



TEST ON MgO BOARDS

FOR

Aussi Rossrock Import Pty Ltd

September 2015

BY

BUILDING CONSTRUCTION TEST LABORATORY

1. INTRODUCTION

At the request of Mr. Peter Yuan of Aussi Rossrock Import Pty Ltd, we attended a testing session during 5 September to 2 October on samples of magnesium oxide boards with a view to confirming its soak / dry bending strength in accordance with AS/NZS 2908.2:2002.

The test was carried out at 6 Gatwood close Padstow, New South Wales during the 32 days. The test load and method of testing evolved from consideration of the Australian Standard AS/NZS 2908.2:2002.

The results of the tests are provided in the following sections of this report.

2. SPECIMENS

Ten full sheets of the MgO boards to be tested were supplied to this lab by the client. These sheets were of nominal dimensions 2.44m L X 1.22m W X 8mm thick.

As the boards are used for external wall, they are in category of Type A in Section 4.1, AS/NZS 2908. It is described that *"Type A sheets are intended for external applications where they may be subjected to the direct action of sun, rain and /or snow. They may be supplied coated or uncoated. Type A sheets shall comply with the requirements of the type-tests in Clause 6."*

The sample sheets were cut to 10 sets of paired specimens to suit the bending test. Each pair of specimens were cut adjacent from one sheet and given the same number, but marked "W" (wet) or "D" (dry), for later alter comparison of results.

3. TEST PROCEDURE

Divide the paired specimens to form two lots of 10 specimens each. After the conditioning procedure, submit the first lot of 10 specimens for equilibrium strength test.

At the same time submit the second lot to 25 soak-dry cycles consists of

- soak in water at ambient temperature for 18 hours;
- drying in a ventilated oven of 60C (+5C) and relative humidity of less than 20% for 6 hours.

After 25 cycles, place the specimens in normal room atmosphere for 7 days. At end of this period, carry out the wet bending test on the specimens.

The modulus of rupture, R_f , in mega Pascals, is given by the formula:

$$R_f = 3Pl / 2be^2$$

Where

- P is the breaking load, in newtons;
- l is the distance between axes of supports, in mm;
- b is the width of test specimen, in mm
- e is the average thickness of the test specimen from two measurements, in mm.

4. TEST RESULT

The data in Table 2 and 3 of Appendix A are the data obtained from the testing for wet (cycled) condition and equilibrium condition of the specimens. The data is used for calculation of modulus of raptures and other parameters.

The modulus of rapture ratio is given by:

$$r_i = R_{fi} / R_{fci}$$

Where: R_{fi} is the MOR of i th test specimen after the soak dry cycling process;
 R_{fci} is the MOC of the i th reference test specimen (from the first lot).

Calculate the average, r mean, and standard deviation, s , of the individual ratios, r_i , as below in Table 1.

Table 1: MOR calculation

Sample	Equilibrium MOR	Cycled MOR	MOR Ratio	Average MOR	MOR standard deviation
1	8.4	7.9	1.1	0.98	0.07
2	8.2	8.2	1.0		
3	7.8	8.8	0.9		
4	8.1	8.3	1.0		
5	8.2	8.7	0.9		
6	8.2	8.5	1.0		
7	8.0	8.3	1.0		
8	8.3	8.8	0.9		
9	8.0	8.7	0.9		
10	8.5	7.7	1.1		

To determine the 95% lower confidence limit, L_i , given by the equation:

$$L_i = r - 0.58s = 0.98 - 0.58 \times 0.07 = 0.94$$

The lower 95% confidence limit according to AS/NZS 2908 shall be greater than 0.75. The test result is 0.94, therefore, the property of bending strength of the sample sheets satisfy the requirement of the standard.

5. CONCLUSIONS

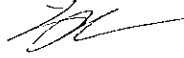
The test carried out, in accordance with the method and procedure specified in AS/NZS 2908.2:2000, on the samples provided by the client has resulted in the findings that they are satisfying the bending strength requirement in the same standard.

The test is supervised by

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Appendix A: Test Data

MOR calculation

l = 215mm, distance between supporting axis
 b = 250mm, width of test specimen

Specimen	Axis A				Axis B				Mean		
	Width mm	Thickness, mm	Measure	Test Load N	MOR Mpa	Width mm	Thickness, mm	Measure		Test Load N	MOR Mpa
1	248	Measure 1	Measure 2	832	8.5	248	Measure 3	Measure 4	755	7.4	7.9
2	248	11.2	11.4	871	8.6	248	11.4	11.6	799	7.9	8.2
3	248	11.5	11.5	885	8.7	248	11.5	11.5	906	9.0	8.8
4	248	11.6	11.6	832	8.0	248	11.5	11.5	873	8.6	8.3
5	249	11.5	11.7	881	8.5	249	11.4	11.5	902	8.9	8.7
6	249	11.3	11.4	896	9.0	247	11.4	11.4	791	7.9	8.5
7	249	11.4	11.4	907	9.0	249	11.4	11.4	753	7.5	8.3
8	247	11.6	11.5	869	8.5	248	11.5	11.3	916	9.2	8.8
9	247	11.4	11.4	889	8.9	248	11.4	11.4	851	8.5	8.7
10	248	11.4	11.4	824	8.2	247	11.8	11.4	734	7.1	7.7
Average					8.6					8.2	8.4

