

High Current Arc Ignition Tester

UL 746A HAI Test Apparatus



Standards: UL 746A (High Current Arc Ignition); related: IEC 60950-1, IEC 60947-1.

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1. Product Overview

The KingPo High Current Arc Ignition Tester is a precision test apparatus designed to evaluate the high current arc ignition resistance of insulating materials. It performs repeated high current arc strikes on material specimens to determine their resistance to ignition under simulated arc fault conditions, as specified in UL 746A (HAI test).

This tester is essential for material manufacturers, electrical equipment developers, and testing laboratories to assess the fire safety performance of insulating materials used in electrical and electronic products where arc fault conditions may occur.

2. Applicable Standards

- **UL 746A** — Polymeric Materials – Short Term Property Evaluations (High Current Arc Ignition Test)
- **IEC 60950-1 / BS EN 60950-1** — Information technology equipment – Safety
- **IEC 60947-1** — Low-voltage switchgear and controlgear
- **Other related standards** — BS 7002, IEC 730-1, etc.

3. Test Purpose

The purpose of the High Current Arc Ignition (HAI) test is to evaluate the resistance of insulating materials to ignition when subjected to high current electrical arcs that may occur under fault conditions in electrical equipment. Materials that can withstand a greater number of arc strikes without igniting demonstrate superior arc ignition resistance and better fire safety performance.

This test is critical for qualifying insulating materials used in electrical enclosures, connectors, and components where arc faults could lead to fire hazards.

4. Key Features

- **Precise High Current Arc Generation** — Generates stable $33A \pm 5A$ high current arcs with controlled electrode movement.
- **Programmable Arc Cycles** — Arc strike counting from 0 to 9999 strikes with automatic control.
- **Standard Electrode System** — Copper static electrode ($\Phi 3.5$ mm) and stainless steel moving electrode ($\Phi 3.0$ mm) with precise geometry.
- **Controlled Arc Parameters** — Arc strike speed of 40 times/min and electrode separation velocity of 254 ± 25 mm/s.
- **Optional Liquid Dropping Function** — Adjustable dropping interval, height, and drop size for enhanced testing scenarios.
- **Safety Enclosed Chamber** — Enclosed test chamber with observation window for operator protection and monitoring.
- **Digital Control System** — User-friendly interface with preset arc counting and parameter programming.

5. Technical Specifications

Parameter	Specification	Notes
Applicable Standards	UL 746A (HAI); IEC 60950-1, IEC 60947-1, etc.	High current arc ignition testing
Arc Strike Current	$33A \pm 5A$	High current arc generation
Arc Strike Speed	40 times/min	Arc application rate
Electrode Separation Velocity	254 ± 25 mm/s	Controlled electrode movement
Arc Strike Times	0–9999 (preset)	Programmable arc cycles
Static Electrode	Copper, $\Phi 3.5$ mm, top bevel angle 30°	Fixed electrode
Moving Electrode	Stainless steel, $\Phi 3.0$ mm, top cone angle 60°	Moving electrode
Electrode Included Angle	45° with horizontal level	Standard configuration

Optional Liquid Dropping	Interval 30±5s, Height 35±5mm, 45–50 drops/cm ³	Adjustable parameters
Control System	Digital control with arc counting	Preset and automatic operation
Safety Features	Enclosed chamber with observation window	Operator protection
Power Supply	AC 220V / 50Hz, 1kVA	Subject to final configuration

6. Testing Principle

The high current arc ignition test assesses the resistance of insulating materials to ignition when exposed to electrical arcs that may occur under fault conditions. During the test, two electrodes are placed in contact with the specimen. A high current arc is initiated as the moving electrode separates from the static electrode at a controlled speed. The test applies a predetermined number of arcs to the material and evaluates whether ignition occurs.

Materials capable of withstanding a greater number of arc strikes without igniting exhibit superior high current arc ignition resistance. This characteristic is critical for evaluating the fire safety performance of insulating materials used in electrical and electronic equipment.

7. Typical Test Procedure

1. Prepare and position the test specimen (clean, flat, correctly placed between electrodes).
2. Set the required number of arc strikes and other test parameters.
3. Close the chamber and initiate the automatic test sequence.
4. The system applies repeated high current arcs at the specified rate.
5. Observe and record whether ignition occurs within the programmed number of arcs.
6. Document results, clean electrodes if needed, and prepare for the next test.

8. Applications

- Insulating Material Manufacturers — High current arc ignition performance evaluation
- Electrical Equipment Manufacturers — Material safety qualification for components
- Testing Laboratories — UL 746A and related HAI compliance testing
- Quality Assurance Departments — Routine material inspection and verification
- Research Institutions — Development of arc-resistant insulating materials

9. Standard Configuration

The standard system typically includes:

- Dual electrode system (copper static + stainless steel moving electrodes with specified geometry)
- Enclosed test chamber with observation window
- Digital control system for arc counting and parameter programming
- Power supply and basic safety features

Note: Optional liquid dropping function and other customizations available upon request.

10. Ordering Information

To provide the most suitable configuration, please confirm the following when requesting a quotation:

- Whether the optional liquid dropping function is required
- Any specific customization needs for electrodes or chamber
- Need for third-party calibration or extended documentation
- Power supply requirements and any integration needs

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