TECHNICAL APPRAISAL

SUPABOARD

Report No. 104710

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PURPOSE

This technical appraisal is intended to provide an opinion on the suitability of the product for its intended use as an internal surface lining in residential dwellings (Building Code of Australia Class 1 buildings) and as an external façade cladding in Class 2-9 buildings.

The product 'Supaboard' is referred to in this report as 'MgO board' or 'Supaboard'.

EXECUTIVE SUMMARY

In our opinion, Supaboard is deemed fit for purpose as an internal and external surface lining in commercial and residential buildings as an alternative to plasterboard and fibre cement sheeting and similar cladding materials.

APPLICANT

BUILDITECO Pty Ltd
Unit 8, 49 Prindiville Drive,
Wangara WA 6065

PRODUCT

Supaboard is a rigid board product for use as a wall, floor or ceiling lining in buildings. It is a manufactured product with the main constituent of magnesium oxide (MgO).

The product can be manufactured in varying thicknesses and panel sizes. The board can be cast in a range of thicknesses between 3mm and 30mm.

MgO has been used for centuries in Asia as a bonding agent for mortar in masonry construction; in much the same way as ordinary Portland cement is used in other areas.

MgO board is manufactured in a number of locations around the world, primarily near areas where MgO ore (periclase) deposits are mined. Major deposits are found in China, Europe, and Canada.

In addition to the base material of MgO, other types of magnesium 'cements', wood flour, and various additives are included to improve manufacturing and enhance various properties. Most MgO boards have some type of fibrous reinforcement within the core and/or on the face. This can include glass mesh, fibers, or a fine screed. MgO boards also contain other additives to enhance flexibility and its resistance to moisture.

MgO boards are made as individual pieces that are cut to length as they are poured onto a casting tray. The initial set occurs horizontally, but the final cure occurs vertically or with spacers between the sheets. The MgO is cast in a liquid slurry-like form (a mixture of MgO powder, and other additives and water) and then sets by chemical reaction. The cast boards are then cured at ambient temperature. There is relatively little input of additional energy during the manufacturing process compared with plasterboard and fibre cement products, giving the MgO board a low embodied energy rating. MgO boards do not contain asbestos, but some have different types of micro fibre reinforcing. This reinforcing is separate from the surface scrim, and is part of the MgO slurry used to cast the MgO sheets.

MgO board is available in various sizes and thicknesses. It is a non-paper-covered material and generally light grey, white or beige in color. It comes in various grades such as smooth finishes, rough textures, and utility grades.

MgO board is intended for use as a surface lining in interior and exterior applications as an alternative to plasterboard products and fibre cement sheeting. It is widely used in South-East Asia and has been approved for use in the U.S.A.

COMPLIANCE REQUIREMENTS

The National Construction Code – Building Code of Australia (hereinafter referred to as the 'BCA') does not contain any specific clauses or requirements pertaining to internal surface linings, other than the requirements for water resistant substrates in wet areas.

BCA Volume 2 incorporates specific requirements for weatherproofing external sheet cladding under Part 3.5, however Volume 1 does not contain specific references with respect to compliance requirements for these types of external cladding sheets with respect to weatherproofing.

BCA Volume 2 does refer to fibre cement sheets (refer BCA clause 3.5.3.3 *Fibre Cement Planks and Weatherboard Cladding)*. This Clause references the following Standards pertaining to fibre cement sheets: AS/NZS 2908.2 and ISO 8336.

BCA Volume 1 Spec C1.1 Clause 2.4 'Attachments not to impair fire resistance'. Clause 2.4 states that "the attachment of a facing or finish…must not impair the required fire resistance level of that part". It is noted that testing of the product has been undertaken with respect to combustibility (AS1530.1) and it is confirmed that the product is deemed non-combustible.

The BCA does not reference any Standards pertaining to MgO board, nor does it reference any Australian Standards or International Standards pertaining to plasterboard.

Due to the lack of specific compliance parameters it is considered more appropriate to compare MgO board against plasterboard and fibre cement sheeting to ascertain whether it is fit for its intended purpose.

COMPARATIVE ANALYSIS

Used as an internal or external lining, the MgO board should be able to meet the following criteria:

- Be a suitable finish for decoration.
- Have a reasonable degree of impact resistance.
- Resist delamination or disintegration when subjected to moisture.
- Resist weathering and thermal movement.
- Not be harmful to building occupants.
- Be workable in terms of cutting, sawing, drilling and fixing.
- Be compatible with substrates/framing supports.

