



**ISO 20653 & IEC 60529 IPX9K High-Pressure / High-Temperature Water Jet Test System
Professional Laboratory Grade Environmental Validation Platform**

1. Product Executive Summary

The KingPo IPX9K Waterproof Test Chamber represents the pinnacle of hydrothermal stress testing for the global automotive and electronics industries. Engineered specifically to satisfy the rigorous requirements of ISO 20653, IEC 60529, and DIN 40050-9, this system provides a controlled environment to simulate high-pressure steam-jet cleaning and professional-grade car wash scenarios.

This platform is indispensable for Tier 1 and Tier 2 automotive suppliers to validate the hermetic sealing of Electronic Control Units (ECUs), Li-ion Battery Enclosures, ADAS Sensors, and High-Voltage Connectors. By delivering a stabilized 8–10 MPa water jet at 80°C, it identifies microscopic sealing vulnerabilities before they lead to catastrophic field failures or costly product recalls.

2. Comprehensive Technical Matrix

Website: www.kingpo.hk

Tel: 0086 769 81627526

Address: No.9, University Rd., Songshan Lake, Dongguan, Guangdong, China

E-mail: sales@kingpo.hk

Fax: 0086 769 89032367



Kingpo Technology Development Limited

Functional Category	Technical Parameter	Engineering Specification	Detailed Remarks
Standards Compliance	Primary Protocols	ISO 20653 / IEC 60529 / DIN 40050-9	Validated for IPX9 / IPX9K certification
Hydraulic Dynamics	Water Pressure	8,000 – 10,000 kPa (80 – 100 bar)	Controlled via PID-driven frequency inverter
	Flow Rate Control	14.0 – 16.0 L/min	Continuous closed-loop flow monitoring
	Water Temperature	80°C ± 5°C	High-density thermal insulation for stability
	Impact Force Calibration	0.9 – 1.2 N (Standard Requirement)	Optional force sensor for metrological validation
Spray Mechanics	Jet Angles	0°, 30°, 60°, 90°	Precision-aligned rail-mounted fan nozzles
	Target Distance	100 – 150 mm	Adjustable per specimen geometry
	Spray Duration	30s per angle (120s total cycle)	Programmable via HMI touchscreen
Specimen Handling	Turntable Diameter	φ400 mm (Standard)	Customized sizes available upon request
	Rotation Speed	5 ± 1 r/min	Synchronized with spray sequences

Website: www.kingpo.hk

Tel: 0086 769 81627526

Address: No.9, University Rd., Songshan Lake, Dongguan, Guangdong, China

E-mail: sales@kingpo.hk

Fax: 0086 769 89032367



Functional Category	Technical Parameter	Engineering Specification	Detailed Remarks
	Payload Capacity	100 kg (High-Load Bearing)	Robust axle design for heavy EV components
Structural Integrity	Internal Material	SUS304 Stainless Steel	2.0mm thickness, mirror-finished, anti-corrosion
	Viewing Window	Tempered Safety Glass	Integrated wiper and LED illumination
Utilities	Power Input	AC 380V; 3-Phase; 50Hz / 60Hz	Total rated power: 25.0 kW

3. Advanced Engineering & Material Science

The KingPo IPX9K chamber is not merely a "pressure washer in a box"; it is a precision instrument designed for multi-decade reliability in high-throughput testing environments.

- **Italian-Imported Hydro-Pump System:** At the heart of the system is an ultra-heavy-duty plunger pump imported from Italy, specifically selected for its ability to handle constant 80°C water without seal degradation or cavitation.
- **Dimensional Accuracy (Figure 7):** Our nozzles are manufactured to the strict tolerances defined in IEC 60529 Figure 7. Any deviation in the nozzle aperture or fan angle would invalidate the jet's "impact profile," leading to false passes.
- **Closed-Loop PID Regulation:** Utilizing a high-speed PLC (Programmable Logic Controller), the system samples pressure and flow data 100 times per second. This ensures that even as the water temperature changes (affecting viscosity), the mechanical force delivered to the specimen remains constant.
- **Thermal Management:** The 70L reservoir features a high-power immersion heating array with dual-layered insulation, allowing the system to reach the 80°C setpoint rapidly and maintain it with a precision of $\pm 2^{\circ}\text{C}$.

4. Methodological Testing Principle

The IPX9K test is designed to verify that water ingress does not occur when the equipment is subjected to a "fan-shaped" high-pressure water jet.

1. **Placement:** The specimen is secured at the center of the turntable.
2. **Angle Sequencing:** The system automatically cycles through the four standard angles

Website: www.kingpo.hk

Tel: 0086 769 81627526

Address: No.9, University Rd., Songshan Lake, Dongguan, Guangdong, China

E-mail: sales@kingpo.hk

Fax: 0086 769 89032367



Kingpo Technology Development Limited

(0°/30°/60°/90°). For each angle, the nozzle delivers a high-impact "curtain" of water while the turntable rotates to ensure 360° coverage.

3. **Jet Impingement:** The combination of heat and kinetic energy tests the physical expansion/contraction of seals and the mechanical resistance of gaskets.
 4. **Verification:** Following the 120-second exposure, the specimen is evaluated for Dielectric Strength, Insulation Resistance, or physical ingress (visual inspection) to determine its IP compliance status.
-

5. Industrial Applications & Strategic Importance

- **New Energy Vehicles (NEV):** Validating the under-chassis battery packs and charging ports against high-pressure road spray and cleaning.
 - **ADAS & Autonomous Systems:** Ensuring that exterior cameras, LiDAR housings, and ultrasonic sensors remain fog-free and functional after cleaning.
 - **Powertrain Electronics:** Testing ECUs, alternators, and wiring harnesses located in the engine bay where steam cleaning is common.
 - **Third-Party Laboratories:** Providing a repeatable, audit-ready platform for UL, TUV, Intertek, and SGS style type-approval.
-

6. Safety Protocols & Maintenance Excellence

- **Operator Safety:** The chamber features a Door Interlock System; if the door is opened during a high-pressure cycle, the pump is instantly deactivated to prevent injury.
 - **System Longevity:** Integrated Water Filtration Units protect the high-pressure pump and precision nozzles from calcification and debris, extending the service interval.
 - **Safety Interlocks:** Includes Over-temperature protection, Motor overload protection, Phase-sequence protection, and Emergency Stop.
-

7. Strategic Procurement Advantage

- **Audit-Ready Documentation:** Every chamber is shipped with a comprehensive Factory Acceptance Test (FAT) report and an ISO 17025 Traceable Calibration Certificate.
- **Manufacturing Excellence:** Built under ISO 9001:2015 quality management and CE safety marking.
- **Global Technical Support:** Backed by KingPo's specialized engineering team in Dongguan, providing remote diagnostic support and rapid-response spare parts logistics.

Website: www.kingpo.hk

Tel: 0086 769 81627526

Address: No.9, University Rd., Songshan Lake, Dongguan, Guangdong, China

E-mail: sales@kingpo.hk

Fax: 0086 769 89032367