BROCHURE

Optibor® in gypsum board

Gypsum board is widely used for internal walls and ceilings by the construction industry, and is a material of growing importance in the do-ityourself sector. It is manufactured by calcining gypsum into a plaster, making a slurry from the plaster, and passing the slurry through machines which shape, set, and cut the substance into a board. The addition of *Optibor*® boric acid to the slurry yields significant improvements in product performance, user convenience, and process efficiency.

Benefits

In gypsum board manufacture, *Optibor* is used to:

- Increase the strength of the board
- Reduce the board weight by about 10%
- Provide better adhesion of the paper backing to the board
- Reduce the curing time of gypsum board
- Prevent wrinkle formation on the surface of the board
- Create a hard gypsum edge that withstands nailing and handling
- Enhance fire retardancy

Formation

The quantity of boric acid required is dependent on the quality of gypsum and also weather conditions. The average loading of boric acid is between 0.03 and 0.15% by weight.

Advantages

Increases mechanical strength

Optibor in gypsum slurry promotes the formulation of large bulky crystals as opposed to long needle-like ones. The bulky gypsum crystals impart a more rigid character to the board.

Improves paper gypsum bond

Starch adhesive is used in wallboard to reinforce the bond between paper backing and gypsum core. By changing the polymeric structure of the starch molecule, *Optibor* gives the adhesive increased viscosity, quicker tack, and better fluid properties. These are essential for the dependable adhesion of the paper to the gypsum core.

Prevents wrinkle formation

Optibor reacts with sodium (eg sodium sulfate) found in many gypsum deposits, to prevent the sodium from creating wrinkles in the paper backing as the wallboard is dried.

Develops a harder board edge

Optibor imparts mechanical strength to gypsum board due to the formation of more bulky crystals. This function improves the board's outer edge.

Accelerates the curing rate

During drying, the removal of water from bulky crystals is faster than from needle-like crystals, thus *Optibor* reduces drying time. The fire retardant properties of boric acid also help to prevent gypsum crystals from burning while in the oven.

Decreases the board weight

To reduce the board weight by making the product less dense, typically foam (air) is injected into the gypsum slurry. This can cause a decrease in strength and an increase in the number of bond failures between paper backing and gypsum core. *Optibor* can be introduced to minimize this potential problem.

Boosts fire retardancy

Spraying the paper backing with a boric acid solution or adding it to the gypsum slurry aids in fire retardancy. *Optibor* inhibits flame combustion and suppresses both afterglow and smoldering.

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About U.S. Borax

U.S. Borax, part of Rio Tinto, is a global leader in the supply and science of borates—naturally-occurring minerals containing boron and other elements. We are 1,000 people serving 650 customers with more than 1,800 delivery locations globally. We supply around 30% of the world's need for refined borates from our world-class mine in Boron, California, about 100 miles northeast of Los Angeles.

About 20 Mule Team products

U.S. Borax produces the *20 Mule Team*® borates family of products from naturally occurring minerals and have an excellent reputation for purity and safety when used as directed. Borates are key ingredients in a number of industrial applications including fiberglass, glass, ceramics, batteries and capacitors, wood preservatives, and flame retardants.

High quality, high reliability, high performance borate products. It's what we're known for.