

Gray King Low Temperature Carbonization Assay Apparatus

Coal Retort Analyzer

Item Number: KT-TE62



Introduction

Engineered for coal assessment, this Gray King carbonization unit features a cast bronze heating block and four test tubes to determine semi coke, tar, and water yields with exceptional thermal accuracy and repeatability.

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Application	Description	Key Benefit
Coking Coal Classification	Quantitative determination of standard coke types (A through G) via pyrolysis residue morphology comparison according to standard national charts.	Enables precise ranking of metallurgical coal grades to secure consistent blast-furnace coke mechanical strength.
Commercial Coal Blending Optimization	Evaluating the synergistic carbonization behavior and by-product generation profiles of blended coking coal charges.	Minimizes raw material procurement costs while maintaining target coke cake structure and volatile product ratios.
Low-Temperature Pyrolysis Evaluation	Assessing coal-to-liquids potential by quantifying primary tar yields, light oil fractions, and semi-coke residues under 600°C anaerobic conditions.	Provides foundational yield data for synthetic fuel refining, chemical feedstock extraction, and industrial tar processing.
Coal Gasification Feedstock Screening	Characterizing moisture evolution, volatile release patterns, and thermal stability of non-coking or low-rank coals prior to gasifier injection.	Prevents unexpected tar condensation in syngas scrubbers and optimizes operating thermal efficiency.
Geological Exploration & Core Profiling	Routine laboratory testing of borehole coal cores across exploration blocks to map coal quality stratigraphy.	High four-tube throughput accelerates exploration timelines while delivering certified baseline geochemical data.
Fuel Science Research & Academic Analysis	Investigating coal devolatilization kinetics, secondary reaction mechanisms, and carbon matrix evolution in energy research institutions.	Delivers repeatable thermal gradients and high-resolution data logging required for peer-reviewed fuel science publications.

Parameter Category	Specification Attribute	Value / Standard Detail
Model Designation	Equipment Identifier	KT-TE62
Standards Compliance	Testing Methodology	GB/T 1341 (Coal Gray-King Low-Temperature Carbonization Test)
Furnace Construction	Structural Type	Four-bore horizontal box-type resistance furnace
	Core Body Material	Cast bronze alloy (5:2 copper-to-tin ratio)
	Constant Temperature Zone	≥ 200 mm length with minimal thermal gradient
Thermal Performance	Operating Carbonization Range	300°C to 600°C
	Maximum Design Temperature	800°C
	Standard Heating Gradient	5°C/min (from 300°C preheat to 600°C soak)
	Soak Duration	15 minutes at terminal carbonization temperature
	Temperature Control Accuracy	±1°C
	Temperature Controller Deviation	< 3°C across full operational cycle
	Inter-Bore Temperature Uniformity	< 1°C bore-to-bore variation

Parameter Category	Specification Attribute	Value / Standard Detail
Instrumentation & Control	Controller Type	Intelligent microcomputer program controller
	User Interface	High-visibility digital LED status and temperature display
	Data Logging	Integrated panel-mounted micro-printer for real-time reporting
Heating Architecture	Heating Element Configuration	8 German heating rods arranged in cross-balanced formation
	Element Power Distribution	Rods I & VIII: 0.45 kW each; Rods II & VII: 0.35 kW each; Rods III & VI: 0.30 kW each; Rods IV & V: 0.10 kW each
	Nominal Bore Power (Avg. 0.60 kW)	Bore I: 0.65 kW; Bore II: 0.53 kW; Bore III: 0.56 kW; Bore IV: 0.66 kW
Capacity & Electrical	Analytical Capacity	1 to 4 samples processed simultaneously
	Operating Power Supply	AC 220V $\pm$ 10%, 50 Hz
Safety & Process Alarms	Electrical Protection	Residual current leakage protection, short-circuit protection
	Process Interlocks	Over-temperature acoustic alarm, automated power shutoff
	Cycle Notification	End-of-test buzzer with visual LED completion indicator
Glassware & Accessories	Carbonization Retort Tube	High-temperature thermal-shock-resistant borosilicate glass
	Condenser Column	Straight-tube (Liebig type) with standard ground joint, cooling length $\geq$ 300 mm
	Condensate Receiver Flask	250 mL conical flask with standard ground joint
	Moisture Measuring Receiver	0 to 10 mL volume with 0.05 mL graduation divisions, ground joint
Analytical Outputs	Sample Positioning Mechanism	Rigid high-temperature metallic push rod
	Measured Quantitative Indices	Semi-coke yield (%), tar yield (%), total moisture yield (%)
	Qualitative Classification	Coke type classification (Standard profile comparison A through G)