

Automatic Coke Reactivity And Post Reaction Strength Determination Apparatus

Item Number: KT-JTB



Introduction

Engineered for standard coke testing, this automated coke reactivity and post-reaction strength determination apparatus integrates silicon carbide heating, mass flow gas regulation, motorized reactor handling, and an integrated tumble drum to deliver accurate, repeatable CRI and CSR analytical metrics.

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Application	Description	Key Benefit
Blast Furnace Coke Quality Verification	Systematic qualification of metallurgical lump coke feedstocks subjected to simulated shaft furnace thermochemical gasification and mechanical tumbling.	Maximizes ironmaking permeability, reduces coke rate consumption, and protects blast furnace hearth integrity.
Coking Plant Coal Blending Optimization	Benchmarking CRI and CSR indices of experimental coke batches produced from varied coking coal blend formulations and coal ranks.	Lowers raw material procurement costs by enabling confident inclusion of non-coking or semi-soft coals without sacrificing structural coke quality.
Commercial Merchant Coke Inbound Inspection	High-volume third-party commercial verification of traded metallurgical fuels against GB/T 4000-2008 contractual procurement specifications.	Eliminates supplier quality disputes through objective, highly repeatable digital analytical logs and certified automated printouts.
Superalloy & Refractory Research	Testing hot-gas corrosion kinetics, degradation thresholds, and structural reactivity of specialized carbon blocks, cathode materials, and graphite elements.	Provides rigorous isothermal testing data under precise CO2 gas concentrations and high thermal regimes up to 1100°C.
Metallurgical Standard Compliance Auditing	Standardized testing across industrial regulatory bodies, institutional certification centers, and national materials testing labs.	Assures full procedural compliance with state and international standards via real-time parameter logging and unalterable digital audit trails.

Process Troubleshooting & Failure Analysis	Diagnostic testing of crushed coke breeze, unexpected furnace burden hang-ups, or uncharacteristic fines generation during ironmaking tapping cycles.	Rapidly pinpoints whether furnace irregularities stem from chemical reactivity susceptibility (CRI) or physical degradation (CSR).
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System Subassembly	Technical Parameter	Engineering Specification (KT-JTB)
Standard Compliance	Governed Testing Standard	GB/T 4000-2008 (Coke Reactivity & Post-Reaction Strength)
Thermal System	Heating Element Configuration	12× High-Density Silicon Carbide (SiC) Rods
	Furnace Rated Power	7 kW
	Maximum Rated Furnace Temperature	1450°C
	Uniform Isothermal Constant Temperature Zone	≥ 150 mm
	Temperature Measurement Transducers	Type N or Type S Thermocouple (Class 0.5)
	Thermocouple Protection Sleeve Material	GH3044 Superalloy Steel or High-Purity Corundum

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	Temperature Control Methodology	Closed-loop Fuzzy PID (Online Variable Tuning Supported)
	Standard Temperature Control Accuracy	1100°C ± 5°C
	Standard Thermal Ramp Profile	Ambient to 1100°C at 15°C/min (Fully User-Programmable)
	Isothermal Hold Duration	2 Hours at 1100°C ± 5°C
Atmosphere & Flow Control	Flow Measurement Instrument	Dual Independent High-Precision Mass Flow Controllers (MFC)
	Nitrogen (N2) Regulation Range	0 to 10 L/min (Continuous Adjustable)
	Carbon Dioxide (CO2) Regulation Range	0 to 10 L/min (Continuous Adjustable)
	Gas Flow Measurement Accuracy	±1% Full Scale (FS)
	Gas Switching Speed & Method	≤ 0.1 s Fast Solenoid Switching (Independent Auto/Manual)
	Pneumatic Circuit Pressure Tolerance	Up to 3.0 MPa
	Integrated Gas Pre-Treatment	Equipped with Dual In-Line Chemical Desiccant Drying Columns
	Real-Time Diagnostics	Real-time digital gas flow and temperature curves on PC interface
Reaction Chamber	Vessel Structural Material	Heat-Resistant Superalloy GH3044 (Rated to 1400°C)
	Reactor Inner Bore & Height	Inner Diameter Φ80 mm, Total Length 500 mm
	Loading & Unloading Mechanism	Motorized Top Mechanical Hoist Transmission
Type I Tumbler Drum	Drum Dimensions & Wall Thickness	Inner Diameter Φ140 mm, Depth 700 mm, Wall Thickness 5-6 mm
	Rotation Velocity & Total Cycle	20 rpm (600 Total Revolutions in 30 min ± 1 min)
	Operational Control	Automatic digital revolution counter and integrated auto-stop
	Drum Loading / Discharging Design	Integrated one-piece design (unloading without drum detachment)
	Standard Auxiliary Analytical Sieves	Round-hole aperture screens: 23 mm, 25 mm, and 10 mm
Automation & Safety	Standard Testing Cycle Sequence	0-400°C Ramp; 400°C N2 Purge (0.8 L/min); 1050°C CO2 Preheat; 1100°C Soak (10 min); 1100°C CO2 Reaction (5 L/min for 2 h); Auto Descent & N2 Cooling Purge (2 L/min); 100°C Tumbler Prompt Alarm
	Laboratory Air Quality Safeguard	Automatic exhaust ventilation fan actuation during active test
	Fault Diagnostics & Circuit Protection	Auto-power cut on over-temperature, thermocouple fault, SCR puncture, gas deficit, or overpressure
	Workstation Integration	Industrial PC workstation with dedicated test suite and printer