BRETT
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Classification report

from

WARRINGTONFIRE

Marpet-g FS, 3.0 – 12.0mm

by

BRETT MARTIN PLASTIC SHEETS

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

Reference: 419419

Classification: V-2

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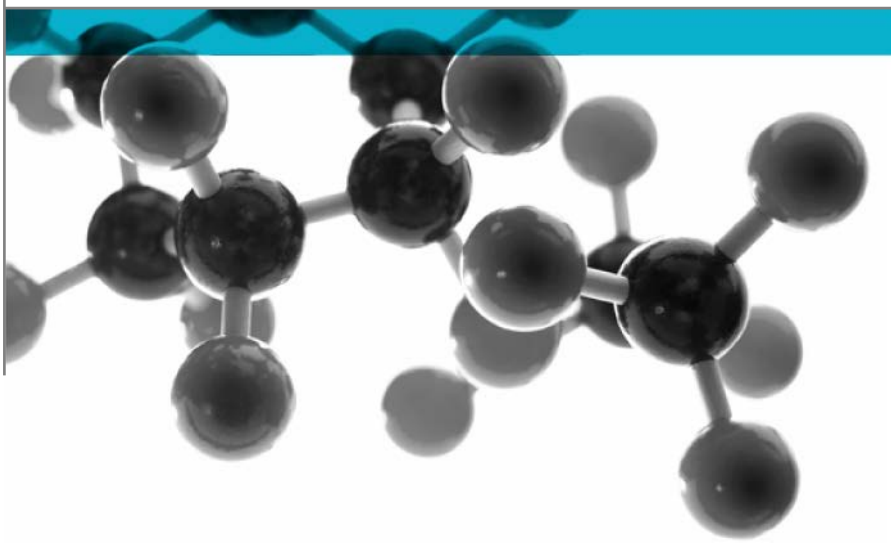
UL 94 V-2 Assessment Report



Assessment of the ability of a range of PETg sheet materials to comply with the requirements of V-2 when tested in accordance with UL94: 2013 ANSI/UP94: 2018

A Report To: Brett Martin Limited

Document Reference: 419419

Date: 1st October 2019

Issue No.: 1

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Executive Summary

Objective

To carry out an assessment of the ability of a range of thicknesses of the following PETg sheet material to comply with the requirements of V-2 classification 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, 6mm, 12mm	3.81kg/m^2, 7.62kg/m^2, 15.24kg/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.

Opinion:

On the basis of the information which has been generated during the test programme which is described in this report, it is the opinion of Warringtonfire that all products within the Brett Martin Limited "Marpet-g FS" thickness range manufactured to the specifications described in this report will achieve a V-2 classification 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'

Date of Test

12th September 2019

Signatories

Responsible Officer T. Mort * Senior Technical Officer	Authorised S. Deeming * Business Unit Head

* For and on behalf of Warringtonfire.

Report Issued: 1st October 2019

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Test Details

Introduction

The sponsor produces and markets a range of PETg sheet materials in a number of different thicknesses and approached Warringtonfire for assistance in conducting a cost effective evaluation of the performance of a number of thicknesses in the range to determine their classification when they are 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', and whether the thickness of the products would have any influence on the results obtained.

Specimens of a product have been tested in accordance with the test methods 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'. The results of the tests are fully reported in the Warringtonfire test reports No's. 418593, 418595 & 418596.

This assessment report has been prepared at the request of the sponsor and relates the results of the tests to the requirements for a V-2 Classification of a material or composite product as defined in UL 94: 2013 ANSI/UL 94: 2018.

This assessment should be read in conjunction with, and not accepted as a substitute for; the Warringtonfire test reports No's. 418593, 418595 & 418596. Those test reports may include additional information which may be relevant to the assessment of the potential fire hazard of the product.

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.

Product Range Considered

The product which was considered during the exercise was a PETg sheet material referenced "Marpet-g FS" available in thicknesses from 3mm to 12mm.

Each thickness of PETg sheet is manufactured utilising the same formulation.

Comprehensive details relating to the composition of the product within the range are given in Appendix 1 of this report.

Information provided by the sponsor in writing prior to this assessment being conducted indicated that the only variable within the product range is the thickness of the material.

Instruction to test

The tests were conducted on the 12th September 2019 at the request of Brett Martin Limited, the sponsor of the test.

Inspection of Available Products and Selection of Products for Test.

