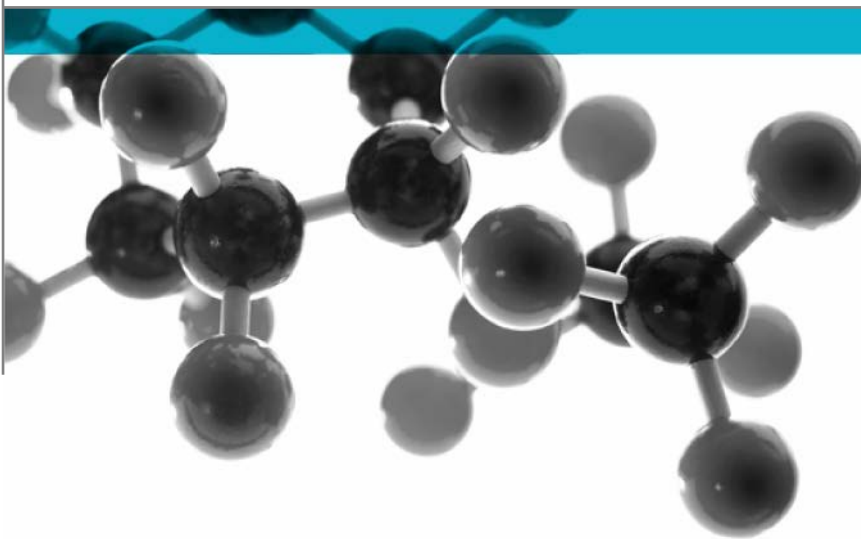


Class 0 Assessment Report



Assessment of the ability Of “MACal 9800 PRO”range of Polyvinylchloride (PVC) self-adhesive films to meet the requirements of ‘Class O’ when applied to a nominally 2mm thick aluminium substrate.

Date: 1st September 2016

Issue No.: 1

Page 1

A Report To: MACtac UK Limited

Document Reference: 371166

**Testing
Advising
Assuring**

Executive Summary

Objective To assess the results of tests to BS 476: Part 6: 1989+A1: 2009 and BS 476: Part 7: 1997, obtained on specimens of the following product and to provide an opinion of compliance with the requirements for a Class 0 surface, as defined in Approved Document B to the Building Regulations 2000.


| Generic Description | Product reference | Thickness or application rate | Weight per unit area or density |
|---|----------------------|-------------------------------|---------------------------------|
| Self-adhesive film applied to an aluminium substrate | "MACal 9800 PRO" | 2.04mm * | 5.39kg/m ² * |
| Individual components used to manufacture composite: | | | |
| Self-adhesive film | "MACal 9800 PRO" | 230 microns | 250g/m ² |
| • Film | Unwilling to provide | 70 microns | 86g/m ² |
| • Adhesive | Unwilling to provide | Unwilling to provide | Not applicable |
| Aluminium substrate | Unable to provide | 1.92mm * | 2.77g/cm ³ * |
| * determined by Exova Warringtonfire | | | |
| Please see page 5 of this test report for the full description of the product tested | | | |

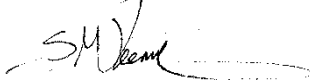
Test Sponsor MACtac UK Limited, 37 Tenter Road, Moulton Park, Northampton. NN3 6AX

Opinion: It is the opinion of **Exova Warringtonfire** that all of the colours within the complete colour range of "MACal 9800 PRO" 2mm thick self-adhesive film faced aluminium panels as tested, would comply with the requirements for a 'Class O' surface, as defined in paragraph A13(b) of Approved Document B, 'Fire Safety', to the Building Regulations 2000.

