Abstract

This presentation will address the challenges for Architects in specifying MgO based panel products for Projects in the United States.

Magnesium Oxide (MgO) based panels are manufactured as numerous panel products including wall sheathing, tile backing, structural insulated panels, structural insulated sheathing, and siding products.

MgO panels have several advantages. In general, when compared to cement-based panels, MgO panels are reported to have greater flexural strength while providing fire resistance comparable with gypsum-based panels. MgO based panels absorb thermal energy in a fire event without losing structural integrity, improving the fire resistance of the assembly. MgO panels have generally higher impact and water resistance than comparable gypsum-based panels. Depending on the product, MgO panels do not contain crystalline silica or asbestos (although fillers, additives, and reinforcements can impact this material quality).

However, challenges to wider acceptance of MgO panels remain. There is currently a lack of broadly accepted MgO panel Standards in the United States. MgO panels are typically more dense and heavier than gypsum wallboard panels generating concerns for handling of large panels in the field. Depending on the composition of the MgO panel, chlorides may be present. When present, the chloride content raises issues of 'weeping' of the panels when exposed to high humidity and the potential of corrosion of metals exposed to the panels. In the past, this included corrosion of metal fasteners, and exposed metallic wiring in wall assemblies.

As MgO based panels are relatively new to the market in the United States the formation and adoption of common standards is in process. MgO panel products are not currently referenced or directly recognized in the body of the model International Building Code (IBC). In comparison to gypsum wallboard (ASTM C2178, etc.) and fiber cement siding (ASTM C1186), MgO panels do not currently have similar product specific ASTM standards. This may change in the future as there is a new draft ASTM working standard for MgO ceramic-cement board (ASTM WK70508) awaiting final approval. The ASTM WK7058 rationale states:

"MgO based cement boards are a new material to most construction industry people and do not have current standards which are necessary for the appropriate and safe use of these products."

Although there is not presently a MgO panel specific ASTM standard, MgO based panels are often tested under other ASTM standards such as ASTM E136 for combustibility, or ASTM E84 for flame spread. To find acceptance under the model Building Code in the USA, manufacturers of MgO panels use Evaluation Reports prepared by the ICC Evaluation Service to demonstrate compliance to the Building Official. For MgO panels, the ICC Evaluation Service Reports (ESR) will typically rely on an Acceptance Criteria standard such as AC386. The AC386 standard addresses the material, physical properties, fire resistance, durability, installation, and quality control of the manufacturer.

The AC386 standard is available to Building Officials, but not to the general public, including Architects and Engineers, without purchasing the Standard for a fee of $1,000. In addition, Architects and Engineers do not have access to the underlying testing data. These design professionals must rely on the manufacturer's product data, and ESR reports published by the ICC Evaluation Service to specify MgO products and include them in their design documents. Architects and Engineers will be hesitant to specify MgO panel products without adopted standards incorporated into the Building Code.

As MgO panels present a viable alternative to gypsum wallboard for fire resistance, fire testing of MgO panel assemblies and the publication of listed fire rated assemblies will accelerate the use of these versatile panels. As an example, an ESR report has been published of a one-hour fire resistance rated wall assembly with proprietary 12MM thick Magnesium Oxide panels indicating fire testing under ASTM E119. However, the proprietary listing indicates a 'panel quality control program with inspections by ICC-ES', but no specific AC standard is referenced in the ESR report.

The widespread incorporation of MgO panel products into architectural specifications and designs by Architects will require the finalization of ASTM standards and their adoption within the body of the Building Code.