Table 2: Soak / Dry bending strength test results for samples tested in the cycled condition



MOR calculation

l = 215mm, distance between supporting axis 215

b = 250mm, width of test specimen

Specimen	Axis A					Axis B					Mean
	Width mm	Thickness, mm		Test Load N	MOR Mpa	Width mm	Thickness, mm		Test Load N	MOR Mpa	
	Measure 1	Measure 2	Measure 3			Measure 4					
1	249	11.4	11.6	877	8.6	249	11.3	11.3	801	8.1	8.4
2	250	11.3	11.5	864	8.6	249	11.5	11.5	793	7.8	8.2
3	249	11.4	11.4	851	8.5	249	11.5	11.6	720	7.0	7.8
4	249	11.5	11.4	868	8.6	249	11.4	11.4	764	7.6	8.1
5	249	11.6	11.6	877	8.4	250	11.4	11.5	814	8.0	8.2
6	249	11.5	11.5	839	8.2	249	11.2	11.4	799	8.1	8.2
7	247	11.4	11.4	872	8.8	249	11.3	11.5	720	7.2	8.0
8	250	11.5	11.4	879	8.6	250	11.4	11.4	812	8.1	8.3
9	248	11.4	11.4	873	8.7	249	11.4	11.4	736	7.3	8.0
10	249	11.5	11.5	857	8.4	249	11.4	11.4	858	8.6	8.5
Average					8.5					7.8	8.2

Table 3: Soak / Dry bending strength test results for samples tested in the equilibrium condition



