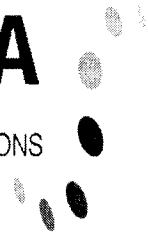


SIGMA

ENERGY SOLUTIONS



Ref: 740349
SJ 36/95

24 February 2005

ASSESSMENT OF LIQUID RUBBER - HIGH BUILD WET AREA MEMBRANE

On the basis of results obtained from testing performed at SIGMA Energy Solutions Laboratory and Lafarge North America, Liquid Rubber High Build cold applied membrane system satisfies the requirements for a Class III High extensibility unreinforced membrane under AS 4858:2004 *Wet area membranes* .

In our opinion, Liquid Rubber High Build cold applied membrane, when applied in accordance with the manufacturer's requirements in applications approved by the manufacturer, can be expected to perform in a satisfactory manner for the warranted life of the installation.

Yours sincerely

Jim Haig
SENIOR CONSULTANT - MATERIALS SCIENCE

Enquiries:	J. Haig	
	Telephone	07 3902 9916
	Facsimile	07 3902 9999
	Mobile	0419793065
	E-mail	jhaig@sigpro.com.au



ENERGY SOLUTIONS

Sigma Energy Solutions
 ABN: 77 104 097 298

LABORATORY REPORT - MATERIALS ANALYSIS
Re: EXAMINATION OF LIQUID RUBBER (HIGH BUILD) FOR
AS 4858:2004 COMPLIANCE, IBS P/L

To :	T. Jones		
From :	J. Haig	Report Date :	23 rd February 2005
Customer Ref :		SIGMA Job No. :	740349 SJ 36/95
Method Reference :	AS 4858 -2004 <i>Wet area membranes</i>		

Sample Description :	Samples of Liquid Rubber High Build were supplied for testing. Documentation of typical properties and test results from Lafarge North America.
-----------------------------	--

This report gives results and comments on testing of Liquid Rubber (High Build) carried out by SIGMA Energy Solutions and Lafarge North America. The results were assessed for compliance with AS 4858 -2004 *Wet area membranes* Section 8 Requirements of Membranes. Results were used to assign a classification for joint movement installation requirements.

Table 1 in Appendix A details tests and assessments performed and compliance results for each AS 4858 Table 8.1 requirement.

Appendix B presents the test report by Lafarge North America for the Acceptance of Cyclic Movement Test.

Table 2 in Appendix C presents the durability test results.

Remarks :	On the basis of results obtained from testing performed at SIGMA Energy Solutions Laboratory and Lafarge North America, Liquid Rubber High Build cold applied membrane system satisfies the requirements for a Class III High extensibility unreinforced membrane under AS 4858:2004 <i>Wet area membranes</i> . A statement of this finding is presented in an appended letter.
------------------	---

J. Dillon, J. Haig
Analysts

.....
Method Signatory

24/2/05
Date



APPENDIX A

Table 1. Assessment of Liquid Rubber High Build to AS 4858 table 8.1 Criteria

AS 4858 Property	Test Method (as called by AS 4858)	Test Method (actually employed)	AS 4858 Pass/Fail Criteria	Result for Liquid Rubber High Build	Comment	Result Status
(a) Moisture vapour transmission rate	ASTM E96 Desiccant Method	ASTM E96 Desiccant Method by Lafarge (reported in Lafarge literature)	Report result - no pass/fail, result used in Property (e)	0.04 grains/hr/ft ² (= 0.67 g/m ² /24hr)	If >8 g/m ² /24hr, property (e) testing is required to establish suitability over particle board. Therefore, testing for Property (e) not required.	Report result - no pass/fail
(b) Water absorption	AS 3558.1	ASTM D 570	Report result - no pass/fail	1.02% max	ASTM D 570 is somewhat different in approach but it is difficult to see much difference in final result to that from AS 3558.1.	Report result - no pass/fail
(c) Acceptance of cyclic movement.	AS 4858 Appendix B (50 cycles 200% extension, 2 mm/hr extension rate, 20°C, 65% RH)	AS 4858 Appendix B	No holes or ruptures through the thickness after 50 cycles.	No tearing or visible damage. Test Report attached as Appendix B	Cyclic Movement testing was originally performed by Lafarge North America under ASTM C 836 - 03. This work was repeated using the AS 4858 protocol to ensure exact compliance. Pass.	4 Pass
(d) Durability	AS 4858 Appendix A (exposure to water, bleach and detergent, heat ageing)	AS 4858 Appendix A	No reduction of elongation at break more than 50% of the reference figure	Results presented in Appendix C	Samples passed for all exposure protocols, indeed no samples showed any reduction in the elongation at break figures. Pass.	4 Pass
(e) Suitability for use over particle board.	If required, AS 4858 Appendix A	Not required	Not required	Not required	Property (a) is <8 g/m ² /24hr so this test is not required	Not required; suitable for use over particle board.



APPENDIX C

Table 2. AS 4858 Appendix A Durability Results

Exposure	Elongation at Break (%) average of 3 determinations to AS 1145.3-2001			Result Status
	7 Day Exposure	28 Day Exposure	56 Day Exposure	
(a) Control - Unexposed Reference Sample (kept in lab 23°C, 65% RH)	Mean: 396% SD: 109	Mean: 488% SD: 26	Not determined ¹	
(b) Water immersion	Mean: 1321% SD: 124	Mean: 1334% SD: 22	Mean: 1296% SD: 52	4 Pass (<50% reduction in % E@B for all periods)
(c) Bleach immersion	Mean: 1176% SD: 87	Mean: 1155% SD: 121	Mean: 1276% SD: 32	4 Pass (<50% reduction in % E@B for all periods)
(d) Detergent immersion	Mean: 1082% SD: 149	Mean: 1231% SD: 70	Mean: 1244% SD: 49	4 Pass (<50% reduction in % E@B for all periods)
(e) Heat ageing	Mean: 587% SD: 63	Not required	Not required	4 Pass (<50% reduction in % E@B for all periods)

1. Given the trends for previous controls and the exposed specimens this sample was omitted so that a limited window of access to the test equipment could be used rather than suffer further delays.

