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Flammability Test Apparatus As per UL - 94 (Vertical / Horizontal Burning) PLC / HMI Control Model Model SSI 549 ULMH

CE An ISO 9001:2008 Company
GMP compliant

The UL test serves as a preliminary indication of a plastics material acceptability for use as part of a device or appliance with respect to its flammability. This test uses specimen which is held at one end in the vertical position (hanging) . A burner flame is applied to the free end of the specimen for two intervals separated by the time it takes for flaming combustion to cease after the first application. The following are recorded for each specimen:

- Duration of flaming combustion after the first burner flame application.
- Duration of flaming combustion after second burner flame application.
- Duration of glowing combustion after second burner flame application.
- Whether or not flaming drips ignite cotton placed below specimen.
- Whether or not specimen burns up to holding clamp.

The Instrument consist of the following

- ✚ A Double Walled Chamber for sample burning with front glass door
- ✚ A Burner settable at 0°, 20° and 45° **angle to the vertical** and precise gas control system including gas regulator
- ✚ PLC control Burner Moving system
- ✚ Sample Holding System (adjustable both vertically and horizontally)
- ✚ Digital Timer for flame application
- ✚ Digital timer for flame observation after flame is removed.
- ✚ Digit timer for Glow observation after the flame is extinguished
- ✚ Exhaust Fan / Light in the chamber



(Actual instrument may differ from the photograph due to regular improvements)

S.S. INSTRUMENTS PVT. LTD.

TRIVENI COMPLEX, E-10-12, JAWAHAR PARK,
LAXMI NAGAR, DELHI 110 092
Ph: +91 (11) 2242 5415, Telefax: +91 (11) 2244 0417,
Email: info@ssinstruments.com, Web Site: www.ssinstruments.com



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Basic Design

- ✚ As per UL 94
- ✚ Inner Chamber Stainless Steel 1m x 1m x 1m (LBH), Volume 1 m³
- ✚ Burner 100 mm length 9.5 mm ID
- ✚ Burner Movement using pneumatic / motor
- ✚ Sample movement to adjust its position with respect to burner

PLC Control

- ✚ **Programs for each test as per UL (HB / V0, V1, V2 / 5VA, 5VB)**
- ✚ Burner Angle / Burn Time preset as per UL
- ✚ Up to 5 Samples can be tested in V5A

Operations

- ✚ Select the test to be performed on the sample
- ✚ Input the flame and flame away time (as per standard)
- ✚ The PLC automatically set the burner angle as per the test requirement.
- ✚ Adjust the sample as per burner position taking in account the position given in the standard.
- ✚ Start the test.
- ✚ If more than one sample needs to be tested, the HMI prompts the user to put second sample.
- ✚ After required no of cycles, the burner is automatically shut off with a beep
- ✚ The Timer for After Flame is switched On automatically.
- ✚ After user Hold this timer, Glow timer is switched On.

Results

- ✚ Results displayed after considering all the parameters as per UL standard
- ✚ In Test where 5 samples are to be considered, the results are summarized and shown after considering all the five samples.
- ✚ Result page directly gives the sample classification as per UL standard



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Flammability Test Apparatus

Input Test Type

Horizontal Burning HB

Vertical Burning V0, V1 and V2

Vertical Burning 5VA and 5VB

Thin Material Vertical Burning

Plaque Specimen Test

Vertical Burning V0, V1, V2 (Input Screen)

Burner Angle (Presets) 0 Deg

Clamp Time 10 Sec

Press to take burner to test position
Position Sample according to the distance required
as per the standard

Press to Ignite The Burner

Set Fuel Rate at 100ml/min using Needle valve
Set Fuel Back Pressure at 10mm Water
Set Blow Flame Length to 20 mm (No. Yellow Tip)

Start Test

Vertical Burning V0, V1, V2 (Test Screen)

Sample No 1

Press to remove flame, if flame reaches 45 Deg Angle

Press to reapply flame when sample stop burning

Specimen Burned to Clamp Holder

Did the Sample drip on Cotton

Test More Sample

Result Screen

Vertical Burning 5VA, 5VB (Result Screen)

After Flame Test plus afterglow time after 100 Barms application for each individual bar specimen

Cotton Indicator ignited by flaming particle or drops from any bar specimen

Start through choice of any please Specimen

Material Conforms to 5A, 5VA

Vertical Burning 5VA, 5VB (Input Screen)

Burner Angle (Presets) 20 Deg

Clamp Time 5 Sec

Press to take burner to test position
Position Sample according to the distance required
as per the standard

Press to Ignite The Burner

Set Fuel Rate at 100ml/min using Needle valve
Set Fuel Back Pressure at 10mm Water
Set Blow Flame Length to 120 mm (2 second of inner blue cone 40 mm)

Start Test

Vertical Burning V0, V1, V2 (Test Screen)

Sample No 1

Press to remove flame, if flame reaches 45 Deg Angle

Press to reapply flame when sample stop burning

Specimen Burned to Clamp Holder

Did the Sample drip on Cotton

Test More Sample

Result Screen

Vertical Burning 5VA, 5VB (Test Screen)

Sample No 2

Flame Application Timer 1 to 5

No of Flame Applications 1 to 5

After 5 applications Press to Start Timer (1)

Press to start the After Glow timer

Weather flaming particle ignited the cotton

Test More Sample

Result Screen

Vertical Burning V0, V1, V2 (Result Screen)

After Flame Test for each individual specimen (1) or (2)

Start after flame time of any condition (1) = (2) for 5 specimens

After Flame Test Afterglow time for each individual specimen after second flame application (2) = (3)

Afterglow or afterglow of any specimen up to the holding clamp

Cotton Indicator ignited by flaming particle or drops

Material Classification IEC 60695-11-10 IEC 60702 LR 94

Material Conforms to

Horizontal Burning HB (Input Screen)

Burner Angle (Presets) 45 Deg

Clamp Time 30 Sec

Press to take burner to test position
Position Sample according to the distance required
as per the standard

Press to Ignite The Burner

Set Fuel Rate at 100ml/min using Needle valve
Set Fuel Back Pressure at 10mm Water
Set Blow Flame Length to 20 mm

Start Test

Horizontal Burning HB (Result Panel)

Time taken to Reach 100 mm mark

Affected Length

Rate of Burning (Length / Time)

Material Classification IEC 60695-11-10 IEC 60702 LR 94

Do Visible Flame on this sample HB 40 PH-1

There are 4 conditions depending on the length and rate of burning

Horizontal Burning HB (Test Panel)

Clamp Time 30 to 60 Sec

Press to Remove Flame, if Flame reaches 25 mm Mark

Start the timer when Flame reaches 25 mm Mark

Press to Start Timer

Input Affected Length

Rate of Burning (Length / Time)

Result Screen

Vertical Burning 5VA, 5VB (Test Screen)

Sample No 1

Flame Application Timer 1 to 5

No of Flame Applications 1 to 5

After 5 applications Press to Start Timer (1)

Press to start the After Glow timer

Weather flaming particle ignited the cotton

Test More Sample

Result Screen

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