

KP-1023

ISO 16750-4:2023 | Clause 5.4.2

ISO 16750-4 Splash Water Test Chamber

Cold water shock testing for automotive electrical and electronic systems and components exposed to sudden splash on a heated DUT.

**0 to +4°C**

Cold-water temperature

3 s

Splash duration

100

Typical test cycles

150 kg

Maximum stated DUT load

Purpose

The KP-1023 reproduces the rapid thermal shock that can occur when cold road water suddenly contacts a hot automotive component. The system combines DUT heating, low-temperature water preparation, controlled splash application and programmable cycle control in one laboratory platform.

Product Overview

ISO 16750-4 cold-water shock testing addresses a specific automotive environmental condition: a component becomes hot during vehicle operation and is then suddenly exposed to cold road water. This rapid temperature change can create different rates of contraction between housings, seals, connectors, potting materials and internal assemblies.

Possible failure mechanisms include mechanical cracking, seal movement, loss of tightness, water ingress and electrical or functional degradation. The test is particularly relevant to electrical and electronic components installed in locations exposed to road splash.

The KP-1023 provides a controlled environment for reproducing this condition. The DUT can be heated to the specified Tmax, held until the required thermal condition is reached, and then exposed to a repeatable cold-water splash. Test cycles and sequence timing are controlled through the PLC and touchscreen interface.

Important distinction. This is a cold-water thermal-shock test system, not a conventional IP-code water-ingress tester. Standards such as ISO 20653 or IEC 60529 address different water-ingress test purposes.

Typical Test Sequence

1

Mount DUT

Representative vehicle installation orientation

2

Heat to Tmax

Hold until required thermal condition is reached

3

Cold-Water Splash

0 to +4°C; 3 L to 4 L in 3 s

4

Repeat

Normally 100 cycles, then evaluate the DUT

What the Test Can Reveal

- Cracking of housings or encapsulation materials
- Seal movement or damage
- Deterioration of bonded interfaces
- Loss of enclosure tightness
- Water penetration through stressed joints
- Connector or cable-entry leakage
- Electrical malfunction after repeated thermal shock

Typical Users

- Automotive OEM laboratories
- Tier 1 and Tier 2 suppliers
- Automotive electronics manufacturers
- EV component manufacturers
- Third-party testing laboratories
- R&D; and reliability teams
- QA and verification laboratories



Angled product view



Front view



Left-side view

Technical Specifications

Equipment Configuration

Parameter	Specification
Model	KP-1023
Internal Working Space	1300 × 900 × 900 mm (D × W × H)
Maximum DUT Dimensions	700 × 700 × 500 mm
Maximum Load Capacity	150 kg
Heating Temperature Range	RT +10°C to 200°C
Temperature Fluctuation	±2°C
Temperature Deviation	±2°C
Test Port	Φ100 mm
Control System	PLC electric control
Operation Interface	7-inch color touchscreen
Test Mode	Splash water / cold-water shock test
Cycle Setting	Default 100 cycles; programmable 0-9999
Power Supply	AC 380 V, 50 Hz, three-phase supply*

* Historical product documentation contains inconsistent information regarding total installed power. The required electrical capacity should be confirmed for the actual KP-1023 configuration before quotation or laboratory installation.

Splash Water Test Parameters

Parameter	Test Condition
Referenced Method	ISO 16750-4:2023, Clause 5.4.2
Water Temperature	0°C to +4°C
Splash Duration	3 s
Water Delivery	3 L to 4 L during the splash
Nozzle-to-DUT Distance	325 ±25 mm
Splash Coverage	Arranged to cover the relevant DUT width
Standard Test Cycles	100
DUT Orientation	Representative of installation in the vehicle
DUT Conditioning	At specified Tmax according to the applicable test plan

The test-method conditions above are distinct from the physical capability of the chamber. The applicable Tmax and DUT operating mode are determined by the component specification rather than by one universal ISO 16750-4 temperature.

Test Chamber & Control Design Typical Test Objects

- SUS316 stainless-steel inner chamber for the wet test environment
- Funnel-type chamber bottom for water collection and drainage
- PLC-based control with 7-inch color touchscreen
- Programmable cycle count and sequence control
- DUT heating capability up to 200°C
- Integrated low-temperature water preparation
- Observation window for monitoring the DUT
- Ø100 mm access port for DUT power or signal cables
- Configurable DUT positioning and splash orientation
- Electronic control units and controllers
- Automotive sensors
- Sealed electronic enclosures
- Connector and cable-entry assemblies
- Lighting electronic modules
- Motor and actuator electronics
- Power-electronics modules
- Battery-system electronic components
- Chassis- or underbody-mounted electronics

Selection note. Not every automotive component automatically requires this test. Vehicle mounting location, environmental exposure, DUT size, mass, fixture, cables and required splash direction should be reviewed before equipment configuration is finalized.

What to Confirm Before Quotation

Standard

applicable edition and clause

DUT

type, dimensions and weight

Temperature

required Tmax

Mounting

orientation and splash direction

Interfaces

powered-DUT, cable or signal requirements

Special needs

test fluid, calibration or documentation

KingPo can then confirm the chamber suitability, fixture and splash arrangement, electrical interface and documentation scope before quotation.

Calibration & Documentation

Parameters that directly influence the test should be verified according to the laboratory's quality system and measurement requirements. Relevant items may include chamber temperature, cold-water temperature, splash quantity or flow, splash duration, nozzle positioning and cycle timing.

Available project documentation can include the operation manual, electrical documentation, equipment inspection records and applicable calibration documents. Third-party or accredited calibration requirements should be specified before quotation.

Technical Inquiry

For configuration review, send the applicable standard edition, DUT drawing or dimensions, DUT weight, required Tmax and splash orientation.

KingPo Technology Development Limited

Factory Address: No.9 University Road, Songshan Lake, Dongguan 523770, China

Tel: +86-769-81627526 | Email: sales@kingpo.hk | Website: www.dgkingpo.com

Standard reference: for current projects confirm ISO 16750-4:2023, Clause 5.4.2. Earlier KingPo documents may cite Clause 4.2 or older figure numbering.