

23rd August 2018

Global Procurement Supplies Limited

Attention: Lester Haycock

Email: Lester@ljmarketing.co.nz

Dear Lester

SI Unit Conversion and Load Capacity – MAGLOK Dragon Flooring Board

We have been provided with a test data sheet by yourself (attached) for the flexural and stiffness testing of your 18mm MAGLOK Dragon Board.

You have requested that we convert the units of the test results to SI Units, and determine the load capacity available for this product.

In considering the load capacity we have;

- Considered the 5 test results Flexural capacity and Modulus of Elasticity as reported.
- Assumed construction of the 18mm floor board is generally in accordance with NZS 3604:2011, with a 45mm wide joist spaced at 450mm centres.
- Assumed the floor board is laid continuous over at least two joist spacing's.
- Assessed the design Flexural capacity and Modulus of Elasticity in accordance with section B3 "Prototype Testing" of NZS 1170:2002.

Under Section B3, NZS 1170, with 5 test samples and a Coefficient of Variation less than 10%, the Standard requires use of the lowest test reading, divided by a kt factor of 1.28.

A Strength reduction factor $\Phi = 0.6$ has been assumed, as there is no relevant material standard that we are aware of at this time.

Based on above the resulting design Flexural capacity $\Phi.M_{bx} = 5.6$ MPa, and the design Modulus of Elasticity $= 4395$ MPa, in SI Units. For the span geometry assumed above the following load capacities and deflection performance is calculated;

Maximum Distributed Live load = 5.0 kPa

Maximum Point Load = 1.9 kN

Deflection of 1mm under 1 kN computed.

Deflection limit of span/300 is not exceeded under the above design loads.

Reviewing these results against the minimum requirements of Table 3.1 NZS 1170 – “Structural Design Actions”;

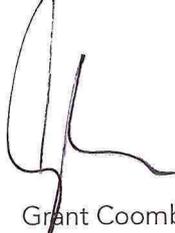
- We observe that the distributed load capacity exceeds the requirements for Domestic (2.0 kPa), Office (3.0 kPa) and File rooms/Office storage (5.0 kPa) space use types.
- We observe that the point load capacity exceeds the requirements for Domestic space use types (1.8 kN), but not Office (2.7 kN) and File rooms/Office storage (4.5 kN) space use types.
- We observe that deflection is not a governing criteria.

In summary, the critical design case for this product, based on the test results supplied, and the geometry and construction assumptions noted above, is flexural strength under point load, and that based on our calculations the limiting use type is Type A-Domestic and Residential Activities as defined in Table 3.1 of NZS 1170.

DISCLAIMER: This report has been prepared solely for the benefit of Global Procurement Supplies Ltd as our client with respect to the brief given to us, and data and opinions contained in it may not be used in other contexts or for other purposes without our prior review and agreement.

Our engagement for this service is with Global Procurement Supplies Ltd, in accordance with the Standard ACENZ 2017 Short Form Conditions of Contract.

Yours sincerely

A handwritten signature in black ink, appearing to read "Grant Coombes".

Grant Coombes
On Behalf of
Engenium Ltd

Short Form Agreement for Consultant Engagement

Between: *Global Procurement Supplies Limited*

.....
(Client)

and: *Engenium Limited*

.....
(Consultant)

Collectively referred to herein as the "Parties" and individually as a "Party"

Project: *Dragon Flooring Board Calculations*

Location: *N/A*

Scope & nature of the Services: *As per Engenium letter dated 23rd August 2018, File E1309*

Programme for the Services: *As per Engenium letter dated 23rd August 2018, File E1309*

Fees & timing of payments: *As per Engenium letter dated 23rd August 2018, File E1309*

Information or services to be provided by the Client: *As per Engenium letter dated 23rd August 2018, File E1309*

The Client engages the Consultant to provide the Services described above and the Consultant agrees to perform the Services for the remuneration provided above. Both Parties agree to be bound by the provision of the Short Form Model Conditions of Engagement (overleaf), including clauses 2, 11 and 12 and any variations noted below. Once signed, this agreement, together with the conditions overleaf and any attachments, will replace all or any oral agreement previously reached between the Parties.

Variations to the Short Form Model Conditions of Engagement (overleaf):

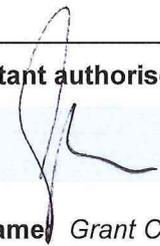
Client authorised signatory (ies):

.....