Date of Test 31st March & 18th August 2016

Signatories


 Responsible Officer
 C. Meachin *
 Technical Officer


 Authorised
 S. Deeming *
 Business Unit Head

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

Report Issued: 1st September 2016

This version of the report has been produced from a .pdf format electronic file that has been provided by **Exova Warringtonfire** to the sponsor of the report and must only be reproduced in full. Extracts or abridgements of reports must not be published without permission of **Exova Warringtonfire**.

| CONTENTS | PAGE NO. |
|--|-----------------|
| EXECUTIVE SUMMARY | 2 |
| SIGNATORIES | 2 |
| ASSESSMENT DETAILS | 4 |
| DESCRIPTION OF TEST SPECIMENS | 7 |
| CLASSIFICATION..... | 8 |
| APPENDIX 1 - RESULTS..... | 9 |
| APPENDIX 2 – CLASSIFICATION CRITERIA..... | 10 |
| REVISION HISTORY | 11 |

Assessment Details

Introduction

This report presents a considered opinion regarding the ability of the “MACal 9800 PRO” range of 2mm thick self-adhesive film faced aluminium panels, to achieve the following:

A ‘Class 1’ designation when tested in accordance with BS 476: Part 7: 1997

Comply with the requirements of ‘Class 0’, as defined in paragraph A13 (b) of Approved Document B, ‘Fire Safety’, to the Building Regulations 2000

Specimens of a product have been tested in accordance with the test methods specified in BS 476: Part 6: 1989+A1: 2009 ‘Method of test for fire propagation for products’ and BS 476: Part 7: 1997 ‘Method of test to determine the classification of the surface spread of flame of products’. The results of the tests are fully reported in the **Exova Warringtonfire** test reports No’s. 363075, 363077, 363082, 363084, 370317 and 370319.

This assessment report has been prepared at the request of the sponsor and relates the results of the tests to the requirements for a Class 0 surface of a material or composite product, as defined in paragraph A13(b) of Approved Document B, ‘Fire Safety’, to the Building Regulations 2000.

This assessment should be read in conjunction with, and not accepted as a substitute for; the **Exova Warringtonfire** test reports No’s. 363075, 363077, 363082, 363084, 370317 and 370319. Those test reports may include additional information which may be relevant to the assessment of the potential fire hazard of the product.

Product Range Considered

The product range considered and evaluated by this assessment comprised “MACal 9800 PRO” a range 2mm thick self-adhesive film faced aluminium panels.

Information provided by the sponsor in writing prior to this assessment being conducted, indicated that the only variable that exists within the “MACal 9800 PRO” range of self-adhesive films, relates to colour. The sponsor stated that in all other respects all the products within the range are identical.

Inspection Of Available Colours and Selection of Colours for Test

The "MACal 9800 PRO" range of 2mm thick self-adhesive film faced aluminium panels is available in an extensive colour range. The opinion contained within this report covers all the colour options within the range. Comprehensive details of the composition of the products within the range are given on Page 7 of this report.

The information provided by the sponsor and which detailed all the colours within the range, was examined and a cost effective test programme based exclusively on colour selection was determined and agreed. The selection was designed to provide the basis for a confident appraisal of the performance of all the products within the range when tested as described above, to allow a confident assessment of their ability to comply with the requirements of "Class 1" and "Class O" to be made.

It was considered that in order to provide a foundation for the assessment, indicative tests in accordance with BS 476: Part 6: 1989+A1: 2009 and BS 476: Part 7: 1997 would be conducted on the lightest colour (white), darkest colour (black) and colour with the highest organic pigment (red).

Criteria for evaluation

The normal criteria for establishing compliance with the requirements for a Class "O" surface as defined in paragraph A13 (b) of approved Document B, "Fire Safety", to the Building Regulations 2000 is as follows:

- In the case of BS 476: Part 6:1989+A1: 2009, a Sub Index s1 of no greater than 6 and a Total index of performance S of no greater than 12 must be achieved.
- In the case of BS 476: Part 7: 1997, flame spread on five specimens must not exceed 165mm and on the sixth specimen must not exceed 190mm.

