

Needle Flame Test Apparatus

IEC 60695-11-5 Needle Flame Tester

Model: KP-FT401

The KP-FT401 Needle Flame Test Apparatus is designed for evaluating ignition hazard and small-flame fire risk of electrical and electronic components under controlled test conditions. It supports selected test methods related to IEC 60695-11-5, with reference to IEC 60335-1 and IEC 62368-1.

The system integrates precision needle flame generation, programmable ignition timing control, high-accuracy temperature monitoring, automatic afterflame recording and chamber ventilation into one enclosed needle flame testing platform.



KP-FT401 Needle Flame Test Apparatus

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|------------------------|---|
| Model | KP-FT401 |
| Standards | IEC 60695-11-5; IEC 60335-1; IEC 62368-1 |
| Test Objects | Electrical and electronic components, enclosures, insulation materials, connectors |
| Main Test Items | Needle flame ignition, afterflame duration, flame propagation behavior |

Product Overview

The KP-FT401 is intended for laboratories that need controlled needle flame application, calibrated flame height, programmable test timing and repeatable observation of afterflame behavior. It is suitable for product development, material screening, quality control and IEC 60695-11-5 related compliance testing.

Typical test objects include electrical and electronic enclosures, insulation materials, connectors, cable assemblies, terminal blocks and internal plastic components used in household appliance and ICT equipment applications.

Key Advantages

| Advantage | Engineering Design | Customer Benefit |
|---------------------------------------|--|--|
| Controlled Needle Flame Source | Stainless steel needle burner with 12 mm \pm 1 mm calibrated flame height and 0° / 45° angle adjustment. | Supports repeatable small-flame application for IEC 60695-11-5 related tests. |
| Temperature Verification | K-type Φ 0.5 mm thermocouple verifies 100 °C to 700 °C rise within 23.5 s \pm 1 s. | Helps confirm the thermal performance of the flame source before formal testing. |
| Programmable Timing | Ignition time is adjustable from 0-9999 s with \pm 0.1 s control; afterflame time is automatically recorded. | Reduces manual timing variation and improves consistency between test runs. |
| Enclosed Test Chamber | Black background chamber with independent ventilation for flame observation and exhaust management. | Improves visual assessment and supports safer laboratory operation. |
| Touch Screen Operation | Touch screen interface with independent electrical control and one-touch automatic operation. | Simplifies setup for R&D, QC and certification support workflows. |

Technical Specifications

General Configuration

| Item | Specification | Function |
|---------------------|---|--|
| Model | KP-FT401 | Needle flame test apparatus for IEC 60695-11-5 related testing |
| Product Type | Needle Flame Test Apparatus | Small-flame ignition hazard evaluation |
| Related Standards | IEC 60695-11-5; IEC 60335-1; IEC 62368-1 | Supports electrical and electronic product safety testing |
| Control System | Touch screen + independent electrical control | Parameter setting and automatic test execution |
| Operation Mode | One-touch automatic operation | Reduces manual operation steps |
| Test Chamber Volume | ≥ 0.5 m ³ | Provides enclosed testing space |
| Test Background | Black background | Improves flame and specimen observation |
| Ventilation | Independent exhaust system | Supports exhaust management during combustion testing |

Flame and Measurement Parameters

| Item | Specification | Function |
|-----------------------|--------------------------------------|---|
| Burner Type | Needle-shaped stainless steel burner | Generates the controlled needle flame source |
| Needle Diameter | Φ0.5-0.9 mm | Supports standardized small-flame application |
| Burner Height | > 35 mm | Meets needle burner construction requirement |
| Flame Angle | 0° / 45° adjustable | Supports different flame application directions |
| Flame Height | 12 mm ± 1 mm | Defines calibrated test flame condition |
| Ignition Time | 0-9999 s ±0.1 s adjustable | Controls flame exposure duration |
| Typical Ignition Time | 30 s | Common setting for standard test procedures |
| Afterflame Time | 0-9999.9 s automatic recording | Records burning duration after flame removal |
| Gas Type | Butane or propane, purity >95% | Provides stable combustion source |
| Temperature Range | 0-1000 °C | Supports flame temperature verification |
| Heating Requirement | 100 °C to 700 °C within 23.5 s ± 1 s | Confirms thermal performance of flame source |
| Thermocouple | K-type Φ0.5 mm, accuracy ±0.05% | Measures flame temperature response |

Testing Principle

The needle flame test applies a controlled small flame to a specimen for a specified duration to evaluate ignition behavior and flame persistence. A stainless steel needle burner generates a stable flame at the required height of $12\text{ mm} \pm 1\text{ mm}$. The flame is applied to the specimen at a defined angle for the set ignition time, and afterflame duration is recorded after flame removal.

The evaluation focuses on whether the specimen ignites, whether flame spread occurs and how long the specimen continues to burn after the flame source is removed. Temperature monitoring with a K-type thermocouple helps confirm that the flame source meets the required thermal response before testing.

Test Workflow

1. Prepare the specimen and position it correctly in the test chamber.
2. Confirm gas purity (>95%), burner condition and ventilation status.
3. Set the flame angle and ignition time through the touch screen interface.
4. Verify flame height calibration at $12\text{ mm} \pm 1\text{ mm}$ using the measurement fixture.
5. Start the automatic test sequence and observe ignition behavior.
6. Record afterflame duration and specimen condition after flame removal.
7. Document the result according to the laboratory procedure and applicable standard.

Operation Notes

- Verify burner stability and calibrated flame height before each test series.
- Use butane or propane with purity higher than 95% for stable combustion.
- Keep the specimen position and flame application area clear and repeatable.
- Use the correct ignition time and flame angle according to the applicable test method.
- Maintain adequate ventilation and stop the test if abnormal combustion or equipment issues occur.
- Regularly inspect the burner needle, thermocouple, timing function and flame height fixture.

Typical Applications

Typical Test Objects

- Electrical and electronic enclosures
- Insulation materials and plastic parts
- Connectors and terminal blocks
- Cable assemblies and wire connection areas
- Household appliance and ICT equipment components

Typical Users

- Electrical safety testing laboratories
- Household appliance manufacturers
- ICT and AV equipment manufacturers
- Component and material suppliers
- Certification bodies, inspection organizations and QC departments

Compliance and Manufacturer Support

The KP-FT401 supports selected test methods related to IEC 60695-11-5. For formal testing programs, users should confirm the applicable standard version, specimen preparation requirements, test clause and laboratory quality procedure before implementation.

Before delivery, KingPo performs factory verification of key functions including burner performance, flame height control, temperature measurement, timing system, automatic test execution and ventilation operation. Verification documentation can be discussed according to customer laboratory quality system requirements.

Information Required for Quotation

- Main test objects and application field
- Applicable standard and test method
- Required flame angle and ignition time
- Whether temperature rise verification is required
- Power supply and laboratory space requirements
- Required documentation or test record format
- Any customization for special specimen types

Manufacturer Information

| Item | Details |
|-----------------|--|
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Referenced standards: IEC 60695-11-5 - Fire hazard testing - Part 11-5: Test flames - Needle-flame test method; IEC 60335-1 - Household and similar electrical appliances - Safety; IEC 62368-1 - Audio/video, information and communication technology equipment - Safety requirements.