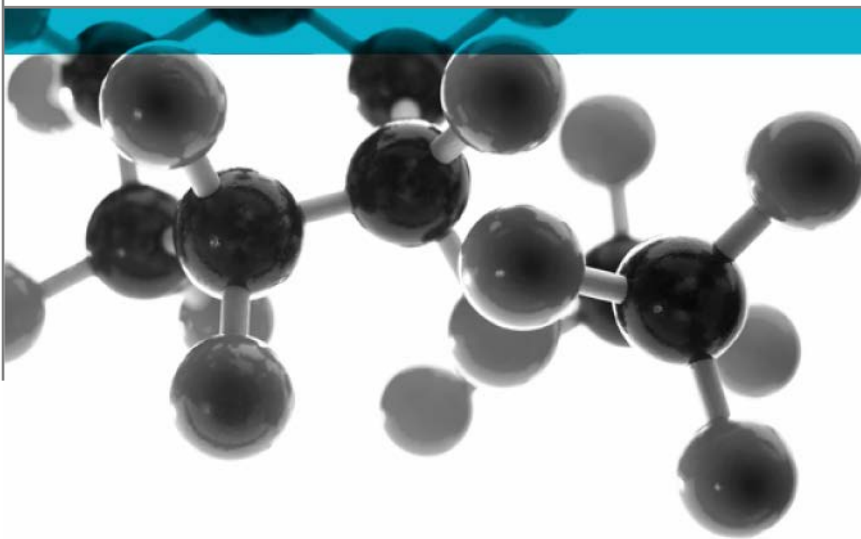


Exova Warringtonfire  
Holmesfield Road  
Warrington  
WA1 2DS  
United Kingdom

T : +44 (0) 1925 655116  
F : +44 (0) 1925 655419  
E : warrington@exova.com  
W: www.exova.com



# UL-94:2014



## Vertical Burning Test For Classifying Materials V-0, V-1 Or V-2

A Report To: Sika Deutschland GmbH

Document Reference: 379191

Date: 15<sup>th</sup> February 2017

Issue: 2

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Testing  
Advising  
Assuring



## Executive Summary

**Objective** To determine the performance of the following material when tested in accordance with Section 8 - "50W (20mm) Vertical Burning Test for Classifying Materials V-0, V-1 or V-2" of UL94:2014 - 'Test for Flammability of Plastics Materials for Parts in Devices and Appliances'.

Generic Description	Product reference	Thickness	Density
Epoxy resin	"Biresin CR132 FR"	4mm	1.21g/cm <sup>3</sup>
<b>Please see page 5 of this test report for the full description of the product tested</b>			


**Test Sponsor** Sika Deutschland GmbH, Stuttgarterstrasse. 139, 72574 Bad Urach, Germany

**Test Results:** When the test results are assessed using the test criteria specified in the Standard, the material, when tested at a nominal thickness of 4mm, is classified as "V-0".

**Date of Test** 8<sup>th</sup> February 2017


**Reason for Revision** This document replaces issue 1 (dated 10<sup>th</sup> February 2017) of the same number which has been withdrawn. The product reference has been amended in this issue 2 report.

## Signatories




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Responsible Officer  
C. Jacques \*  
Technical Officer




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Authorised  
T. Mort \*  
Senior Technical Officer

\* For and on behalf of **Exova Warringtonfire**.

Report Issued: 15<sup>th</sup> February 2017

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## Test Details

<b>Purpose of test</b>	To determine the flammability of a plastics material when it is tested in accordance with the test procedure specified in Section 8 – “50W (20mm) Vertical Burning Test for Classifying Materials V-0, V-1 or V-2” of UL94:2014 - ‘Test for Flammability of Plastics Materials for Parts in Devices and Appliances’.
<b>Scope of test</b>	<p>The requirements of UL94:2014 cover plastics materials and are intended to serve as a preliminary indication of their suitability with respect to flammability for a particular application. The requirements may be applied to other non-metallic materials, if found to be appropriate.</p> <p>The final acceptance of a material by the Underwriter's Laboratories Inc. is dependant upon its use in complete equipment which conforms with the Standards applicable to such equipment.</p>
<b>Fire test study group/EGOLF</b>	Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and has agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.
<b>Instruction to test</b>	The test was conducted on the 8 <sup>th</sup> February 2017 at the request of Sika Deutschland GmbH, the sponsor of the test.
<b>Provision of test specimens</b>	The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure.
<b>Conditioning of specimens</b>	<p>The specimens were received on the 30<sup>th</sup> January 2017.</p> <p>Five specimens were conditioned for at least 48 hours at a temperature of <math>23 \pm 2^{\circ}\text{C}</math> and a relative humidity of <math>50 \pm 5\%</math> prior to testing.</p> <p>Five specimens were conditioned in a circulating air oven for 168 hours at <math>70 \pm 1^{\circ}\text{C}</math> and were then cooled in a desiccator, over anhydrous calcium chloride, for at least four hours at room temperature prior to testing.</p>

## Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description	Epoxy resin system
Product reference	"Biresin CR132 FR"
Name of manufacturer	Sika Deutschland GmbH
Density	1.21g/cm <sup>3</sup> (stated by sponsor) 0.99g/cm <sup>3</sup> (determined by <b>Exova Warringtonfire</b> )
Thickness	4mm (stated by sponsor) 5.18mm (determined by <b>Exova Warringtonfire</b> )
Colour	"Light Blue"
Flame retardant details	The sponsor was unwilling to provide this information
Brief description of manufacturing process	Resin / hardener mixture was cast into a metal mould, cured to make a solid sheet and then cut into specimens

## Test Results

**Test procedure** Each specimen was tested in accordance with the test method specified in the Standard and the following points were observed and recorded for each specimen.

- A - Duration of flaming after first flame application (seconds).
- B - Duration of flaming after second flame application (seconds).
- C - Duration of glowing after second flame application (seconds).
- D - Whether or not the specimens burn up to the holding clamp.
- E - Whether or not the specimens drip flaming particles which ignite cotton swatch.

**Results** The following results were recorded for the ten specimens tested. The letters correspond with those listed under 'Test Procedure'.

**Specimens conditioned at a temperature of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 5\%$ .**

Specimen No.	A	B	C	D	E
1	Nil	Nil	Nil	No	No
2	Nil	Nil	Nil	No	No
3	Nil	1	Nil	No	No
4	Nil	Nil	Nil	No	No
5	Nil	Nil	Nil	No	No

**Specimens conditioned at a temperature of  $70 \pm 1^\circ\text{C}$  for 168 hours.**

Specimen No.	A	B	C	D	E
1	Nil	Nil	Nil	No	No
2	Nil	Nil	Nil	No	No
3	Nil	Nil	Nil	No	No
4	Nil	1	Nil	No	No
5	Nil	Nil	Nil	No	No

**Conclusion** When the test results are assessed using the test criteria specified in the Standard, the material, when tested at a nominal thickness of 4mm, is classified as "V-0".

The classification requirements can be found in Appendix 1.

### Applicability of test results

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

### Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

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## Appendix 1 – Classification Criteria

Criteria conditions	V-0	V-1	V-2
Afterflame time for each specimen $t_1$ or $t_2$	≤10s	≤30s	≤30s
Total afterflame time for any condition set ( $t_1$ plus $t_2$ for the 5 specimens)	≤50s	≤250s	≤250s
Afterflame plus afterglow time for each individual specimen after the second flame application ( $t_2+t_3$ )	≤30s	≤60s	≤60s
Afterflame or afterglow of any specimen up to the holding clamp	No	No	No
Cotton indicator ignited by flaming particles or drops	No	No	Yes

If only one specimen from a set of five specimens does not comply with the requirements, another set of five specimens is to be tested. In the case of the total number of seconds of flaming, an additional set of five specimens is to be tested if the totals are in the range of 51-55 seconds for V-0 and 251-255 seconds for V-1 and V-2. All specimens from this second set shall comply with the appropriate requirements in order for the material in that thickness to be classified V-0, V-1 or V-2.



## Revision History

Issue No : 2	Re-issue Date: 15 <sup>th</sup> February 2017
Revised By: C. Jacques	Approved By: T. Mort
Reason for Revision: This document replaces issue 1 (dated 10 <sup>th</sup> February 2017) of the same number which has been withdrawn. The product reference has been amended in this issue 2 report.	

Issue No :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	