# Acronem Consulting Australia Pty Ltd

Dr Cameron Chick
Acronem Consulting Australia Pty Ltd
3/62 Warrigal Road, Parkdale, VIC, 3195

25th January 2016

Mr John Pierpont
Regen Building Solutions
4/240 Victoria Rd,
Largs Bay,
South Australia, 5016

RE: XL Floor 75 for flooring of Self-contained dwellings
(1.5kPa uniformly distributed actions & 1.8kN concentrated actions)

Dear John:

I have undertaken an analysis of the strength and deflection behaviour of XL Floor 75, consisting of 12mm Megaboard top and bottom faces with Class H EPS core, based on:

- The results of testing to AS 2908.2 on 20mm Laminated Megaboard
  - Composition, Reinforced Modified Magnesia Cement
  - Thickness 2x10mm boards bonded together by their 'rough face'.
  - Density: 920 kg/m3
  - Appearance: 'Off-white' fibre reinforced cementitious board.
- Material properties of Class H rigid cellular polystyrene – moulded in accordance with AS 1366.3.
- The results of testing of XL Floor 75 for punching or crushing with reference to AS/NZS 1170.1 Table 3.1 Note 1 for a 1.8kN concentrated action.

Megaboard mean bending strength results are determined from testing in accordance with AS/NZS 2908.2:2000 8.2.1 following "conditioning for equilibrium strength", 7 days at 23℃, 50% RH in accordance with 8.1.2.1.3, "The Laminex Group – Technology Centre Test Report", Report No. 15E048, 9 Nov. 2015.
The modulus of rupture (MOR), reported as 7.4MPa, in accordance with AS/NZS 2908.2:2000 5.2.1 is the average of the values obtained from testing the samples in both the longitudinal and transverse directions. The minimum MOR result of all tests in the longitudinal direction is 8.0 MPa.
The modulus of elasticity (MOE) is calculated from data provided in Test Report No. 15E048, calculated between loads of 10% and 40% of the maximum. The average MOE of all tests is determined as 3510 MPa.
On this basis 20mm Laminated Megaboard may be classified in accordance with AS/NZS 2908.2:2000 as Type B, Category 2 for an apparent density of 920kg/$m^3$.

I have determined the Ultimate Limit State strength and Serviceability Limit State deflection design capacities of XL Floor 75 discounting the positive effects of the Class H EPS core. This

is based on design values of MOE and MOR as 2693 MPa and 6.57MPa respectively, based on the procedures of AS/NZS 1170.0:2002 Appendix B allowing for the variability of structural units.

The design values of MOR and MOE, established by these procedures, have been applied to generate span tables for XL Floor 75 considering the Ultimate Limit State (ULS) and Serviceability Limit State (SLS) loadings of AS/NZS 1170.1:2002, Table 3.1 for Self-contained dwellings (1.5kPa uniformly distributed actions and 1.8kN concentrated actions).
In all cases it is assumed that XL Floor 75 shall only be installed where the length (defined as the long edge of the original panel) of any board shall span 'across' at least three (3) joists.

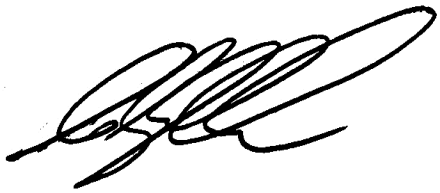
The results of this analysis are presented in the table below.

| **XL Floor 75: Imposed floor actions (Q) - Uniformly Distributed Actions (kPa) & Concentrated Actions (kN)** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Joist Span (mm)** | **UDL, Q (kPa)** | | | | | **Point Load, Q (kN)** | | | | |
| | **Span/150** | **Span/200** | **Span/250** | **Span/300** | **Span/400** | **Span/150** | **Span/200** | **Span/250** | **Span/300** | **Span/400** |
| **450** | 46.00 | 46.00 | 46.00 | 46.00 | 46.00 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| **600** | 46.00 | 46.00 | 46.00 | 46.00 | 46.00 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Limited by deflection (G+$\psi_s$Q), where $\psi_s$=0.7, and G is self-weight | | | | | | | | | | |
| Limited by Strength (1.2G+1.5Q), or Long-term Creep (G+0.4Q), where G is self-weight | | | | | | | | | | |

While the maximum UDL able to be supported by the XL Floor 75 is greater than the 1.5kPa uniformly distributed action required for domestic and residential activities, the 1.8kN maximum concentrated action is the limiting load case for the reference values of imposed floor actions attributed to self-contained dwellings.
XL Floor 75 satisfies those listed strength and deflection requirements for imposed floor actions in accordance with AS/NZS 1170.0 and is suitable for joist spans up to 600mm for self-contained dwellings (1.5kPa uniformly distributed actions and 1.8kN concentrated actions).

The analysis performed covers only those matters and products listed and excludes any other matter or product.

Yours Faithfully,



Dr Cameron Chick BE(Hons), Ph.D, GC.Com.(Mktg), M.AIRAH, RPEQ
Registered Building Practitioner: Engineer (Civil) Registration No: EC 39441
Director - Acronem Consulting Australia Pty Ltd



Acronem Consulting Australia Pty Ltd
Web: www.acronem.com.au Phone: +61 437 407 176
Email: cameron@acronem.com.au