

IEC 60950-1 Annex A.3 Hot Flaming Oil Tester

Fire Enclosure Protection Test Apparatus



Standards: IEC 60950-1 Annex A.3 (Fire Enclosure Protection Test)

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Product Overview

The KingPo IEC 60950-1 Annex A.3 Hot Flaming Oil Tester is a specialized apparatus designed to evaluate the fire enclosure protection performance of electrical and electronic equipment. It simulates burning oil or hot liquid leakage through enclosure openings to verify whether the fire enclosure can prevent ignition of materials placed below.

The test involves pouring a controlled amount of burning oil from a specified height onto or through the enclosure opening, with cheesecloth used as an ignition indicator. This apparatus is suitable for manufacturers, testing laboratories, and certification bodies assessing fire enclosure protection for power supplies, servers, network equipment, and communication devices.

Key Advantages

- ### Designed for IEC 60950-1 Annex A.3 Test Requirements

Engineering: Accurately replicates the hot flaming oil pouring test conditions specified in IEC 60950-1 Annex A.3 for fire enclosure protection evaluation.

Benefit: Enables reliable and standardized verification of whether burning oil, flame, or hot particles passing through the enclosure can ignite materials below, supporting product safety certification.

- ### Controlled & Repeatable Oil Pouring System

Engineering: Precisely controlled oil volume (10 mL), pouring rate (~1 mL/s), height (100 mm), and timing with presettable parameters for burning time and pouring time.

Benefit: Ensures highly repeatable and consistent test conditions, reducing variability and improving the reliability of fire enclosure performance evaluation.

- ### Safe Enclosed Test Chamber Design

Engineering: Fully enclosed test area with observation capability, black background for improved flame visibility, and comprehensive safety protection measures for operators and the laboratory.

Benefit: Enhances laboratory safety, contains flames and oil residue, and allows clear visual monitoring of ignition behavior during testing.

- ### Clear Ignition Indicator System

Engineering: Uses standardized bleached cheesecloth (approx. 40 g/m²) positioned 50 mm below the sample as the ignition indicator, with clear pass/fail criteria based on whether the cloth ignites.

Benefit: Provides an objective, visual, and easily documented method to determine whether the fire enclosure effectively prevents external ignition from burning oil leakage.

- ### User-Friendly & Safe Operation

Engineering: Presettable test parameters, controlled pouring mechanism, and safety-focused design with enclosed chamber and protection measures.

Benefit: Simplifies test setup and execution while prioritizing operator safety, making it suitable for both R&D and routine quality control testing.

Technical Specifications

3.1 Performance Parameters

Parameter	Specification	Remark / Notes
Applicable Standard	IEC 60950-1 Annex A.3	Fire enclosure protection test
Test Method	Hot flaming oil pouring test	Simulates burning oil leakage through enclosure
Oil Volume per Test	10 mL	Typical test quantity
Pouring Height	100 mm	From pouring point to test reference position
Pouring Rate	Approx. 1 mL/s	Controlled pouring speed
Burning Time	60 s (presettable 1–99999 s)	Hot flaming oil burning duration

Pouring Time	10 s (presettable 1–99999 s)	Controlled oil discharge duration
Indicator Material	Bleached cheesecloth ~40 g/m ²	Ignition indicator placed 50 mm below sample
Test Oil Specification	Calorific value ~38 MJ/L; density 0.845–0.865 g/mL; flash point 43.5–93.5°C	Per applicable standard requirements

3.2 Equipment & Safety

Parameter	Specification	Remark / Notes
Test Chamber	Enclosed with observation capability	Safe containment and visual monitoring
Test Area Background	Black background	Improves observation of flame and ignition
Safety Design	Enclosed chamber with protection measures	Operator and laboratory safety
Equipment Size (approx.)	1150 × 750 × 1350 mm	Subject to final configuration
Equipment Weight (approx.)	150 kg	Subject to final configuration
Power Supply	Customized (common: AC 220V / 50Hz)	Per local requirements

Testing Principle

The test simulates a fire enclosure failure scenario where combustible liquid inside equipment ignites due to overheating, component failure, or abnormal conditions. A controlled amount of burning oil is poured from 100 mm height onto or through enclosure openings. Cheesecloth (40 g/m² density) is placed 50 mm below the sample as an ignition indicator.

The test evaluates whether burning oil, flame, or hot particles passing through the enclosure ignite the cheesecloth. If the indicator does not ignite, the enclosure demonstrates effective protection against external fire spread from burning oil leakage.

Pass criterion: The cheesecloth does not ignite during or after the test.

Best Practices & Common Error Mitigation

1. Use the specified test oil and confirm the correct volume (10 mL) before each test.
2. Maintain consistent pouring rate (~1 mL/s) and height (100 mm).
3. Position the enclosure sample and cheesecloth correctly (50 mm below the sample).
4. Ensure the oil is burning consistently before pouring.
5. Observe and record the cheesecloth condition (ignites, chars, melts, or unaffected).
6. Clean the chamber of oil residue, soot, and by-products after each test.
7. Follow IEC 60950-1 Annex A.3 procedure and all safety precautions.

Typical Applications

- Electrical and electronic equipment manufacturers — Fire enclosure protection verification
- Power supply, server, and network equipment manufacturers — Compliance testing
- Testing laboratories and certification bodies — Fire safety evaluation services
- R&D teams — Development of fire-resistant enclosure designs
- Quality assurance teams — Routine verification of fire enclosure performance

Supply Options & Support

Customization available for chamber structure, pouring mechanism, power supply, and safety enclosure design. Factory verification of oil pouring system and measurement devices. Third-party calibration support available upon request.

Compliance & Manufacturer

This equipment is designed and manufactured in strict accordance with IEC 60950-1 Annex A.3 for fire enclosure protection testing using the hot flaming oil method. It supports compliance verification for electrical and electronic equipment requiring fire enclosure evaluation.

Manufactured under ISO 9001, ISO 14001, and ISO 45001 certified management systems. CE, RoHS, PSE, and SGS documentation can be provided upon request according to the applicable equipment configuration.

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