UL 94 Chamber

firetesting technology

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UL 94:
Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

The UL 94 tests are conducted on plastic materials to measure flammability characteristics, giving a preliminary indication of their suitability for a particular application.

FTT provides the complete solution for reliable testing for all UL 94 classifications in a robust, easy to use instrument. The tests determine 12 flame classifications of materials for specific applications:

- Six of the classifications relate to materials commonly used in manufacturing enclosures, structural parts and insulators found in consumer electronic products (5VA, 5VB, V-0, V-1, V-2, HB).
- Three of the remaining six classifications relate to low-density foam materials commonly used in fabricating speaker grills and sound-deadening material (HBF, HF-1 and HF-2).
- The last three classifications are assigned to very thin films, generally not capable of supporting themselves in a horizontal position (VTM-0, VTM-1, and VTM-2). These are usually assigned to substrates on flexible printed circuit boards.

These tests determine the material's tendency either to extinguish or to spread the flame once the specimen has been ignited.

FTT UL 94 Test Apparatus

The apparatus is supplied as a complete system incorporating all the features necessary for ease of use and safety.

It conforms to all five UL 94 horizontal and vertical Bunsen burner tests and associated international standards. These are:

- Horizontal Burning Test; UL 94 HB (ASTM D635, IEC 60695-11-10, IEC 60707, ISO 1210).
- Vertical Burning Test: UL 94 V-0, V-1, or V-2 (ASTM D3801, IEC 60695-11-10, IEC 60707, ISO 1210).
- 500W (125mm) Vertical Burning Test: 5VA or 5VB (ASTM D5048, IEC 60695-11-20, IEC 60707, ISO 9772).
- Thin Material Vertical Burning Test: VTM-0, VTM-1, or VTM-2 (ASTM D4804, ISO 9773).
- Horizontal Burning Foamed Material Test: HBF, HF-1 or HF-2 (ASTM D4986, ISO 9772).
- Burners (ASTM D5025, ASTM D5207, ISO 10093, ISO 10351)

Features and Benefits

- A bench mounted draft free combustion chamber with a large inside volume of 1.0m^3 and exhaust fan to enable simple evacuation of combustion products.
- Large sliding window made from heat resistant ceramic glass giving a generous view of the specimen during a test. An interior light is also fitted.
- Specimen holders
- Fully adjustable horizontal and vertical specimen supports.

- A burner in compliance with ASTM D5025, with simple angle adjustment (0°, 20°, 45°) and precision gas control system including gas flow meters, pressure regulator and pressure gauge (manometer).
- Two access ports enabling easy entry to the chamber for movement of the burner and specimen.
- A burner wing tip.
- Three digital test duration timers for accurate but simplified operation with remote handset.

TECHNICAL SPECIFICATIONS	
Test Chamber	
Measuring principle	Flammability of plastic materials subject to direct impingement of flame
External dimensions	1.47m (L) × 0.74m (D) × 1.3m (H)
Internal dimensions	1.4m (L) × 0.6m (D) × 1.2m (H)
Internal volume	$1m^3$
Exhaust	Self-starting industrial frame size extraction fan with over temperature/current protection. Low noise metal frame and metal impeller meet UL94V-0. Outer diameter of exhaust chimney = 100mm Exhaust flow rate 19 l/s
Interior light	610mm fluorescent, 240VAC 50/60Hz or 110V 50/60Hz (specify at time of order)
Digital timers (3pcs)	8 digit battery powered panel mount programmable timer with 10 timer ranges and 9mm high reflective LCD display

Burner and Gas Control System	
Burner	A burner in compliance with ASTM D5025
Burner wing tip	Dimensions of slit 48 ± 1 mm in length by 1.3 ± 0.05 mm in width. Used for the test procedure in Horizontal Burning Foamed Material Test.
Burner mounting fixtures	Simple angle adjustment (0°, 20°, 45° available) from the vertical axis
Gas flow meter	Flow adjustment valves and flowmeters, 0.1-1.7 ℓ/min & 10-300 cm^3/min methane
Manometer	0-150 mmWC
Safety precaution	Flash back arrestor

