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Attention: Craig Floyd

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SUBJECT: ASSESSMENT FOR INTERNAL SURFACE FINISHES OF LIGHTBETON PANEL FOR COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE(NZBC)

Dear Craig

Thank you for your request to provide advice on the compliance with the New Zealand Building Code for internal surface finishes requirements of the following LightBeton Panels.

- 19mm thick LightBeton MDF panel consisting of a 16mm thick FR MDF core and covering surface of 2mm to 2.7mm thick concrete overlay in Classic Grey and Classic White colors.
- 18mm thick LightBeton mineral sandwich panel consisting of 2mm thick concrete layer, backed with 3mm thick mineral board, 10mm particle board and 3mm thick mineral board in Cassic Grey, Urban Grey, Classic White and Anthracite colours.

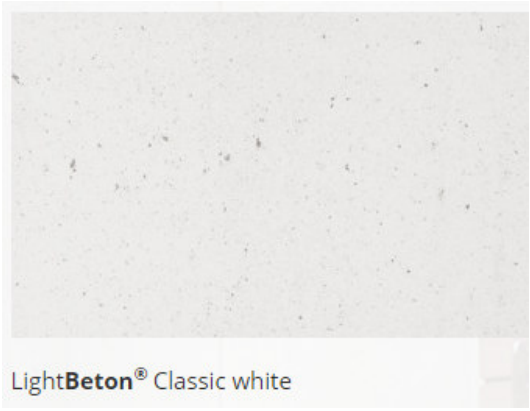
Product Description

A LightBeton panel consists of a 2mm thick concrete surface layer which can be applied to various panel substrates.

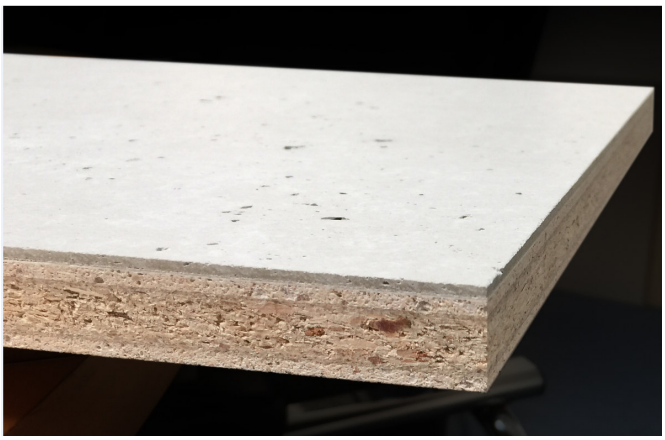
According to the LightBeton brochure, LightBeton panels are backed with either fibre glass, polypropylene honeycomb or MDF panels. However our assessment has only been carried out for following products which have test data supplied.

- 19mm thick LightBeton FR MDF panel consisting of a 16mm thick FR MDF core and covering surface of 2mm to 2.7mm thick concrete overlay with Classic Grey and Classic White colours.

LightBeton FR MDF Panel



- 18mm thick LightBeton mineral sandwich panel consisting of 2mm thick LightBeton surface covering, backed with 3mm thick mineral board, 10mm particle board and 3mm thick mineral board. The 3mm thick mineral board(density 960kg/m3) has magnesium oxide base which is cement bound and fibre reinforced before it is bonded to a 10mm thick particle board.



New Zealand Building Code Compliance

The building code C3.4a states

Provisions	Limit on application
PERFORMANCE **C3.4** (a) materials used as internal surface linings in the following areas of *buildings* must meet the performance criteria specified below:	Clause C3.4 does not apply to *detached dwellings*, within *household units* in *multi-unit dwellings*, or *outbuildings* and *ancillary buildings*.

Area of *building*	Performance determined under conditions described in ISO 9705: 1993	
	***Buildings* not protected with an automatic *fire* sprinkler system**	***Buildings* protected with an automatic *fire* sprinkler system**
Wall/ceiling materials in sleeping areas where care or detention is provided	Material Group Number 1-S	Material Group Number 1 or 2
Wall/ceiling materials in exitways	Material Group Number 1-S	Material Group Number 1 or 2
Wall/ceiling materials in all *occupied spaces* in importance level 4 *buildings*	Material Group Number 1-S	Material Group Number 1 or 2
Internal surfaces of ducts for *HVAC systems*	Material Group Number 1-S	Material Group Number 1 or 2
Ceiling materials in crowd and sleeping uses except *household units* and where care or detention is provided	Material Group Number 1-S or 2-S	Material Group Number 1 or 2
Wall materials in crowd and sleeping uses except *household units* and where care or detention is provided	Material Group Number 1-S or 2-S	Material Group Number 1, 2, or 3
Wall/ceiling materials in occupied spaces in all other locations in *buildings*, including *household units*	Material Group Number 1, 2, or 3	Material Group Number 1, 2, or 3
External surfaces of ducts for *HVAC systems*	Material Group Number 1, 2, or 3	Material Group Number 1, 2, or 3
Acoustic treatment and pipe insulation within airhandling plenums in sleeping uses	Material Group Number 1, 2, or 3	Material Group Number 1, 2, or 3

