

A **bnp** PUBLICATION

March 2008 > www.ceramicindustry.com

CERAMIC

INDUSTRY

The Exclusive Global Voice of Ceramic
& Glass Business and Manufacturing

Machining Technologies

- > Laser Processing
- > Refractories

Energy-Saving Refractories



As energy prices soar, resource-intensive industries are being increasingly challenged to find ways to save energy wherever possible. One area for potential energy savings is in a place one might not immediately suspect: the furnace's refractory lining. Monolithic refractories offer a number of significant opportunities to save energy compared to traditional brick, and colloidal silica-bonded monolithic refractories* offer further savings over refractories that are bonded with cement.

New Energy Savings

The savings begin at the refractory manufacturing level. Colloidal silica-bonded monolithic refractories are manufactured without the firing, drying or other energy-intensive processes involved in the production of brick, which the colloidal silica products replace. As a result of lower energy costs, these products can be offered at a lower unit cost.

For the end user, colloidal silica-bonded monolithic refractories conserve energy in a number of ways, both before and after installation. Unlike brick and mortar, which must be installed by hand, colloidal silica-bonded refractory can be pumped or shotcreted to form the furnace lining. The installation process takes fewer man-hours to complete—cutting down-time to weeks instead of months—and results in both time and energy savings.

After installation, colloidal silica-bonded refractories normally need no more heat for cure-out than a brick and mortar lining. They also require substantially less heat energy for cure-out than cement-bonded refractories because there is no chemically bonded water in the colloidal silica-bonded products.

Low-Energy Repairs

Colloidal silica-bonded monolithics can be applied to repair clean brick surfaces or as a new lining. When a brick lining is about 60% worn away, the remaining 40% of the brick must be torn out and discarded (if it is to be replaced by another brick lining). The energy that went into the forming of the discarded brick is essentially thrown away, and the process requires extra energy to tear out the old brick and replace it.

In comparison, when a colloidal silica-bonded monolithic lining is 60% worn, the addition of the new colloidal silica-bonded material rapidly and easily restores the lining to its original thickness. The old material must simply be cleaned, and the new colloidal silica-bonded material bonds directly to it. This type

► Colloidal silica-bonded monolithic refractories offer a number of energy-saving opportunities over refractories that are bonded with cement.

by Charles Connors, Sr., Chief Executive Officer, Magneco/Metrel, Addison, Ill.

of bonding cannot be done with cement-bonded materials; like brick, they must be removed completely and replaced.

Additional Benefits

Compared to low- or ultra-low cement-bonded castables, colloidal silica-bonded refractories exhibit superior hot strength, thermal shock and creep resistance properties, excellent erosion and abrasion resistance, high resistance to chemical attack, and increased mechanical strength. All of these factors result in longer life for the furnace lining, which results in additional energy savings over time.

With better refractoriness and hot load strength, colloidal silica-bonded refractories can be used with less cold-face cooling than more traditional refractories. More of the processed heat can be kept in the process and not dissipated by cooling, thus saving energy.

Colloidal silica-bonded monolithics can be used wherever acid or neutral refractories are possible, and can be matched to the process for which they are used as a lining. For instance, formulations have been developed for use in the glass, steel, iron, copper, aluminum and ceramic industries. In addition, formulations can match the demands of each respective region of a furnace to further increase the life span of the lining. 🌐

For more information regarding energy-saving refractories, contact Magneco/Metrel at 223 Interstate Rd., Addison, IL 60101; (630) 543-6660; fax (630) 543-1479; e-mail marketing@magneco-metrel.com; or visit www.magneco-metrel.com.

*Metpump line of colloidal silica-bonded monolithic refractories, manufactured by Magneco/Metrel.