Print name:

Date:

Consultant authorised signatory (ies):

.....


Print name: *Grant Coombes*

Date: *23rd August 2018*

SHORT FORM MODEL CONDITIONS OF ENGAGEMENT

1. The Consultant shall perform the Services as described in the attached documents.
2. The Client and the Consultant agree that where all or any of, the Services are acquired for the purposes of a business the provisions of the Consumer Guarantees Act 1993 are excluded in relation to those Services. However, nothing in this Agreement shall restrict, negate, modify or limit any of the Client's rights under the Consumer Guarantees Act 1993 where the Services acquired are of a kind ordinarily acquired for personal, domestic or household use or consumption and the Client is not acquiring the Services for the purpose of a business.
3. In providing the Services, the Consultant must use the degree of skill, care and diligence reasonably expected of a professional consultant providing services similar to the Services.
4. The Client shall provide to the Consultant, free of cost, as soon as practicable following any request for information, all information in the Client's power to obtain which may relate to the Services. The Consultant shall not, without the Client's prior consent, use information provided by the Client for purposes unrelated to the Services. In providing the information to the Consultant, the Client shall ensure compliance with the Copyright Act 1994 and shall identify any proprietary rights that any other person may have in any information provided.
5. The Client may order variations to the Services in writing or may request the Consultant to submit proposals for variations to the Services. Where the Consultant considers a direction from the Client or any other circumstance is a variation the Consultant shall notify the Client as soon as practicable.
6. As soon as the either Party becomes aware of anything that will materially affect the scope or timing of the Services, the Party must inform the other Party in writing.
7. The Client shall pay the Consultant for the Services the fees and expenses at the times and in the manner set out in the attached documents. Where this Agreement has been entered by an agent (or a person purporting to act as agent) on behalf of the Client, the agent and Client shall be jointly and severally liable for payment of all fees and expenses due to the Consultant under this Agreement.
8. All amounts payable by the Client shall be due on the 20th of the month following the month of issue of each GST Invoice or at such other timing as agreed in writing between the parties. If the Client fails to make the payment that is due and payable and that default continues for 14 days, the Consultant may provide written notice to the Client specifying the default and requiring payment within 7 days from the date of the notice. Unless payment has been made by the Client in full, the Consultant may suspend performance of the Services any time after expiration of the notice period. The Consultant must promptly lift the suspension after the Client has made the payment.
9. Where the nature of the Services is such that it is covered by the Construction Contracts Act 2002 (CCA) and the Consultant has issued a payment claim in accordance with the CCA, the provisions of the CCA shall apply. In all other cases, if the Client, acting reasonably, disputes an invoice, or part of an invoice, the Client must promptly give the reasons for withholding the disputed amount and pay any undisputed amount in accordance with clause 8.
10. Where Services are carried out on a time charge basis, the Consultant may purchase such incidental goods and/or Services as are reasonably required for the Consultant to perform the Services. The cost of obtaining such incidental goods and/or Services shall be payable by the Client. The Consultant shall maintain records which clearly identify time and expenses incurred.
11. Where the Consultant breaches this Agreement, the Consultant is liable to the Client for reasonably foreseeable claims, damages, liabilities, losses or expenses caused directly by the breach. The Consultant shall not be liable to the Client under this Agreement for the Client's indirect, consequential or special loss, or loss of profit, however arising, whether under contract, in tort or otherwise.
12. The maximum aggregate amount payable, whether in contract, tort or otherwise, in relation to claims, damages, liabilities, losses or expenses, shall be five times the fee (exclusive of GST and disbursements) with a maximum limit of \$NZ500,000.
13. Without limiting any defences a Party may have under the Limitation Act 2010, neither Party shall be considered liable for any loss or damage resulting from any occurrence unless a claim is formally made on a Party within 6 years from completion of the Services.
14. The Consultant shall take out and maintain for the duration of the Services a policy of Professional Indemnity insurance for the amount of liability under clause 12. The Consultant undertakes to use all reasonable endeavours to maintain a similar policy of insurance for six years after the completion of the Services.
15. If either Party is found liable to the other (whether in contract, tort or otherwise), and the claiming Party and/or a Third Party has contributed to the loss or damage, the liable Party shall only be liable to the proportional extent of its own contribution.
16. Intellectual property prepared or created by the Consultant in carrying out the Services ("New Intellectual Property") shall be jointly owned by the Client and the Consultant. The Client and Consultant hereby grant to the other an unrestricted royalty-free license in perpetuity to copy or use New Intellectual Property. Intellectual property owned by a Party prior to the commencement of this Agreement and intellectual property created by a Party independently of this Agreement remains the property of that Party. The ownership of data and factual information collected by the Consultant and paid for by the Client shall, after payment by the Client, lie with the Client. The Consultant does not warrant the suitability of New Intellectual Property for any purpose other than the Services or any other use stated in the Agreement.
17. The Consultant has not and will not assume any duty imposed on the Client from time to time pursuant to the Health and Safety at Work Act 2015 ("the Act") arising out of this engagement. The Consultant and Client agree that, for the purpose of the Act, the Consultant will not at any time have management or control of the Project workplace.
18. The Client may suspend all or part of the Services by notice to the Consultant who shall immediately make arrangements to stop the Services and minimise further expenditure. The Client and the Consultant may (in the event the other Party is in material default that has not been remedied within 14 days of receiving the other Party's notice of breach) either suspend or terminate the Agreement by notice to the other Party. If the suspension has not been lifted after 2 months the Consultant has the right to terminate the Agreement and claim reasonable costs as a result of the suspension. Suspension or termination shall not prejudice or affect the accrued rights or claims and liabilities of the Parties.
19. The Parties shall attempt in good faith to settle any dispute by mediation.
20. This Agreement is governed by the New Zealand law, the New Zealand courts have jurisdiction in respect of this Agreement, and all amounts are payable in New Zealand dollars.

