



Test report

from

WARRINGTONFIRE

Marpet-g FS, 3.0mm

by

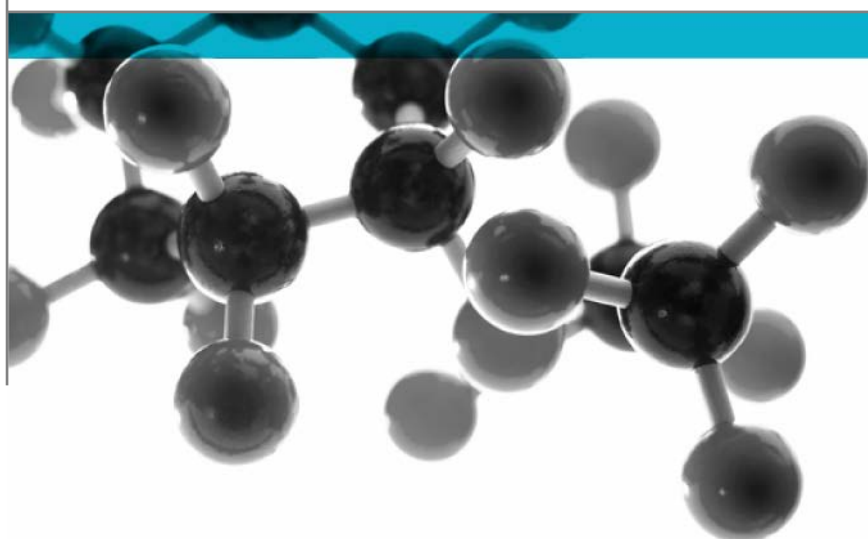
BRETT MARTIN PLASTIC SHEETS

Test by UL 94: 2013, ANSI / UL 94: 2018

Reference: 418593

Classification: V-2

UL 94: 2013 ANSI/UL 94: 2018



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

A Report To: Brett Martin Limited

Document Reference: 418593

Date: 19th September 2019

Issue: 1

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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 UL 94: 2013 ANSI/UL 94: 2018 - 'Test for Flammability of Plastics Materials for Parts in Devices and Appliances'.

Generic Description	Product reference	Thickness	Weight per unit area
Polyethylene terephthalate glycol-modified sheet	"Marpet-g FS"	3mm	3.81kg/m ²
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor

Brett Martin Limited, 24 Roughfort Road, Newtownabbey, Co. Antrim, BT36 4RB, Northern Ireland.

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 3mm, is classified as "V-2".

An uncertainty of measurement estimation has been conducted in relation to the duration of flaming and glowing. The findings are as detailed in Test Results section of this report.

Date of Test

12th September 2019

Signatories


Responsible Officer C. Jacques * Senior Technical Officer


Authorised T. Mort * Senior Technical Officer

* For and on behalf of [Warringtonfire](#).

Report Issued: 19th September 2019

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Test Details

Purpose of test	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 UL 94: 2013 ANSI/UL 94: 2018 - 'Test for Flammability of Plastics Materials for Parts in Devices and Appliances'. This test was conducted under the requirements of our UKAS flexible scope of accreditation.
Scope of test	The requirements of UL 94: 2013 ANSI/UL 94: 2018 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. The final acceptance of a material by the Underwriter's Laboratories Inc. is dependent upon its use in complete equipment which conforms with the Standards applicable to such equipment.
Fire test study group/EGOLF	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.
Instruction to test	The test was conducted on the 12th September 2019 at the request of Brett Martin Limited, the sponsor of the test.
Provision of test specimens	The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens were received on the 4th September 2019. Five specimens were conditioned for at least 48 hours at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ prior to testing. Five specimens were conditioned in a circulating air oven for 168 hours at $70 \pm 1^{\circ}\text{C}$ and were then cooled in a desiccator, over anhydrous calcium chloride, for at least four hours at room temperature prior to testing.

Description of Test Specimens

The description of the system given below has been prepared from information provided by the sponsor of the test. This information has not been independently verified by [Warringtonfire](#). All values quoted are nominal, unless tolerances are given.

Generic type	Polyethylene terephthalate glycol-modified sheet
Product reference	"Marpet-g FS"
Name of manufacturer	Brett Martin Ltd.
Thickness	3mm (stated by sponsor) 2.86mm (determined by Warringtonfire)
Weight per unit area	3.81kg/m ² (stated by sponsor) 3.50kg/m ² (determined by Warringtonfire)
Colour reference	"Clear"
Flame retardant details	See Note 1 below
Brief description of manufacturing process	Extrusion

Note 1: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the product / component.

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 (± 0.6 seconds).
- B - Duration of flaming after second flame application (± 0.8 seconds).
- C - Duration of glowing after second flame application (± 0.8 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'.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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	5	2	Nil	No	Yes
2	6	2	Nil	No	Yes
3	5	2	Nil	No	Yes
4	4	2	Nil	No	Yes
5	4	2	Nil	No	Yes

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

Specimen No.	A	B	C	D	E
1	19	15	Nil	No	Yes
2	2	8	Nil	No	Yes
3	3	8	Nil	No	Yes
4	19	17	Nil	No	Yes
5	5	2	Nil	No	Yes

Conclusion

When the test results are assessed using the test criteria specified in the Standard, the material, when tested at a nominal thickness of 3mm, is classified as “V-2”.

An uncertainty of measurement estimation has been conducted in relation to the duration of flaming and glowing. The findings are as detailed in Test Results section of this report.

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	$\leq 10s$	$\leq 30s$	$\leq 30s$
Total afterflame time for any condition set (t_1 plus t_2 for the 5 specimens)	$\leq 50s$	$\leq 250s$	$\leq 250s$
Afterflame plus afterglow time for each individual specimen after the second flame application (t_2+t_3)	$\leq 30s$	$\leq 60s$	$\leq 60s$
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 :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	

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