To provide the confidence to make a realistic appraisal of all the products included in the "MACal 9800 PRO" range and to provide an opinion for the purposes of this appraisal relating the results to the requirements of Class "O" and Class 1, the following additional performance limits were agreed:

- In the case of BS 476: Part 6: 1989+A1: 2009, a Sub Index s1 of no greater than 4 and a Total index of performance S of no greater than 10 must be achieved.
- In the case of BS 476: Part 7: 1997, flame spread of any type (flash, transitory or sustained) as defined in the standard, must not exceed 110mm on all specimens tested.

One indicative test to BS 476: Part 6: 1989+A1: 2009 and two indicative tests to BS 476: Part 7: 1997 must be performed on each colour with the completion of the formal test on the worst performing colour.

Face subjected to tests

The specimens were mounted in the test positions such that the film face was exposed to the heating conditions of the tests.

Specimen mounting for purposes of tests

Each specimen tested to BS 476: Part 7: 1997 in direct contact with a nominally 12mm thick non-combustible backing board.

Results of tests

A summary of the results obtained during each test conducted to BS 476: Part 6: 1989+A1: 2009 (sub index 's1' and the index of performance, 'S') is given in Appendix 1.

A summary of the results obtained during each test conducted to BS 476: Part 7: 1997 (flame spread distance at both at both 1.5 minutes and the final, maximum, flame spread distance, together with any supplementary observations made during the test) is given in Appendix 1.

Examination of test results

The requirements for a 'Class 1' designation in accordance with BS 476: Part 7: 1997 and a 'Class O' surface, as defined in paragraph A13 (b) of Approved Document B, 'Fire Safety', to the Building Regulations 2000, are given in Appendix 2 of this report.

On examination of the results achieved during both the Part 6 tests and the Part 7 tests, it can be seen that all the products tested comfortably complied with the performance criteria defined above. In the case of the Part 6 tests a maximum sub index, 's1', of 0 (zero) and a maximum index of performance, 'S', of 0.2 were achieved for each product tested, and in the case of each specimen tested to BS 476: Part 7, the maximum flame spread distance recorded was 75mm.

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 | | Self-adhesive film applied to an aluminium substrate | |
| Thickness of overall composite | | 2.04mm (determined by Exova Warringtonfire) | |
| Weight per unit area of overall composite | | 5.39kg/m ² (determined by Exova Warringtonfire) | |
| Self-adhesive film | Product reference | "MACal 9800 PRO" | |
| | Name of manufacturer | MACTac Europe SPRL | |
| | Thickness | 230 microns | |
| | Weight per unit area | 250 g/m ² | |
| | Film | Generic type | Polyvinyl chloride (PVC)film |
| | | Product reference | See Note 1 below |
| | | Name of manufacturer | See Note 1 below |
| | | Thickness | 70 microns |
| | | Weight per unit area | 86g/m ² |
| | | Colour reference | All colours |
| | | Flame retardant details | See Note 2 below |
| | Adhesive | Generic type | Acrylic |
| | | Product reference | See Note 1 below |
| | | Name of manufacturer | See Note 1 below |
| | | Colour reference | "Clear" |
| | | Application rate | See Note 1 below |
| | | Application method | See Note 1 below |
| | | Flame retardant details | See Note 2 below |
| | Curing process | See Note 1 below | |
| | Substrate | Generic type | Aluminium |
| Product reference | | See Note 3 below | |
| Name of manufacturer | | See Note 3 below | |
| Thickness | | 1.92mm (determined by Exova Warringtonfire) | |
| Density | | 2.77g/cm ³ (determined by Exova Warringtonfire) | |
| Colour reference | | "Silver" (observed by Exova Warringtonfire) | |
| Flame retardant details | | This component is inherently flame retardant | |
| Brief description of manufacturing process | | See Note 1 below | |

Note 1: The sponsor was unwilling to provide this information.

Note 2: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.

Note 3: The sponsor was unable to provide this information.