SUMMARY DATA

**ASTM C1185-08(2016), Standard Test Methods for Sampling and Testing
 Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards
 Section 5: Flexural Strength (Modulus of Rupture)**

Client: Chu & Son
 Job Number: CHSN062618-22
 Test Location: *NTA, Inc.*
Nappanee, Indiana

Constructed By: Melissa Johnson
 Performed By: Melissa Johnson
 Witnessed By: Caleb Hunsberger

General:

Date Received: 6/27/2018
 Construction Date: 8/1/2018
 Conditioning: Start Date: 8/1/2018
 End Date: 8/8/2018
 Test Date: 8/9/2018

Apparatus:

Sensor (Conditioning):	Asset No. 00000
Tape:	01448
Calipers:	01780
Balance:	00003
Load Frame:	00140
Load Cell:	00151
Load Fixture:	01149
Support Fixture:	01149
Tape:	01448
Sensor (Test):	00576
Dial Indicator:	N/A

Conditioning Environment (Equilibrium):

Start	Temp. (°F): 72.1	RH (%) 49.5
End	Temp. (°F): 72.8	RH (%) 48.5

Product Description:

Manufacturer: Chu & Son
 Trade Name: Dragon Board
 Material Description: 6-in x 12-in x 18mm nominal thickness Dragon Board
 Product Certifications: none
 Product Type: Flat Sheet

Test Results:

Test Variable: None
 Modifications: None

Load Rate (in./min.): 1.25
 Span (in.): 10

Ambient Temp. (°F): 72.5
 Ambient RH (%): 51.2

Table A1: Summary of Results

	Flexural Strength (psi)	Breaking Moment (ft-lbf/ft)	Modulus of Elasticity (psi)
Average:	1,901	157	916,558
St. Dev.:	166	14	83,486
COV:	8.73%	9.17%	9.11%

This summary contains only data arrived at after employing the specific test procedures listed herein. This summary data might not include all reporting requirements of the test standard. The data herein does not constitute a recommendation for, endorsement of, or certification of the product or material tested. NTA, Inc. makes no warranty, expressed or implied, except that the test has been performed, and data prepared, based upon the specimen furnished by the client. Extrapolation of data, from the test data provided herein, to the batch or lot from which the specimens were obtained may not correlate and should be interpreted with extreme caution. NTA, Inc. assumes no responsibility for variations in quality, composition, appearance, performance, or other features of similar materials produced by the client, other persons, or under conditions over which NTA, Inc. has no control. NTA Inc. has issued this data summary for the exclusive use of the client to whom it is addressed. Any use or duplication of this summary shall not be made without their consent. This summary shall only be reproduced in its entirety.

