

CCMC MGO BOARD ADVISORY UPDATE



Dear Building Officials,

The following is an update to the CCMC MgO Board Advisory dated July 2017. The following documents have been revised to reflect the fact that the product GreenE-Board™ (CCMC 13417-R), manufactured by Southern Cross Technologies, Inc., is no longer included in the CCMC Registry of Product Evaluations. As of January 2018, the CCMC Evaluation Report for this product has been cancelled. Please note that all references to this product have been removed from the following Advisory.

CCMC was recently made aware of premature failures in other countries of some magnesium oxide (MgO) boards. Due to the increased use of MgO boards in Canada, and CCMC's role in support of Canada's Building Officials, Provincial/Territorial Governments and construction industry, we are providing the following technical information for consideration during the product acceptance for building permits in local jurisdictions.

In particular, below we will be addressing two scenarios: (i) the use of non-CCMC evaluated MgO boards and (ii) the use of CCMC evaluated MgO boards and the associated applications, conditions and limitations. When considering non-CCMC evaluated MgO products for approval, please consider the information provided below or request that the manufacturer to obtain a CCMC evaluation report. When using CCMC evaluation reports, it is important that conditions, limitations and application requirements stated in the reports are clearly understood and followed.

Note: MgO boards predominately come in three different types: magnesium oxychloride hydrate, magnesium oxysulfate hydrate or magnesium oxyphosphate hydrate. This bulletin pertains mainly to magnesium oxychloride hydrate boards. CCMC has not evaluated magnesium oxysulfate hydrate nor magnesium oxyphosphate hydrate products, therefore the performance of these MgO products is unknown to CCMC at this time. Additionally, CCMC's partners in Denmark and Australia have only provided information and comments regarding magnesium oxychloride hydrate boards. If building officials are accepting innovative construction products not evaluated by CCMC, building officials are cautioned to conduct appropriate due diligence and consider the information contained in this bulletin or request a CCMC evaluation report from the manufacturer.

KEY POINTS

01. CCMC through its membership in the World Federation of Technical Assessment Organizations (WFTAO) has partnered with Denmark and Australia to better understand the use of MgO Boards where challenges with MgO boards have been well documented.
02. Denmark has concluded that MgO boards do not perform well at humidity levels over 84% RH, especially for exterior uses. Denmark found, for their climate and their test conditions, MgO boards damaged wood studs, as well as, metal objects under these conditions. Australia has concluded that there is a body of evidence that shows MgO boards should not be in direct contact with metal except for stainless steel fasteners.
03. Discussions with the Chinese Magnesite Manufacturers' Association (the Chinese MgO board industry association) have confirmed that there is a wide range of MgO boards with varying levels of quality control being manufactured in China.
04. Building officials are advised to complete additional due diligence regarding approving the use of non-CCMC evaluated MgO products or ask manufacturers to obtain a CCMC number. Based on the results from Denmark and Australia, non-evaluated MgO products should not be used in humid conditions with humidity levels over 84% RH and should not be in direct contact with metal except for stainless steel fasteners (see the use of non-CCMC evaluated MgO board).
05. Building officials are asked to carefully review the conditions and limitations (e.g. the use of

specific corrosion-resistant fasteners) regarding the recently revised CCMC 14038-R – “MEGCRETe MgO Board using MBP-IP Technology” (non-structural exterior sheathing) when assessing the product’s proposed installation as per the CCMC report (see CCMC 14038-R MEGCRETe MgO Board).

06. Building Officials are reminded that CCMC evaluations are product specific and ‘intended use’ specific. CCMC has only evaluated the product for its intended use as stipulated in CCMC’s evaluation reports. Any other products and/or use being marketed by the CCMC report holders are not part of the CCMC evaluation (see the use The USE of non-CCMC evaluated MgO board).
07. CCMC has not evaluated the use of any MgO product in direct contact with different metals except for stainless steel fasteners, nor has CCMC evaluated any proposed protective membrane as a protection for the effects on metal of MgO boards. CCMC will continue to research MgO boards in collaboration with NRC experts, external experts, WFTAO and CCMC report holders. The results will be shared with building officials across Canada and reflected in CCMC evaluations. This research will include investigations of the effect of the boards on wood studs in Canadian climates. Until it is completed, caution is recommended in approving the use of any MgO board for use in wet or humid environments.
08. CCMC report holder, Rethinking Construction (CCMC 14038-R)) has been notified about this communication.

THE USE OF NON-CCMC-EVALUATED MGO BOARDS

INFORMATION FROM DENMARK

CCMC’s counterparts in Denmark warn about the use of non-evaluated MgO boards in humid environments. The problem that exists is due to the chloride ions within the boards which could cause corrosion. This risk is heightened in the presence of moisture and/or high humidity. If metal (such as galvanized steel) parts, fasteners or flashings are in contact with the boards, there is a risk for rapid corrosion. Additionally, galvanization and other zinc coatings were found to be inadequate as a method to prevent corrosion of fasteners by MgO boards. Wood studs were found to absorb excessive moisture and described as taking on a “diseased” appearance after exposure to the boards. These MgO boards were not evaluated for the intended use in Denmark and authorities are currently dealing with the replacement of large amounts of non-evaluated MgO boards as a result of the rapid corrosion of metal fasteners/elements in instances where these boards were used as exterior sheathing.