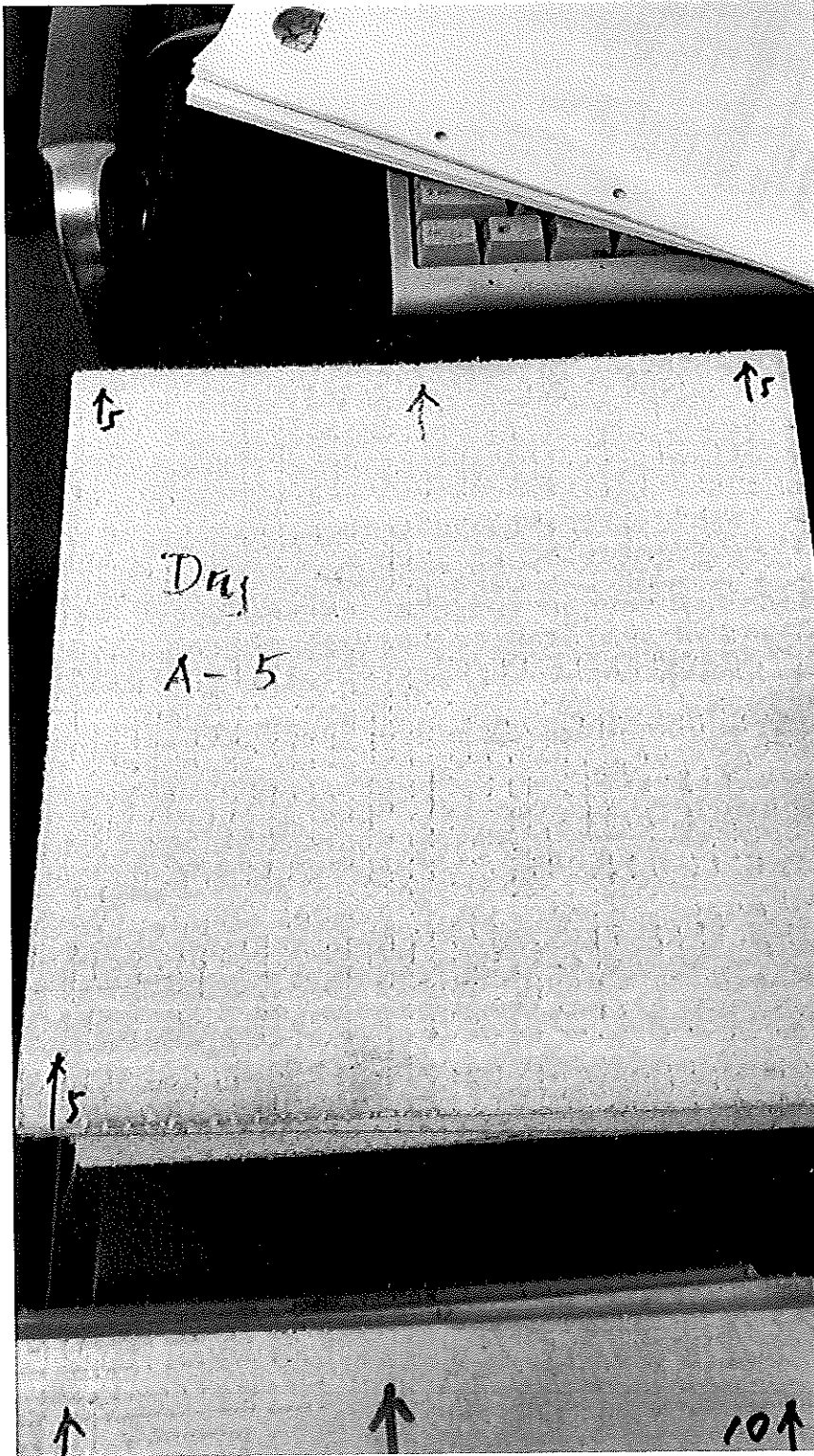


Photo A: Test Samples

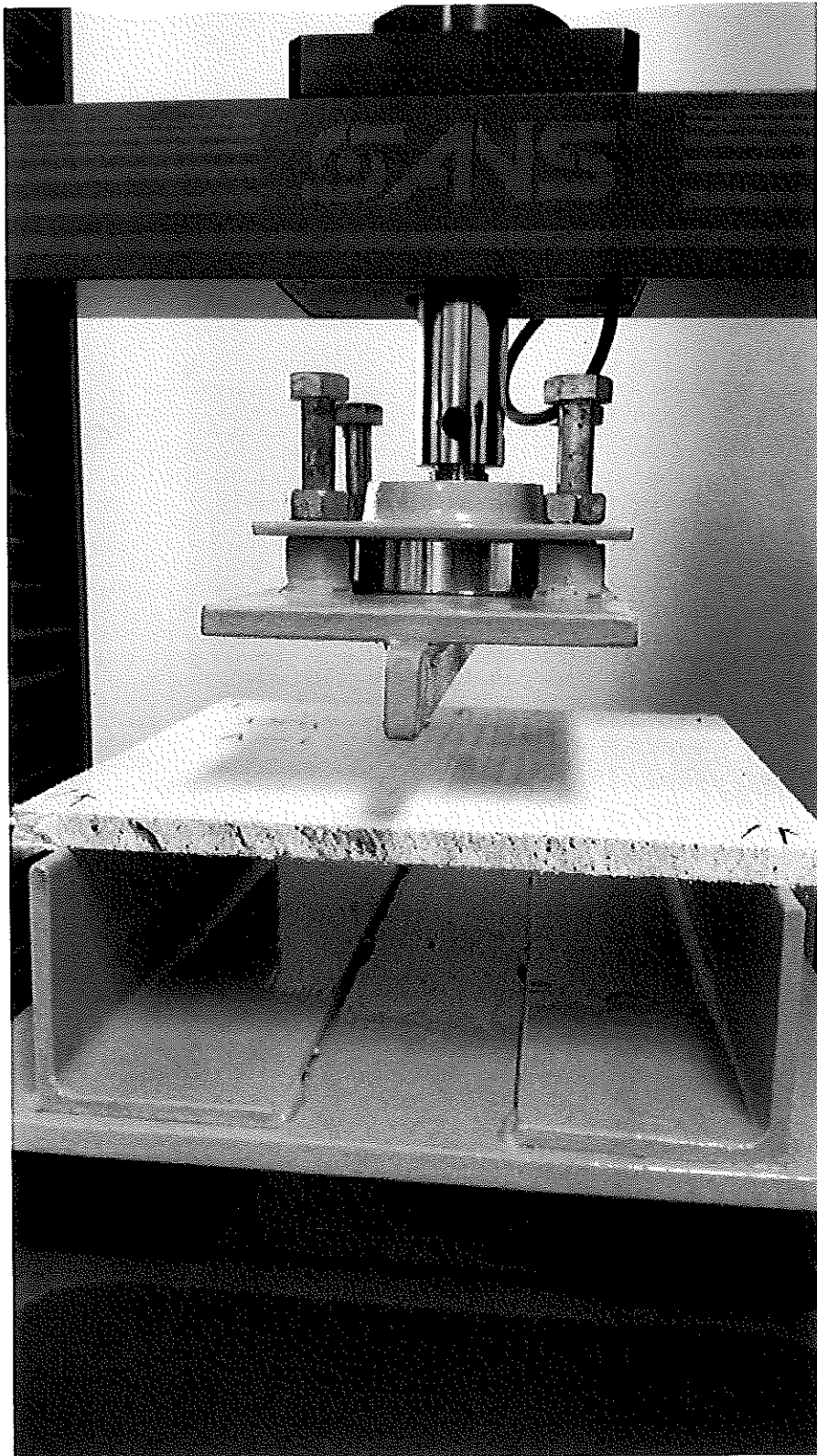


Photo B: Test Setup