



## TECHNICAL BULLETIN – TB078.004

### OVERLAYING MAGNESITE FLOORING

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#### Introduction & Scope

This Technical Bulletin covers issues related to Magnesium and similar flooring materials. ARDEX Technical Services receives inquiries about applying toppings for vinyl or carpet and tiling over such substrates. Building occupiers commonly consider renovations of existing floors, but new installations are occasionally considered.

**ARDEX does not recommend using any of its Flooring, Waterproofing, or Ceramic Tile Adhesive products over Magnesite floor topping.**

#### Historical Background

This type of flooring is an in-situ composition that was commonly laid in the 1960s and 70s and is rarely applied today, though some types are still available. Modern versions are more common in the US and Europe but are also available in Australia. Magnesite was used as a levelling underlayment and for sound deadening for multistorey buildings, typically home units, and as a feature floor. It has the additional property of being of being fire retardant.

#### What is Magnesite?

Magnesite (as an applied topping) and its more modern variants are specialized cementitious products based on Magnesium Oxychloride (or Magnesium Oxysulphate) cement. The most common form involves the reaction between a Magnesium Chloride solution and Magnesium Hydroxide powder to form the cement binder. The finished product also contains a filling material, commonly sawdust, wood fibres, cork, or asbestos. Colourants may also have been added. The product is mixed and then poured onto the surface to be topped. These floorings are usually at least 25mm thick, except where worn down, and are not usually well bonded to the base slab.

In the last couple of years, Magnesite has also appeared in the form of 19-25mm thick flooring sheets, similar to the traditional compressed fibre-cement sheets. After discussing the topping material, we will examine these 'Magnesia' sheets.

#### Why is Magnesite not a Recommended Substrate?

This type of flooring is moisture-sensitive and will gradually break down if it remains wet for an extended period. As the filler consists of sawdust and wood particles bound together with Magnesium Oxychloride, it will swell up, and the filler can also rot and produce unpleasant odours. Magnesite flooring is hygroscopic and in high humidity environments, close to water (e.g., lakes, coastal), or when exposed to regular wetting from situations such as constant steam cleaning of carpets, washing of vinyl where the water penetrates joints or where there is an inadequate slab membrane and rising damp is present, the material absorbs moisture with the resultant effect as detailed above.



Prolonged exposure to high humidity or moisture will release chlorides, either by leaching unreacted Magnesium Chloride or possibly breaking down the cement. These highly corrosive chlorides can attack concrete and metal fittings or reinforcement, which is part of the 'concrete cancer' phenomenon. This problem has been identified in several buildings in coastal areas of NSW, and the resultant damage to steel reinforcement produced concrete failures, with considerable expense and inconvenience to repair damaged floors.

There is always risk in covering such composition floorings with new impervious floorings, especially where the sub-floor is on the ground. They are sometimes laid where the protection from rising dampness is barely adequate, and while the Magnesite surface can breathe so that the flooring remains dry, once covered, the moisture levels can rise to the extent that failure occurs.

## Recommendations where Magnesite is in Place

The standard procedure recommended is to remove the old Magnesite flooring and prepare the base by applying a bonded screed at least 25mm thick, incorporating some form of bonded D.P.M. where necessary.

Alternatively, if the Magnesite has been laid to a thickness of less than 25mm, then consideration should be given to removing the Magnesite Flooring then using ARDEX self-levelling compounds.

Additionally, ARDEX recommends that Magnesium floors be inspected by an independent Testing Authority such as Mahaffey Associates (<http://www.mahaffey.com.au/>) or ARUP Engineers ([http://www.arup.com/Global\\_locations/Australia.aspx](http://www.arup.com/Global_locations/Australia.aspx)) for possible steel reinforcement damage.

Also, since older Magnesite installations may contain asbestos, removal will require observance of relevant statutory health and environmental requirements for dealing with asbestos disposal by suitably licensed and approved contractors. Expert advice should be sought in this area.

**ARDEX Australia cannot warrant the performance of any of its products, including Floor Smoothing Cements and Repair Mortars, Waterproof Membranes, or Ceramic Tile Adhesives applied over Magnesite, and therefore recommends its removal. ARDEX is aware that non-ARDEX-approved advice exists for using ARDEX Floor Smoothing Cements over Magnesite or similar. Still, these are against ARDEX's Technical recommendations, and users following such advice do so at their own risk.**

## Magnesia Board

These sheets are made from compressed magnesite-type materials and may be sealed. The compression moulding makes the material more impermeable and less subject to immediate moisture damage. They are used for applications such as decks and wet area floors. ARDEX has examined some of these boards and found that applying tile adhesives is feasible, provided the surface is primed with ARDEX WPM300 hydroxy. However, we have also noted that when subjected to immersion for adhesive tensile testing, swelling can occur and that, in some cases, the matrix appears to have started decomposing.

ARDEX has made several recommendations after testing for the application of tile adhesives and waterproofing for specific magnesia board products but not for the application of smoothing cement. Further, ARDEX accepts no responsibility for any defects or issues with these boards in service.

## References



ACRA 2002. Submission to the Joint Select Committee on the Quality of Buildings by the Australian Concrete Repair Association.

CSIRO 1971. Magnesite Flooring. Commonwealth Experimental Building Station. Notes on the Science of Building No. 117.

NOHSC:2002 1988. Guide to the Control of Asbestos Hazards in Building or Structures. The National Health and Occupational and Safety Commission.

**IMPORTANT**

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition, specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations, contact your nearest Ardex Australia Office.

**DISCLAIMER**

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

**REASON FOR REVISION-ISSUER**

Change of slogan and address

**DOCUMENT REVIEW REQUIRED**

36 months or whenever third-party suppliers change their recommendations.

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