The sponsor stated at the time of preparing this report that the "Marpet-g FS" range PETg sheet materials was available in a range of thicknesses. The sponsor requested that three of these thicknesses (3mm, 6mm and 12mm - the extremes and mid-point of the range) be tested to determine what classification would be achieved 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'.

Warringtonfire was not involved in any selection or sampling procedures.

Conditioning of specimens

The specimens were received on the 4th September 2019.

Ten specimens of each thickness were conditioned for at least 48 hours at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5% prior to testing.

Ten specimens of each thickness were conditioned in a circulating air oven for 168 hours at 70 ± 1°C and were then cooled in a desiccator, over anhydrous calcium chloride, for at least four hours at room temperature prior to testing.

Criteria for evaluation

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' defines the following classifications. The requirement for this assessment (V-2) is highlighted in bold text:

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.

Results of tests

A summary of the results obtained during each test conducted to 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' is given in Appendix 2.

Examination of test results

On examination of the results achieved during each of the tests conducted, it can be seen that each of the thicknesses tested complied with the V-2 classification performance criteria defined above.

Opinion

Opinion

On the basis of the information which has been generated during the test programme which is described in this report, it is the opinion of Warringtonfire that all products within the Brett Martin Limited "Marpet-g FS" thickness range manufactured to the specifications described in this report will achieve a V-2 classification 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'

Validity of opinion

The above opinion relates only to specimens of the product in the form described in this report and is based on information and experience available at the time of preparation of the report. Small differences in the composition of the PETg sheet material may significantly affect the performance during the test and will therefore invalidate the test results. It is the responsibility of the supplier of the product to ensure that the product specification which is supplied is identical to the specification described in this report.

The specification and interpretation of fire test methods is the subject of ongoing development and refinement, changes in associated legislation may also occur.

After September 2024, this opinion is no longer valid unless confirmed by a Supplement to the report describing satisfactory results of the testing scheduled to be carried out during that month.

Appendix 1 – Detail of products assessed

The description of the specimens 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	(stated by sponsor) (determined by Warringtonfire)	3mm 2.86mm	6mm 5.82mm	12mm 12.05mm
Weight per unit area	(stated by sponsor) (determined by Warringtonfire)	3.81kg/m² 3.50kg/m^2	7.62kg/m^2 7.30kg/m^2	15.24kg/m^2 13.94kg/m^2
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.

Appendix 2 – Summary of 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

The letters in the table below correspond with those above.

Report No. (Thickness)		Conditioned at a 23 ± 2°C & 50 ± 5%					Conditioned at a 70 ± 1°C for 168 hours					Result
	Specimen No.	A	B	C	D	E	A	B	C	D	E	
418593 (3mm)	1	5	2	Nil	No	Yes	19	15	Nil	No	Yes	V-2
	2	6	2	Nil	No	Yes	2	8	Nil	No	Yes	
	3	5	2	Nil	No	Yes	3	8	Nil	No	Yes	
	4	4	2	Nil	No	Yes	19	17	Nil	No	Yes	
	5	4	2	Nil	No	Yes	5	2	Nil	No	Yes	
418595 (6mm)	1	2	1	Nil	No	Yes	Nil	2	Nil	No	Yes	V-2
	2	Nil	2	Nil	No	Yes	1	3	Nil	No	Yes	
	3	Nil	2	Nil	No	Yes	Nil	26	Nil	No	Yes	
	4	3	4	Nil	No	Yes	3	5	Nil	No	Yes	
	5	3	4	Nil	No	Yes	17	6	Nil	No	Yes	
418596 (12mm)	1	17	3	Nil	No	Yes	13	14	Nil	No	Yes	V-2
	2	15	2	Nil	No	Yes	21	2	Nil	No	Yes	
	3	42	16	Nil	No	Yes	13	7	Nil	No	Yes	
	4	26	6	Nil	No	Yes	16	Nil	Nil	No	Yes	
	5	22	2	Nil	No	Yes	16	2	Nil	No	Yes	
	6	26	Nil	Nil	No	Yes	Not required					
	7	12	2	Nil	No	Yes						
	8	1	3	Nil	No	Yes						
	9	18	3	Nil	No	Yes						
	10	1	6	Nil	No	Yes						

Note: In the case of the 12mm thick specimens reported under 418596; one specimen from the initial 5 specimens that were tested (conditioned at 23 ± 2°C & 50 ± 5%) failed to comply with the V-2 classification requirements. In accordance with the requirements of the test standard, a further 5 specimens were tested, all of which were V-2 compliant, therefore the product achieves V-2 classification.

Revision History

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

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