

KINGPO TEST EQUIPMENT CO., LTD.



IPX3 & IPX4 Combined Rain Spray Test Chamber

IEC 60529 IPX3 & IPX4 Oscillating Tube Testing System

One Machine for Both IPX3 & IPX4 • Cost & Space Efficient • High Repeatability

Applicable Standards
IEC 60529 IPX3 & IPX4

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1. Product Overview

What it is

The KingPo IPX3 & IPX4 Combined Rain Spray Test Chamber is a highly efficient combined oscillating tube testing system engineered to perform both IPX3 and IPX4 rain spray tests in accordance with IEC 60529 using a single piece of equipment. It delivers a practical solution for testing laboratories and manufacturers by eliminating the need for separate machines, significantly reducing laboratory footprint, simplifying workflow, and lowering overall testing costs while maintaining the highest levels of accuracy and repeatability.

What it tests

This chamber performs both IPX3 (oscillating tube at $\pm 60^\circ$) and IPX4 (oscillating tube up to $\pm 180^\circ$) rain spray tests. It is ideal for household appliances, lighting products, electrical control cabinets, outdoor equipment, and industrial enclosures that require verification against rain spray conditions at different intensities.

Why it matters

Having both IPX3 and IPX4 capability in one machine greatly improves testing efficiency, reduces capital investment, saves laboratory space, and accelerates product development and certification. It is the preferred solution for organizations that regularly perform both levels of rain spray testing.

2. Key Advantages

• Combined IPX3 & IPX4 Capability

Engineering: Single oscillating tube system with adjustable swing angle — supports both IPX3 ($\pm 60^\circ$, total 120°) and IPX4 (up to $\pm 180^\circ$) through simple angle adjustment.

Benefit: Eliminates the need for two separate machines. Significantly reduces equipment investment, laboratory space, and operational complexity.

• Precision Oscillating Tube System

Engineering: High-precision oscillating tube with 400 mm radius and servo-driven mechanism for smooth, accurate swinging across the full required angle range.

Benefit: Delivers highly repeatable and standards-compliant rain spray exposure for both IPX3 and IPX4 tests.

• High-Accuracy Nozzle Array

Engineering: $\Phi 0.4$ mm precision nozzles spaced at 50 mm intervals with controlled flow rate of 0.07 L/min $\pm 5\%$ per nozzle.

Benefit: Ensures uniform water distribution and consistent droplet size across the entire test specimen in both test modes.

• Flexible Turntable with Optional Tilt

Engineering: Adjustable rotating turntable (1–5 rpm) with customizable diameter and optional 15° tilt function.

Benefit: Provides uniform exposure from all directions and allows simulation of more realistic installation angles.

• Easy Mode Switching via PLC Control

Engineering: Advanced PLC with touchscreen interface that allows quick and easy switching between IPX3 and IPX4 test modes without hardware changes.

Benefit: Greatly improves testing efficiency and reduces operator training requirements.

• Efficient Recirculating Water System

Engineering: Integrated water circulation and filtration system that maintains stable flow and pressure while minimizing water consumption.

Benefit: Lowers operating costs and supports environmentally responsible laboratory practices.

3. Technical Specifications

3.1 Performance Parameters

Parameter	Specification	Notes / Tolerance
Applicable Standards	IEC 60529 IPX3 & IPX4	Combined testing capability
Oscillating Tube Radius	400 mm (standard)	Other sizes available on request
IPX3 Swing Angle	±60° from vertical (total 120°)	Standard IPX3 requirement
IPX4 Swing Angle	Up to ±180°	Standard IPX4 requirement
Nozzle Diameter	Φ0.4 mm	Precision spray nozzles
Nozzle Spacing	50 mm	Uniform distribution
Flow Rate per Nozzle	0.07 L/min ±5%	Standard for both IPX3 & IPX4
Turntable Speed	1–5 rpm (adjustable)	Ensures uniform exposure
Water Pressure	80–150 kPa (adjustable)	Suitable for both IPX3 and IPX4

3.2 Mechanical Structure

Parameter	Specification	Notes
Chamber Material	SUS304 Stainless Steel	Full corrosion resistance
Turntable Diameter	500–800 mm (customizable)	With optional 15° tilt function
Water System	Recirculating with filtration	Reduces water consumption

3.3 Electrical & Control System

Parameter	Specification	Notes
Control System	PLC + Touchscreen HMI	Easy mode switching between IPX3 & IPX4
Power Supply	AC 220V, 50/60Hz	Standard laboratory power

4. Testing Principle

This combined test chamber utilizes a single oscillating tube to execute both IPX3 and IPX4 rain spray tests as required by IEC 60529. In IPX3 mode, the tube oscillates at ±60° from vertical (total 120° arc). In IPX4 mode, the swing range is extended up to ±180° to simulate more severe splashing conditions. The test specimen is placed on a rotating turntable that provides uniform exposure from all directions. Operators can quickly switch between the two test modes via the control system without changing hardware. This integrated design accurately replicates real-world rain and spray exposure scenarios while significantly streamlining the testing process and ensuring full compliance with both standards.

5. Typical Applications

- **Testing Laboratories** — Streamlined IPX3 and IPX4 compliance testing with minimal equipment footprint
- **Household Appliance Manufacturers** — Combined rain spray validation for product development and certification
- **Lighting and Luminaire Producers** — Waterproof performance verification for outdoor and architectural lighting
- **Electrical Equipment Manufacturers** — Multi-standard ingress protection testing for control cabinets and power distribution systems
- **Quality Assurance and R&D Departments** — High-efficiency testing workflow to support higher productivity

6. Compliance & Manufacturer

This equipment is engineered and manufactured in strict accordance with IEC 60529 for both IPX3 and IPX4 rain spray testing. It offers laboratories and manufacturers a standardized, efficient, and reliable platform to meet multiple ingress protection requirements using only one piece of equipment.

Metrological Integrity & Validation

- **Factory Calibration:** Each unit is delivered with a comprehensive traceable calibration certificate as standard.
- **ISO/IEC 17025 Accreditation:** Available upon request to meet the stringent requirements of certification laboratories.
- **Performance Verification:** Regular verification of oscillation angle, flow rate, and turntable performance is recommended.

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Specialist in Precision Environmental, Ingress Protection & Reliability Test Systems

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