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Durability Appraisal of *Eterpan* Fibre Cement Cladding Panels

1. Introduction

Les Boulton & Associates Ltd (LBA) was requested by *Fibre Cement Solutions* (FCS) to carry out a durability appraisal on the materials used to manufacture *Eterpan* medium density (MD) fibre cement cladding panels. The purpose of the durability appraisal was to assess the materials used for the manufacture of *Eterpan* MD fibre cement board to ensure that they comply with the durability requirements of the New Zealand Building Code (NZBC) Clause B2 *Durability*.

Eterpan fibre cement board is a building product manufactured by *Eternit Asia Panels* an *Etex Group* company based in Malaysia. *Eterpan* MD is manufactured from a homogeneous mixture of cement, organic cellulose fibres and selected mineral fillers. *Eternit* fibre cement board is a composite material comprising cellulose fibres bonded tightly within the cementitious silicate matrix.

To ensure that good mechanical properties and good durability are obtained the *Eternit* fibre cement board is autoclaved during manufacture. Fibre cement board is autoclaved to form a highly dimensional stable board for exterior claddings. The *Eternit* fibre cement board is manufactured by the advanced flow-on technology instead of the conventional Hatschek method. The flow-on technology for manufacture of fibre cement board produces a homogeneous product with a monolithic core that has superior delamination resistance.

Eterpan MD fibre cement board comes in thicknesses ranging from 6mm to 20mm. *Eterpan* MD board is available in a light grey colour with an unsanded surface finish or with a sanded surface finish. The *Eterpan* panels can be painted after installation as a cladding to enhance the appearance and the long term durability of the façade cladding.

The benefits of using *Eterpan* fibre cement panels as a façade cladding on buildings are as follows:

- Fibre cement panels have excellent durability.
- Fibre cement panels have good weather resistance and immunity to water damage.
- Fibre cement panels have excellent fire resistance.
- Fibre cement panels are lightweight, workable and low shrinkage.
- Fibre cement panels are resistant to termite and insect attack.

- Fibre cement panels are asbestos free and non-hazardous.

The following documentation, laboratory testing reports and technical data sheets were submitted by FCS. The technical information provided was reviewed in order to carry out a durability assessment on the materials used to manufacture *Eterpan* fibre cement board.

- AS-NZS 2908:2000, Part 2, Cellulose Cement Products - Flat Sheet.
- Eterpan Technical Manual, Eternit, Etex Building Group, Malaysia, 2018.
- Eterpan MD Technical Data Sheet, Eternit, Etex Building Group, Malaysia, 2018.
- Eterpan MD, MSDS Sheet, Eternit, Etex Building Group, Malaysia, 2018.
- Eterpan Producer Statement, Eternit Asia Pacific, Malaysia, R.Vermier, MD.
- Eterpan Warranty, Eternit, Etex Building Group, Malaysia, 2018.
- Eterpan Test Report for external wall claddings, Report No.16-004746, Eternit Australia, AWTA Product Testing, South Australia, 2016.
- Report on Eterpan MD fibre cement board, MaterialLab, Fugro Technical Services Ltd, Report No.041823ST50194, Hong Kong, 2005.

2. Assessment of *Eterpan* fibre cement panel base materials

Eternit medium density fibre cement board is employed for manufacture of building products such as *Eterpan* cladding panels. *Eternit* MD fibre cement board can be used for:

- Exterior cladding systems.
- Internal linings.
- Wet wall linings.
- Rigid wall underlays.
- Soffits.
- Flooring systems.
- Schist and stone backing board.

Eternit fibre cement board is manufactured using the following base materials:

- Portland cement
- Silica sand
- Cellulose fibres
- Water
- Minor amounts of harmless additives

Eterpan fibre cement panels have an *Eternit Warranty* for the material of manufacture (fibre cement) to remain defect free due to the materials employed in the manufacturing process of the fibre cement board for a period of 15 years from the date of purchase.

Eterpan fibre cement panels have been assessed by testing authorities to ensure that the material complies with Standards for fibre cement flat sheet. The fibre cement board used to manufacture

Eterpan MD panels complies with Standard AS-NZS2908:2000, Part 2, *Cellulose-cement products - Part 2: flat sheets*.

3. Durability of *Eterpan* MD fibre-cement cladding panels

Eterpan panel board is a fibre cement composite bonded tightly within a silicate matrix. The autoclaved fibre cement board acquires high strength during the flow-on manufacturing process. In addition, the *Eterpan* fibre cement cladding is resistant to fire, water, termites and corrosion.

Eterpan cladding panels combine the durability of cement and the workability of cellulose fibres in the composite material. The strength, water resistance and durability of fibre cement make the material suitable for exterior wall cladding on residential, commercial and industrial buildings. In addition *Eterpan* board can be used for internal linings, wet wall linings, rigid wall underlays, soffits, flooring systems and schist and stone backing board.

Assessment of the materials employed for manufacture of the *Eterpan* fibre cement panels has shown that the materials are protected against all forms of degradation by the choice of high quality base materials. Additional protection and enhanced durability can be acquired by application of a decorative coating system onto the *Eterpan* external panel surfaces.

The *Eterpan* MD cladding panels have been appraised to ensure that the building product is compatible with all cladding system structural elements. *Eterpan* cladding panels are compatible with metal fixings, aluminium alloy support structures, structural adhesives, and treated timber battens in wall cavities.

The materials employed to manufacture *Eterpan* panels are suitable to withstand exposure to all New Zealand environmental conditions. This includes exposure in marine environments where it is recommended that a paint coating is applied. The likelihood of any structural degradation occurring on *Eterpan* fibre cement panels due to atmospheric exposure conditions during service in New Zealand is low.

To ensure that the expected service life is achieved for *Eterpan* cladding panels, routine inspection and maintenance should be carried out by the building owner as recommended by the cladding system supplier.

4. Durability appraisal of *Eterpan* MD cladding panels

4.1 A review of the manufacturing process and the material testing program for *Eterpan* Medium Density fibre cement façade cladding panels has been carried out.

4.2 The NZ Building Code (NZBC) Clause B2 *Durability* requirement for *Eterpan* MD fibre cement cladding panels is a service life of 15 years. For *Eterpan* MD used as a rigid wall underlay the service life requirement is 50 years.

4.3 Assessment of the *Eterpan* MD panel technical data sheets and the measures taken during manufacture against degradation of the fibre cement board has shown that the materials employed meet the durability requirement of the NZ Building Code (NZBC) Clause B2 *Durability* for at least 15 years of service life.

4.4 If used as a rigid wall underlay for a cladding system *Eterpan* MD fibre cement board will give a service life of at least 50 years which meets the requirements of NZBC Clause B2 *Durability*.

Durability appraisal prepared by:

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