APPRAISAL

Milestone Certifiers has assessed the following aspects in undertaking this appraisal:

Durability
As a surface lining, Supaboard would be expected to resist a significant amount of wear and tear throughout its anticipated life span. Its impact resistance and moisture resistance have been extensively tested by other authorities and testing agencies and it compares favourably with fibre cement sheeting and exceeds the performance of plasterboard. It does not have a tendency to delaminate when subjected to moisture as fibre cement sheet does. Its flexural strength and tensile strength are very good compared to both plasterboard and fibre cement sheeting. Its chemical composition is extremely stable, even when subjected to moisture. When subjected to freeze-thaw cycles, fibre cement sheeting and plasterboard will disintegrate; extended testing of MgO board to months of freeze-thaw cycles have not shown any significant loss of performance in the product. MgO board does not contain any nutrient sources to support fungal growth. Its thermal expansion rate is less than fibre cement sheeting for the same thickness of material.

Moisture Resistance
MgO board will absorb moisture when submerged for extended periods. The amount of absorption varies depending on the composition of the board. The significant difference between MgO and other similar products is that the performance of the board is not affected by moisture, unlike plasterboard which will disintegrate (even 'moisture resistant' plasterboard will fail over time) and fibre cement sheet which will delaminate. MgO board retains its impact resistance when saturated; it does not lose its hardness. Surface staining does not manifest after drying of the board. The moisture resistant properties of the board make it an ideal substrate for wet areas or as an external surface lining when suitably sealed.

Sustainability
Supaboard is manufactured from naturally occurring MgO ore, which is mixed with water and small quantities of additives (fillers) and left to cure at room temperature. The product is not kiln dried or autoclaved; therefore it has a relatively low embodied energy. The fillers used in the mix can be sourced from a variety of different materials, including waste wood chips. Off-cuts and waste sections producing during the manufacturing process can be ground down and re-used. On-site waste could also conceivably be re-used if a recycling facility was available (to our knowledge, such a facility does not currently exist in Australia).

Material Safety
(refer also to attached MSDS). Ordinary work safety practises should be adopted when using the product on site, including the wearing of PPE when using power tools. Whilst the base material is inert, fine dust can be created during the cutting process and inhalation of the dust should be avoided. The product does not contain asbestos or other known

carcinogens. Obviously, careful selection of the added fillers is paramount to ensuring that the product remains safe to use.

Workability
Milestone Certifiers have witnessed a practical demonstration of the workability of the material under typical work site conditions. The product was scored and snapped, power cut, hand cut, drilled, fixed and nailed. It was observed that the product performed in much the same manner as plasterboard, however due to its relative hardness it required more effort to work. Like both plasterboard and fibre cement sheeting, care is required when utilising fixings close to the edge of the sheet – BUILDITECO recommend a 20mm (+/- 5mm) clearance to the edge of the sheet to prevent edge failure. The product was tested for fixing pull-out strength and was shown to perform better than both plasterboard and fibre cement sheeting of the same thicknesses. Generally, the mode of failure occurs as snapping of the board across the fixing rather than localised failure around the fixing point.

Surface Finishing
The product has two distinct surface finishes resulting from the manufacturing process. On the 'bed' side of the board it is relatively smooth and, once primed, can receive a normal painted or textured finish. On the other side, the board is generally slightly textured and is a good surface for application of texture coatings. Used as an internal surface lining, the board joints can be flushed and jointed in the same way as plasterboard. Used as an external surface lining, the manufacturers require the board to be sealed prior to the application of approved proprietary surface coating applications.

CONCLUSION

In the opinion of Milestone Certifiers, the Supaboard product (MgO board) is suitable for use as an internal and external surface lining material in residential dwellings subject to the limitations contained in this Technical Appraisal. The Supaboard product is also suitable for use as an external cladding material on Class 2-9 buildings subject to the limitations contained in this Technical Appraisal.

LIMITATIONS

The following limitations apply to this technical appraisal for the Supaboard product:

1. This technical appraisal applies only to the use of the Supaboard product as described herein.

2. This technical appraisal will be withdrawn or amended if Milestone Certifiers considers that a change in design, manufacturing quality or third party certification renders the basis of the appraisal invalid.

3. The manufacturers recommendations for fixing, drilling and sawing of the material are complied with.

4. The manufacturer's recommendations for sealing the product prior to the application of approved proprietary surface coating applications.

5. Appropriate precautions are taken during cutting and drilling of the material to prevent dust inhalation.

6. In wet areas, walls are protected by a membrane sealing system in accordance with AS3740-2004.

REFERENCES

The following documents where used in carrying out the appraisal:

Suppliers Information

1. BUILDITECO Pty Ltd.
Installation Guide.
Supaboard Building Systems product information.

Information From Other Sources

1. MGO Group Inc.
'Magboard' Material Safety Data Sheet.

2. MBP Building Products
Structural Performance and Fire Testing:
- RADCO California Test Report RAD 4224
- Southwest Research Institute, San Antonio California.
- Underwriters Laboratory (UL); UL Certification File R26120

3. James Hardie Pty Ltd
Material Safety Data Sheet.
Certificate of Physical Properties (HardiFlex Sheets).

4. Wikipedia (Online Resource).
'Magnesium Oxide Wallboard'

5. Walls & Ceilings Online.
Article Dated: 31st Oct 2007:
Author: Robert Thomas
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