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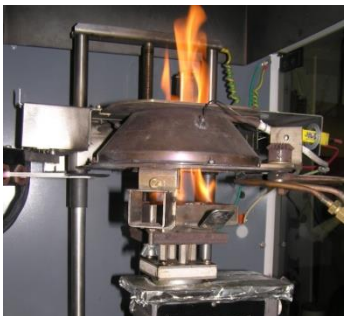

FIRE ASSESSMENT REPORT

FAR 4436 ISSUE 2

ASSESSMENT REPORT ON KVADRAT CAVA, REMIX, TOPAS AND CANVAS TEXTILES

CLIENT
Kvadrat Maharam Pty Limited
17 Foster Street
Surry Hills
Sydney
NSW 2010
Australia

ASSESSMENT OBJECTIVE

This report gives the BRANZ assessment of the Group Number Classification in accordance with the NCC Volume One Specification C1.10 when determined in accordance with AS 5637.1 and the New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A for the Classification of Fire Performance of Wall and Ceiling Lining Materials, for products tested in accordance with AS/NZS 3837 with a supporting test under AS/NZS 3837 and ISO 5660.

CLIENT

Kvadrat Maharam Pty Limited
17 Foster Street
Surry Hills
Sydney
NSW 2010
Australia

PRODUCTS

Kvadrat Cava, Remix, Topas and Canvas textiles.

CONCLUSION

The results when analysed in accordance with the NCC Volume One Specification C1.10 and the NZBC Verification Method C/VM2 Appendix A for the Classification of Fire Performance of Wall and Ceiling Lining Materials the material as described in Section 2 achieved the following classification following testing when adhered to a plasterboard substrate.

Building Code Document	Group Number Classification
NCC Specifications C1.10 determined in accordance with AS 5637.1:2015	**2** Smoke less than 250 m^2/kg
NZBC Verification Method C/VM2 Appendix A	**2–S**

LIMITATION

This report is subject to the accuracy and completeness of the information supplied.

BRANZ reserves the right to amend or withdraw this assessment if information becomes available which indicates the stated fire performance may not be achieved.

This assessment report may only be quoted or reproduced in full.

TERMS AND CONDITIONS

This report is issued in accordance the Terms and Conditions as detailed and agreed in BRANZ Services Agreement for this work.

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TABLES

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1. INTRODUCTION

This report gives the BRANZ assessment of the Group Number Classification in accordance with the NCC Volume One Specification C1.10 when determined in accordance with AS 5637.1 and the New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A for the Classification of Fire Performance of Wall and Ceiling Lining Materials, for products tested in accordance with AS/NZS 3837 with a supporting test under AS/NZS 3837 and ISO 5660.

2. BACKGROUND

In AWTA Test Report 7-563476-MO issued 27/11/2008, Kvadrat Cava, Remix and Topas of various colours were subjected to testing in accordance with AS/NZS 3837:1998. The three specimens were described as having the following compositions Cava: 90% wool and 10% nylon weighing 340 g/m^2; Remix: 90% wool and 10% nylon weighing 340 g/m^2 and Topas: 100% wool weighing 450 g/m^2. The specimens were loose laid to a substrate of 10 mm thick plasterboard. The specimens Data files labelled 171884 spec1.csv, 171884 spec2.csv and 171884 spec3.csv were supplied by the client.

On 23 April 2015 an additional test under FH5719-1-50-1 was conducted at BRANZ Limited laboratories, Judgeford, New Zealand. The sample was described as Canvas with a composition of 90% new wool worsted and 10% nylon weighing 415 g/lin.m. The sample was adhered to a substrate of 10 mm thick plasterboard using Professional Ultra Clear PRO 880 wallcovering adhesive prior to testing and subjected to a single indicative test at 50 kW/m^2 in accordance with AS/NZS 3837:1998 and ISO 5660 Parts 1 and 2.

3. TESTS SUMMARY

3.1 AWTA Testing

The test standards requires that the mean heat release rate (HRR) readings over the first 180 s from ignition for the three specimens should differ by no more than 10% of the arithmetic mean of the three readings. In the event of this criterion not being met, a further three specimens are required to be tested. The results are summarised in Table 1.

Table 1: Mean Heat Release Rates over the first 180 s from ignition

Specimen ID	Average HRR over 180 s from ignition	Arithmetic mean	Difference from the arithmetic mean
171884 spec1	49.6	45.9	8.1%
171884 spec2	41.9		-8.7%
171884 spec3	46.2		0.7%
FH5719-1-50-1	41.1	NA	-10.5

The above table identifies all specimens exposed to 50 kW/m² irradiance met the acceptance criteria. Although FH5719-1-50-1 was outside of the variability criteria of the test standard, the same performance criteria were met. Further tests were deemed not to be necessary and would not be expected to lead to an alteration of the classification.

The report summary for the specimens as described in Section 2, exposed to an irradiance of 50 kW/m² is summarised in Table 2.

