 3327
Compressive Strength	≥ 4500 MPa	ASTM E9 Standard Test Method
Modulus of Elasticity (Young's Modulus)	620 – 650 GPa	Ultrasonic Pulse-Echo Measurement
Thermal Conductivity	80 – 100 W/(m·K) at 20°C	Laser Flash Method
Maximum Continuous Temperature	400°C in Air / 600°C in Inert Gas	Standard Laboratory Operating Limit

Operational Parameter	Specification & Recommendations
Mill Compatibility	Laboratory vibratory disc mills, puck pulverizers, cup mills, and swing mills
Clamping Systems	Compatible with pneumatic clamping devices, eccentric manual toggle clamps, and threaded mechanical spindles
Operating Frequency Range	700 to 1450 rpm (11.6 to 24.2 Hz) standard vibrational operating speeds
Chemical Resistance	Highly resistant to alcohols, acetone, hexane, neutral solvents, and mild organic acids; avoid hydrofluoric acid
Cleaning Procedures	Ultrasonic bath cleaning with volatile solvents, dry wiping, or brief pre-milling conditioning with pure quartz sand