

KINGPO TEST EQUIPMENT CO., LTD.



IPX3 Oscillating Tube Rain Spray Test Chamber

IEC 60529 IPX3 Rain Spray Testing System

Precision Oscillating Tube • Uniform Spray • Advanced PLC Control

Applicable Standards IEC 60529 IPX3

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1. Product Overview

What it is

The KingPo IPX3 Oscillating Tube Test Chamber is a specialized rain spray testing system designed to evaluate the protection of enclosures against water sprayed from an oscillating tube in accordance with IEC 60529 IPX3. It provides manufacturers and testing laboratories with a reliable and repeatable platform to verify waterproof performance of electrical products, household appliances, lighting fixtures, and industrial equipment under simulated rain spray conditions.

What it tests

The chamber assesses ingress protection performance of enclosures when exposed to water sprayed from an oscillating tube swinging at $\pm 60^\circ$ (total 120°). It is ideal for testing household appliances, lighting products, electrical control cabinets, outdoor equipment, and industrial enclosures that may be exposed to angled rain spray in real-world use.

Why it matters

IPX3 testing is a critical requirement for products intended for outdoor or semi-outdoor use. Reliable rain spray testing helps manufacturers identify sealing weaknesses early, ensure compliance with international standards, reduce field failures caused by water ingress, and accelerate product certification and market entry.

2. Key Advantages

- **Precision Oscillating Tube System**

Engineering: High-precision oscillating tube with 400 mm radius and servo-driven mechanism for smooth, accurate swinging at $\pm 60^\circ$ from vertical (total 120° swing).

Benefit: Delivers highly repeatable and standards-compliant rain spray exposure, ensuring reliable test results accepted by certification bodies worldwide.

- **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 and adjustable water pressure (80–150 kPa).

Benefit: Ensures uniform water distribution and consistent droplet size across the entire test specimen for accurate and reproducible results.

- **Flexible Turntable with Optional Tilt**

Engineering: Adjustable rotating turntable (1–5 rpm) with customizable diameter (500–800 mm) and optional 15° tilt function for enhanced test configurations.

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

- **Advanced PLC Control System**

Engineering: PLC-based control with intuitive touchscreen interface for easy parameter setting, real-time monitoring, and automated test cycle execution.

Benefit: Minimizes operator error, ensures test consistency, and generates traceable digital records for quality audits and compliance documentation.

- **Robust SUS304 Stainless Steel Construction**

Engineering: Full SUS304 stainless steel chamber with large observation window, designed for long-term durability and excellent corrosion resistance in continuous laboratory use.

Benefit: Ensures equipment longevity, maintains test accuracy over time, and reduces maintenance costs.

- **Efficient Recirculating Water System**

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

Benefit: Lowers operating costs, ensures consistent water quality, and supports environmentally responsible laboratory practices.

3. Technical Specifications

3.1 Performance Parameters

Parameter	Specification	Notes / Tolerance
Applicable Standard	IEC 60529 IPX3	Oscillating tube rain spray test
Oscillating Tube Radius	400 mm (standard)	Other radii available on request
Swing Angle	±60° from vertical (total 120°)	IPX3 standard 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 IPX3 requirement
Water Pressure	80–150 kPa (adjustable)	Precise pressure regulation
Turntable Speed	1–5 rpm (adjustable)	Ensures uniform exposure

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
Observation Window	Large tempered glass window	Safe visual monitoring during test
Water System	Recirculating with filtration	Reduces water consumption

3.3 Electrical & Control System

Parameter	Specification	Notes
Control System	PLC + Touchscreen HMI	Intuitive operation and monitoring
Safety Protection	Leakage, overload, emergency stop	Comprehensive laboratory safety
Power Supply	AC 220V, 50/60Hz	Standard laboratory power

4. Testing Principle

The IPX3 Oscillating Tube Test Chamber evaluates the ability of an enclosure to protect against water sprayed from an oscillating tube, as defined in IEC 60529 IPX3. During the test, water is supplied to the oscillating tube, which swings back and forth over the specimen at ±60° from vertical (total 120° swing). The specimen is mounted on a rotating turntable to ensure uniform exposure from all directions. Water is sprayed through precision nozzles on the tube at a controlled flow rate of 0.07 L/min per nozzle. The combination of precise tube oscillation and turntable rotation accurately simulates real-world rain spray conditions, allowing reliable evaluation of whether water ingress could compromise the safe operation or safety of the equipment.

5. Typical Applications

- **Household Appliance Manufacturers** — IPX3 rain spray testing for enclosures, control panels, and external components
- **Lighting and Luminaire Producers** — Waterproof performance verification for outdoor and architectural lighting products
- **Electrical Equipment Manufacturers** — Ingress protection testing for industrial control cabinets and power distribution equipment
- **Third-Party Certification Laboratories** — IEC 60529 IPX3 formal compliance testing and type approval support
- **Quality Control and R&D Departments** — Rain spray validation during new product development and batch inspection

6. Compliance & Manufacturer

This equipment is engineered and manufactured in strict accordance with IEC 60529 for oscillating tube rain spray testing. It provides a standardized and reliable platform for evaluating the protection of enclosures against spraying water.

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 flow rate, oscillation angle, and turntable speed is recommended.

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Specialist in Precision Environmental, Ingress Protection & Reliability Test Systems

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