



LES BOULTON
& ASSOCIATES LIMITED

MATERIALS AND CORROSION CONSULTANTS

Suite 2, 266 Onewa Road
Birkenhead, Auckland
New Zealand
PO Box 101261
North Shore Mail Centre
Telephone 09 419 8451
Facsimile 09 419 8492
Mobile 021 478 300
Email: lboulton@wave.co.nz
www.corrosioncontrol.co.nz

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NZ Sustainable Forest Products
10 Gannons Rd
RD 1
REEFTON 7895

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Durability Appraisal of *Magnum Board* Wall Lining

1. Introduction

Les Boulton & Associates Ltd (LBA) was requested by *NZ Sustainable Forest Products* (NZSFP) to carry out an appraisal of the material employed in *Magnum Board* for wall linings in buildings. *Magnum Board* wall lining is manufactured at the *Magnum Building Products* (MBP) facility in China to USA specifications. The purpose of the durability appraisal was to assess whether the material employed in manufacture of *Magnum Board* complies with the durability requirements of the *New Zealand Building Code* (NZBC) Clause B2, *Durability*.

Magnum Board is composed of fibre-reinforced magnesium oxide base designed to be installed as an interior wall lining of buildings. *Magnum Board* wall lining is appropriate for use in wet areas of a building, such as behind shower linings and as a tile-backer board. *Figure 1* shows the two sides of samples of the *Magnum Board* wall lining.

The following test reports, documentation and the MSDS data sheet were made available by NZSFP in order that the durability appraisal could be carried out on the materials of construction used for *Magnum Board*.

- RADCO Test Report No.RAD-4451, California, USA; “*Humidified Testing of magnesium oxide sheets per AC386 (acceptance criteria for fibre-reinforced magnesium oxide based sheets)*”; January 26, 2009.
- RADCO Test Report No.RAD-4224, California, USA; “*Physical properties testing of magnesium oxide sheets per AC386 (acceptance criteria for fibre-reinforced magnesium oxide based sheets)*”; May 8, 2008.
- Certified Test Summary & Product Specifications AC386 Criteria – ASTM and UL Procedures; Magnum Building Products, Long Beach, California, USA; August, 2011.
- Technical Bulletin No.113011-1148, “*Fastener design and material recommendation*”; Magnum Building Products, Florida, USA, January 19, 2012.
- Technical Bulletin No.090509-1405, “*Installation Guidelines for Magnum Wall and Ceiling Board*”, Magnum Building Products, Florida, USA, May 2012.
- MSDS Data Sheet No.MBGEP-032107-5; *Magnum Board*, Magnum Building Products, Florida, USA, January 1, 2009.

2. Assessment of the Durability of *Magnum Board*

Magnesium oxide board has been given the *Code Mark Approval* in Australia and *Magnum Board* is supported by the *UL Mark* in North America. *Magnum Board* has been extensively tested to ASTM Standards in the USA for performance criteria and correct installation procedures.

Magnum Board is composed of fibre-reinforced magnesium oxide-based homogeneous sheet. *Magnum Board* has the following composition:

- Magnesium oxide (MgO)
- Magnesium chloride (MgCl₂)
- Cellulose
- Perlite
- Proprietary additive
- Fibreglass scrim

The materials employed in *Magnum Board* are chemically inert except for a low level of magnesium chloride which may be corrosive to some metal fasteners if the lining board is installed in a wet or humid environment. However, this potential problem has been addressed by MBP who strongly recommend that installers of *Magnum Board* use stainless steel (SS) fasteners to attach *Magnum Board* wall lining sheets to treated timber or light gauge steel joists. In addition, during installation the stainless steel fastening screws are required to be countersunk and coated with three coats of a jointing compound to ensure that the SS fastener heads are sealed inside the board below the final lining surface.

Extensive physical testing of *Magnum Board* to recognised ASTM Standards (USA) has shown that the board material is resistant to insects (e.g. termites) and it is not susceptible to water damage. The board material does not support microbial growth such as mold or mildew. The magnesium oxide based board is non-flammable and it is also non-combustible. In addition, the dust generated when cutting *Magnum Board* during installation of the sheets as a wall lining is non-toxic.

3. Durability Appraisal of *Magnum Board*

Assessment of the materials comprising *Magnum Board* has shown that the materials employed in the manufacture of the wall lining in conjunction with good installation practices are adequate to avoid any degradation issues that may arise during service in wet areas of a building. Thus, the materials employed for manufacture of *Magnum Board* are suitable to withstand exposure under New Zealand conditions in the wet areas of a building. The likelihood of any structural damage occurring on *Magnum Board* wall linings due to microbial degradation of the material, or to corrosion of metal fasteners used for the board in wet service areas is very low.

A review of the product data sheets and the ASTM testing results for the materials of construction of *Magnum Board* was carried out. Assessment of the environmental testing for material performance during service showed that the materials used for manufacture of the wall

lining board will meet the durability requirements of the NZ Building Code, Clause B2, *Durability*. The NZ Building Code Clause B2 Durability requirements for interior wall linings, including use as wall linings behind tiled showers, is as follows:

- Interior wall linings: at least 15 years or the same durability as the tile covering the wall lining.

The *Magnum Board* interior wall lining should provide a service life of not less than 15 years when installed as a wall lining in all wet areas of buildings.

Durability Appraisal prepared by:

L. H. Boulton

Principal Consultant

**Les Boulton & Associates Ltd
Materials and Corrosion Consultants**

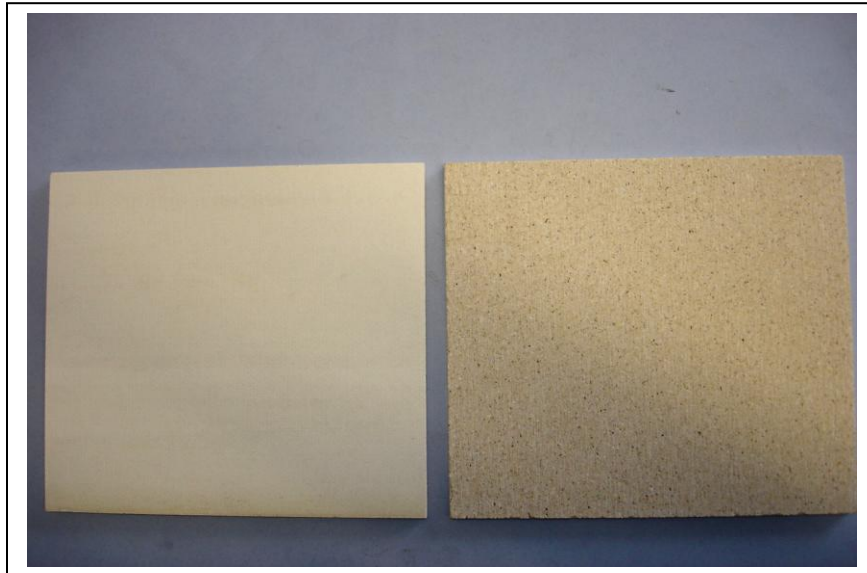


Figure 1. *Magnum Board* showing both sides of the sheet material. The wall lining board is made from a fibre-reinforced magnesium oxide base.