The internal surface finishes for walls and ceilings are tested to assess the risk of the spread of flame across the surface using one of two methods which enables a material Group Number between 1 and 4 to be assigned to the material and demonstrate compliance with the Table above. A postscript “S” can also be provided which denotes that the smoke production also needs to be considered. The first method is the ISO9705 (full scale room corner-test) and assigned a Group Number between 1 to 4 (least to most combustible). The second method is using the ISO5660 (bench scale fire test on a small sample of material) with the input parameters and method of calculating the Material Group Number given in Appendix A of C/VM2.

There is also an overview provided by MBIE (Ministry of Business Innovation and Employment NZ) website for comparing Group numbers in New Zealand to Australian and European test standards.

https://www.building.govt.nz/building-code-compliance/c-protection-from-fire/c-clauses-c1-c6/surface-finishes/overview/

In Europe, the risk of the spread of flame across the surface finish of the materials are assessed using the methods specified in the EN13501-1:2007+A1:2009 standard. The classification levels are A1, A2, B, C, D, E and F, from least to most combustible.

The Single Burning Item (SBI) as described in EN 13501-1:2007+A1:2009 is a test method for determining the reaction to fire behaviour of building products when exposed to the thermal attack by a propane burner. The results of this test, using a Fire Growth Rate (FIGRA ratio) have been correlated by MBIE to the ISO 9705 Group Numbers and the requirements of NZBC Clause 3.4(a) in the same manner as the ISO 5660 cone calorimeter test.

Compliance can also be demonstrated using Table C1 of Acceptable Solution (C/ASx) for materials with Australian and European classification without the need for the further testing.

Table C1 Alternative test or classification standards for Group Numbers

Requirements according to C/VM2 Appendix A using ISO 9705 or ISO 5660	Requirements according to NCC Specification C1.10 Clause 4 using AS ISO 9705	European Classification using EN 13501-1
Group Number 1- S	Group Number 1, and a smoke growth rate index not more than 100	Class A1, A2 or Class B and Smoke production rating s1 or s2
Group Number 1	Group Number 1	Class A1, A2 or B
Group Number 2- S	Group Number 2, and a smoke growth rate index not more than 100	Class C and Smoke production rating s1 or s2
Group Number 2	Group Number 2	Class C
Group Number 3	Group Number 3	Class D
Group Number 4	Group Number 4	Class E and F

LightBeton Panel Testing Results and Discussion

The classification report defines the classification assigned to the products in accordance with the procedures given in the standard EN13501-1:2007+A1:2009: Fire Classification of Construction Products and Building Elements – Part 1: classification using data from reaction to fire tests.

Based on Classification Report No. 2015-1724-K1 issued 16.07.2015, the classification of 19mm overall thickness LightBeton Classic Grey and Classic White panels with 16mm FR MDF backing and 2mm thick LightBeton finishing is ranked as Class **B** related to its behavior in case of fire and Class **s1** for smoke development. This corresponds to the most onerous requirement which is Group Number 1S (C/ASx Table C1) therefore this product complies with the Group Number **1S** requirements. LightBeton finishing can also be fixed on timber, plywood or particleboard with a minimum thickness of 12mm or more as it has already been tested on 16mm FR MDF board in accordance with NZBC C/VM2 Table A2.

Based on Classification Report No. P172579, Issue No. DE/4 dated 02/10/2017, the classification of 18mm thick LightBeton mineral sandwich panel consisting of 2mm thick LightBeton finishing, 3mm mineral board, 10mm particle board and 3mm mineral board is ranked into Class **B** related to its behavior in case of fire and Class **s1** for smoke development. This corresponds to the most onerous requirement which is Group Number **1S** (C/ASx Table C1) therefore this product complies with the Group Number 1S requirements.

Conclusion

The spread of fire over internal surface finishes for walls and ceilings consisting of 19mm overall thickness LightBeton FR MDF panel and 18mm overall thickness LightBeton mineral sandwich panel is Class **B** and Class **S1** for behavior in case of fire and smoke respectively based on the classification reports which corresponds to Group Number **1S** (C/ASx Table C1) therefore these products will comply with the building code C3.4a if the installation is carried out in accordance with the manufacturer's instructions.

DISCLAIMER

1. This report is based on the following documentation supplied by Plytech International Ltd.
   - Classification Report No. 2015-1724-K1 issued 16.07.2015
   - Classification Report No. P172579, Issue No. DE/4 dated 02/10/2017
2. This opinion represents the views of Origin Fire Consultants.
3. If a more authoritative opinion is required, then this would have to be obtained from a recognised testing laboratory.
4. This report does not relieve other designers and consenting authorities to assess the relevance of this report to the particular building project.

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