Easy entry to the chamber via one of the two access ports

Specimen Holders and Support	
Retort stand tripod base (2pcs)	180mm from rod to centre of foot. Cast iron with central hole tapped for retort rod. Blue acrylic gloss finish with rubber feet
Retort rod (2pcs)	600mm stainless steel retort rod
Swivel post holder	Two Q-clamp rod holders with centre swivel allows tilting of clamp at any angle in parallel planes. Outside adjustment screw allows close proximity between items.
Three prong clamp (medium) (2pcs)	Three-prong clamps for holding circular or irregular objects. Dual adjustment allows both jaws to be moved to the object without having to move the entire clamp and enables even weight distribution around the rod axis. Non-corrosive nickel finish with slip on vinyl and fibreglass finger covers. Maximum jaw capacity = 57mm.
Three prong clamp	As per three prong clamp (medium) but maximum (small) (2pcs) jaw capacity = 25mm
Boss head (3pcs)	Diecast, nickel-plated with heavy nickel-plated brass thumb head clamping screws.
Flexible specimen support	Used in the Horizontal Burning Test; HB
Wire gauze	125mm × 125mm, having 20 openings per 25mm, made with 0.43 ± 0.03mm diameter iron wire, used in the Horizontal Burning Test, HB
Foam support stand	Used in the Horizontal Burning Foamed Material Test: HBF, HF-1, or HF-2
Foamed sample	Stainless steel, 215mm long × 75mm wide with 13mm support gauze of its length bent to form a right angle at one end
Specimen mandrel form	12.7 ± 0.5mm diameter rod, used in Thin Burning Material Test

Due to **FTT**'s continuous development policy, specification could change without prior notice

SERVICES	
Gas Supply	A supply of technical grade methane gas, (min 98% pure), with a regulator for uniform gas flow. The connection to the chamber is a 6mm diameter hose barb.
Extraction	The extraction from the chamber must be connected to a suitable exhaust point, e.g. fume cupboard.
Power	Electrical power providing, 230VAC 50/60Hz, 1A or 110VAC 50/60Hz, 2A must be available at the test apparatus. (Check services label)
Conditioning	Specimens are preconditioned in accordance with ASTM D 618 (ISO 921) at 23 ± 2°C and 50% relative humidity for a minimum of 48 hours. Specimens for certain tests are to be preconditioned in an air-circulating oven for 168 hours at 70 ± 1°C and then cooled in the desiccator for at least 4 hours at room temperature, prior to testing. Once removed from the desiccator, specimens shall be tested within 30 minutes. All specimens are to be tested in a laboratory atmosphere of 15-35°C and 45-75% relative humidity. Cotton shall be conditioned in the desiccator for at least 24 hours prior to use. Once removed from the desiccator, the cotton shall be used within 30 minutes.
Test Accessories	Cotton – a supply of absorbent cotton wool, (100% cotton). Adhesive tape.

Unrivalled Experience in Design and Manufacturing

FTT's site in East Grinstead, is home to the largest group of fire scientists and instrumentation design engineers working on fire testing instrumentation, and is at the heart of our design and manufacturing. For almost 30 years **FTT** has provided the highest quality instruments and service for fire testing and research professionals worldwide, directly and through its extensive global sales and support network.

Quality

- World-class manufacturing in accordance with multiple international and national standards, including: EN, ISO & ASTM
- ISO 14001, ISO 9001 certified

Integrity

- A dedicated team passionate about fire testing instrumentation and continuous product improvement
- Delivering reliable, robust and easy-to-use instruments for the past 30 years

Excellence

- A world-class team made up of qualified fire scientists, mechanical, electrical and electronic fire instrument design engineers and production, installation and maintenance engineers

Global

- World-wide distribution network for global sales, installations, training, maintenance and technical support
- Leading global supplier of the Cone Calorimeter, Large Scale Calorimeter, NBS Smoke Chamber and Oxygen Index