

Magnesium Oxide Board: the New Wonder Material?

Magnesium Oxide (MgO) is a naturally occurring, abundant mineral. In Asia and the Middle East it has been used for centuries in mortar for masonry construction. More recently, it is being made into panels that are used for sheathing and as interior finishes, especially for partitions and fire walls.

While Magnesium Oxide board, a factory-made, non-insulating sheathing board product, was developed for the construction industry only a few decades ago, magnesium oxide itself is far from new, as it was an important material used in the Great Wall of China.

MgO board has been used in Europe and Asia as a standard panel sheathing material for years. Recently, the world's second tallest building, the Taipei 101 in Taiwan, used it for both the interior and exterior wall sheathing and subfloor sheathing.

MgO board is strong and has good flexural and tensile strength, making it suitable as a structural sheathing. It is a very resistant material that does not support mould growth, and is insect resistant. Its high fire and water resistance, and good impact resistance makes it ideal to use for damage-prone applications as well as humid coastal areas and those subject to hurricane forces.

The fire properties of MgO boards are similar to gypsum boards. It is non-combustible in terms of the building codes and has a "zero" flame spread and smoke developed rating. It does not burn at all, and can often be substituted thickness-for-thickness for Type X drywall in fire-rated wall assemblies. Some proprietary MgO systems have been tested in two-, three- and four-hour UL-rated assemblies.

Magnesium Oxide boards are now available in North America and should quickly fill a niche that will give the gypsum board manufacturers new competition, especially where fire resistive assemblies are required. In the US, MgO became UL-approved for construction in 2003.

The manufacture of MgO is considered to be environmentally superior to gypsum board because it is not as energy intensive, so has a lower embodied-energy content. In its raw form it is

silvery white, and becomes a soft gray during processing. MgO is completely free of toxins, including formaldehyde, silica, asbestos, heavy metals, and organic solvents.

MgO boards come in various thicknesses, from ¼" to 1", in sheet sizes similar to those of drywall. It can be used for a number of applications including wall and ceiling linings, fascias, soffits, tile backing and underlayment.

MgO boards are harder than drywall – somewhat like the cement board used around bathtub enclosures. It is easy-to-install, similar to drywall and cement board. It can be scored and snapped, although it is stronger than drywall and requires more effort. It can be cut with a power saw, drilled-through and fastened like other similar boards. It is more flexible than Portland cement boards but less flexible than drywall, but thin sheets can be bent or warped to follow gentle curves.

MgO board can absorb water without affecting its performance, so it can be used indoors and outdoors, and in damp locations such as showers. Like cement-based siding, if MgO is used outdoors in an exposed location, it needs some form of coating. It can also be used structurally – as in bracing for walls – and also semi-structurally, such as underlayment for flooring.

One manufacturer, Magnum Building Products, has performed a variety of tests including fire, water, mould, and insect resistance to meet ASTM and UL standard compliance, so the product is code compliant.

One application where the product is being used in the US is as a facing material for structural insulated panels (SIPs). Most SIPs are made with OSB or plywood facings, but that is vulnerable to moisture and insect deterioration in the event of improper detailing, and also would have a lower fire resistance. MgO-faced SIP panels overcome this. ☉