INFORMATION FROM AUSTRALIA

Similarly, CCMC counterparts in Australia have concerns over the bimetallic reactions attributed to MgO boards that were not evaluated for the intended use. They warn that conditions and limitations should be placed on its use. Currently, there are failures related to high rise buildings due to the corrosive effect of magnesium chloride salt leached from the boards on other metal structures. The effects of oxidation on metals such as mild steel (commonly used in building construction) are obvious and the destruction is rapid. There is now a body of evidence to support the view that non-evaluated MgO boards reacts in a negative way with metals. This reaction is precipitated by the presence of moisture. This moisture can be either external moisture as in wind driven rain or snow build up, or internal moisture as a result of humidity or leakage from an external source. Consequently, it is important to ensure that the board is protected from situations where it comes in contact with any moisture. It is also important that the board be isolated against intimate contact with all other metal structures in a building and stainless steel fasteners should be used. Australian authorities suggest that in their jurisdiction, given the high degree of product substitution, false marketing and faulty installation practices in the market place, a strict regime of evaluation and due diligence should be applied to the use of MgO products.

LOCAL APPROVAL OF NON-CCMC EVALUATED MGO BOARDS

The information from Denmark and Australia is provided for your consideration regarding the use of non-CCMC evaluated MgO products. Please consider the experiences of other countries when determining installation parameters and specific details related to non-CCMC evaluated MgO products. Specifically, MgO boards should not be used in direct contact with steel studs or other metal components (i.e. non-stainless steel Z-girts, metal channels, brick ties, etc.) and should not be used in humid or moist conditions due to the heightened risk of corrosion in the presence of moisture and in high-humidity areas.

When considering non-CCMC evaluated MgO products for approval, please consider the information provided in this bulletin or request a CCMC evaluation report from the manufacturer. When using CCMC evaluation reports, it is important that conditions, limitations and application requirements stated in the reports are clearly understood and followed. It is also important that official CCMC reports as opposed to promotional material are used to understand the product performance in relation to Building Codes and intended use.

CCMC 14038-R MEGCRETE MGO BOARD USING MBP-IP TECHNOLOGY (FOR USE AS NON-STRUCTURAL

EXTERIOR SHEATHING)

This report, which has been recently revised, addresses the performance of Rethinking Construction's proprietary "MEGCRETe MgO Board using MBP-IP Technology" as an alternative solution to the code specified non-structural exterior gypsum sheathing. The MEGCRETe MgO Board is a magnesium oxychloride hydrate board. As this exterior sheathing is non-structural and not qualified to provide bracing of exterior walls, the interior gypsum in a wall assembly is designated to resist lateral loads associated with provisions in Subclause 9.23.13.1.(2)(a)(iii) of the NBC 2015. Please note that conditions and limitations imposed on the product are such that this board must be attached with stainless steel fasteners, specifically SS316, SS304 or SS305. This is also a requirement for any subsequent fasteners that may penetrate the MgO board (i.e. cladding fasteners). The "MEGCRETe MgO Board using MBP-IP Technology" panel was primarily evaluated as an exterior sheathing where the required bracing is being provided by the interior gypsum. The "MEGCRETe MgO Board using MBP-IP Technology" panel may be installed as the interior sheathing where the required bracing is being provided by the exterior wood-based sheathing as part of a conventional wood-frame assembly. The evaluation as exterior sheathing included (i) the durability resistance required to survive the exterior elements during construction, equivalent to exterior gypsum sheathing, and (ii) the long-term performance after being protected with the sheathing membrane and cladding. Therefore, the durability for interior use in a protected interior environment, is already addressed. However, other aspects that may be important to the user as an interior finish (joint taping/compounding, paintability) has not been evaluated.

ADDITIONAL INFORMATION

CCMC'S MANDATE

At the request of the Provinces and Territories, the regulators of construction across Canada, CCMC was created as Canada's official evaluation service for building officials and the construction industry in 1988. Formalizing this relationship was a Memorandum of Understanding between Canada's Federal Government and Provincial and Territorial Governments (PTs). Also at the request of the PTs, CCMC was centralized at the National Research Council of Canada (NRC) a federal government organization, in Ottawa, working closely with Codes Canada and research expertise.

CCMC's mandate is to provide a technical opinion that a product or system complies with the requirements of Canada's Building Codes as an 'alternative solution' and to provide verification that a product conforms to a recognized product or material standard.

As a Federal Government organization and part of the NRC, CCMC's due diligence on all evaluations is impartial, neutral and science-evidence based, intended to protect the health and safety of Canadians first and foremost. CCMC applies the same objective, factual and rigorous process on all evaluations and provides an expert, unbiased opinion on Code and Standard compliance without commercial interest in the products evaluated. Also as a federal government entity, CCMC stands behind all of its technical evaluations.

REGULAR COMMUNICATION WITH CANADA'S BUILDING OFFICIALS

CCMC values its partnership with building officials across Canada. CCMC has increased its outreach to building officials via your respective associations and will continue to do more in the future. In 2017, CCMC plans on launching a Building Official Helpdesk supported by regular technical updates and we invite building officials to contact CCMC directly for clarification on CCMC evaluations when there is confusion in the marketplace caused by misleading information on websites or other marketing sources.

Thank you for working with CCMC, Canada's official national evaluation service.

Dino Zuppa Manager, CCMC