Classification

Opinion

On the basis of the information that has been generated during the test programme that is described in this report, it is the opinion of **Exova Warringtonfire** that when the product, “MACal 9800 PRO” (fully described on Page 7 of this report) is applied to an aluminium panel substrate having a thickness of 2mm, it would:

- Achieve a Class 1 designation, if tested in accordance with BS 476: Part 7: 1997
- Achieve a fire propagation index, I , of not greater than 12 and a subindex, i_1 , of not greater than 6, if tested in accordance with BS 476:Part 6:1989+A1: 2009.

On the basis of the results referred to above, it is also the opinion of **Exova Warringtonfire** that all of the colours within the complete colour range of “MACal 9800 PRO”, “MACal 9800 PRO” 2mm thick self-adhesive film faced aluminium panels as tested, would comply with the requirements for a ‘Class O’ surface, as defined in paragraph A13(b) of Approved Document B, ‘Fire Safety’, to the Building Regulations 2000

Validity of opinion

The above opinion relates only to the “MACal 9800 PRO” product as described on Page 7 of this report. Any change in the nature of the substrate or in the composition or physical properties of the coating product 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 that is supplied is identical to the specification described in this report.

This opinion is based on the requirements of the Building Regulations at the date of this report. If the Building Regulations are revised or amended in any way subsequent to that date, care must be taken to ensure that this opinion is not invalidated by those revisions or amendments.

The opinion has been formulated on the assumption that the specimens are representative of the product in practice. **Exova Warringtonfire** was not involved in any sampling or selection procedures which would confirm this or in any audit testing which would provide confidence in the consistency of the product in the tests.

This report may only be reproduced in full. Extracts or abridgements shall not be published without permission of **Exova Warringtonfire**.

Appendix 1 - Results

Results of Specimens Tested to BS 476: Part 6: 1989+A1: 2009

| WF No. | Colour reference | Sub index, 's ₁ ' | Index of performance, 'S' |
|--------|------------------|------------------------------|---------------------------|
| 363082 | "White" | 0.0 | 0.0 |
| 363084 | "Red" | 0.0 | 0.0 |
| 370319 | "Black" | 0.0 | 0.2 |

Results of Specimens Tested to BS 476: Part 7: 1997

| WF No. | Colour reference | Flame Spread at 1.5 minutes (mm) | Final Flame Spread (mm) |
|--------|------------------|----------------------------------|-------------------------|
| 363075 | "White" | <50 (both specimens) | <50 (both specimens) |
| 363077 | "Red" | <50 (both specimens) | <50 (both specimens) |
| 370311 | "Black" | 60, 60, 75, 60, 60, 60 | 60, 60, 75, 60, 60, 60 |

Supplementary Observations

None.

Appendix 2 – Classification criteria

Classification of Spread of Flame Given in BS 476: Part 7: 1997

| CLASSIFICATION | SPREAD OF FLAME AT 1.5 MIN | | FINAL SPREAD OF FLAME | |
|----------------|----------------------------------|----------------------------------|-----------------------|----------------------------------|
| | LIMIT | LIMIT FOR ONE SPECIMEN IN SAMPLE | LIMIT | LIMIT FOR ONE SPECIMEN IN SAMPLE |
| | <u>mm</u> | <u>mm</u> | <u>mm</u> | <u>mm</u> |
| Class 1 | 165 | 165 + 25 | 165 | 165 + 25 |
| Class 2 | 215 | 215 + 25 | 455 | 455 + 45 |
| Class 3 | 265 | 265 + 25 | 710 | 710 + 75 |
| Class 4 | exceeding the limits for Class 3 | | | |

Definition of 'Class O' in Approved Document B to the Building Regulations

Paragraph A13(b) of Approved Document B, 'Fire Safety', to the Building Regulations 2000 states that a 'Class O' material or the surface of a composite product is either:

- a) composed throughout of materials of limited combustibility

or

- b) a Class 1 material (as determined by BS 476: Part 7: 1997) which has a fire propagation index (I) of not more than 12 and a subindex (i_1) of not more than 6

Revision History

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