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PHOSPHATE BONDED REFRACTORIES AND INSULATING MATERIALS

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The fundamental studies in phosphate bonding carried out by Kingery (1) in the USA in early fifties gave rise to world-wide investigations and practical application of a new type of refractories and insulating materials. The use of phosphate binders made it possible to develop a unique class of refractories and insulating materials with principally novel technical properties. Theoretical investigations and power-saving nonwaste technology of their production has been developed in Orgtehstrom from the early seventies. The result of these activities was industrial production of phosphate bonded refractories and insulating materials on a commercial basis; the technology was introduced in all ceramics and glass works of construction material industry of the Latvian SSR.

The basic groups of produced phosphate materials are the following:

1. Dense structural phosphate bonded monolithic refractories;
2. Structural-insulating phosphate bonded lightweight concretes;
3. Refractory and insulating gunning masses;
4. High-temperature granulated aggregates;
5. Refractory glues, sealants and repair masses.

Compared to the conventional refractories, they offer the following advantages:

1. Setting of the material takes place at relatively low temperatures, some are cold-setting;
2. They develop high strength after setting;
3. They have excellent abrasion resistance;
4. They show good adhesion both in cold and hot applications.
5. They are highly resistant to thermal shock.

(1) W.D. Kingery, *J. Amer. Ceram. Soc.* 35, No 3, 61 (1952).