Table 2: Key results from testing to AS/NZS 3837

	Mean Specimen thickness (mm)	Irradiance (kW/m²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m²)	Average Specific Extinction Area (m²/kg)
171884	10.5*	50	14	144.7	27.4
FH5719-1-50-1	10.7*	50	13	240.4	27 (NCC) 23 (NZBC)

* Thickness includes 10 mm plasterboard substrate

4. DISCUSSION

4.1 Suitability of test methods

The use of empirical correlations to determine the time to flashover in AS ISO 9705, based on AS/NZS 3837 test results as the specimen is comprised largely of homogenous materials that;

- are not an assembly, nor finished with a profiled facing,
- are not considered to melt or shrink away from a flame
- are not an assembly with joints or openings
- is not faced with a foil type reflective surface.

The specimens were deemed suitable for testing in accordance with AS 5637.1:2015 and testing was performed in accordance with AS 3837 for the purposes of Group Number Classification as specified in the NCC Volume One Specification C1.10 Clause 4.

The tested specimens prepared as described in Section 2 were tested in the horizontal orientation with the wallcoverings adhered to a plasterboard substrate. Therefore, to ensure that the results remain valid, it is considered that the empirical correlations are only suitable for specimens installed as they were tested.

4.2 Differences between AS/NZS 3837 and ISO 5660

ISO 5660 is essentially identical to AS/NZS 3837. It uses the same equipment, the same test conditions and specimen preparation, the key difference is in the end of test criteria. The differences are summarised below.

Table 3: End of test criteria for AS/NZS 3837 and ISO 5660

	AS/NZS 3837	ISO 5660
1	2 minutes after flaming or other signs of combustion cease	30 minutes after sustained flaming.
2	Average mass loss rate over 1-minute falls below 150 g/m²; or	30 minutes with no ignition
3	60 minutes have elapsed, whichever occurs first	Oxygen level returns to ambient for at least 10 minutes
4	-	Mass of specimen becomes zero

The tests that are the subject of this assessment were all carried out in accordance with AS/NZS 3837.

Any comparison between the test methods needs to establish that sufficient data was collected when tested to AS/NZS 3837 to fully characterise the fire performance that would be captured if the end of test criteria of ISO 5660 were applied.

4.3 The AS/NZS 3837 test results

In the three tests in AWTA Test Report 7-563476-MO, the specimens comprised of the wallcovering and a plasterboard substrate. In such systems, the main combustible component is the wallcovering and the paper facing of the plasterboard.

The combustion phase of the tests was therefore typically very short. In this series of tests, the mean values for time to ignition range from 12 s to 16 s, and test durations as determined by the AS/NZS 3837 end of test criteria from 195 s to 228 s. The averaged mass lost by the specimens during the tests (8.4 g) exceeded that of the wallcovering (3.1 g) and paper facing of the plasterboard combined (approximately 4.6 g).

It is therefore considered that if the three tests had been conducted and data reduced in accordance with ISO 5660, the increased duration of the tests would not have yielded a different Group Number Classification.

The Average Specific Extinction Area values are typically reduced albeit slightly when the data is reduced over a longer period. Therefore, it is considered to be conservative to use the Specific Extinction Area from testing to AS/NZS 3837 directly.

5. CLASSIFICATION IN ACCORDANCE WITH NCC VOLUME ONE SPECIFICATION C1.10

Calculations were carried out according to AS 5637.1. The classification for the tested specimens as described in Section 2 is as follows:

	171884 spec1	171884 spec2	171884 spec3	FH5719-1-50-1	Classification
Group number Classification	2	2	2	2	2
Average Smoke Extinction Area	27.9	34.2	20.0	27	

The average specific extinction area for the sample is less than the 250 m²/kg limit and therefore it may be used in buildings without a sprinkler system complying with Specification E1.5 in accordance with Specification C1.10 Table 3.

6. CONCLUSION

The results when analysed in accordance with the NCC Volume One Specification C1.10 for the Classification of Fire Performance of Wall and Ceiling Lining Materials when determined in accordance with AS 5637.1, the materials as described in Section 2, and as discussed in Sections 3 and 4, achieved the following classification following testing when adhered to plasterboard substrate.

Group Number Classification	**2**
The average specific extinction area was less than the 250 m²/kg limit	

7. CLASSIFICATION IN ACCORDANCE WITH NZBC VERFICATION METHOD C/VM2 APPENDIX A

The following classification has been assessed in accordance with the New Zealand Building Code Verification Method C/VM2 Appendix A: Establishing Group Numbers for lining materials. Calculations were carried out according to section A1.3 for predicting a material's group number for each specimen tested. It states that "If a different classification group is obtained for different specimens tested, then the highest (worst) classification for any specimen must be taken as the final classification for that material." The classification for the specimens as described in Section 1 is as follows:

	171884 spec1	171884 spec2	171884 spec3	FH5719-1-50-1	Classification
Group number Classification	2	2	2	2	2-S
Average Smoke Extinction Area	Less than 250 m²/kg			23	

The three samples designated 171884 spec 1, 2 and 3 recorded an average specific extinction less than 250 m²/kg when tested to AS/NZS 3837. As discussed above, it is considered conservative to use these values. Therefore, in accordance with Verification Method C/VM2 Appendix A, samples achieving either a Group Number classification 1 or 2, and with an average specific extinction area less than 250 m²/kg are identified with “S” post-script to the Group Number.

8. CONCLUSION

For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 2.

Group Number Classification	**2-S**