

Promat

by etex

THE SECRET BEHIND

PROMATECT®

FIRE PROTECTION BOARDS

DISCOVER A UNIQUE
MANUFACTURING PROCESS



THE SECRET BEHIND PROMATECT® FIRE PROTECTION BOARDS

Discover a unique manufacturing process

Calcium silicate fire protection boards are widely used in construction and industrial applications due to their excellent fire resistance, thermal insulation, and durability. Within the world of fire protection boards, the PROMATECT® boards are unique because they are engineered in such a way that they deliver unsurpassed performance in a wide range of demanding fire tests. They are manufactured through a sophisticated process that ensures consistent quality and performance.

The production of PROMATECT® boards is an automated industrial process involving precise chemical reactions and mechanical operations. By adjusting the raw material ratios and the appropriate moulding and curing methods, Promat® has tailored the boards to meet the highest performance requirements, making them the preferred choice for fire-rated ductworks.

Before production: selecting and preparing the raw materials

The process begins with the careful selection and preparation of high-quality raw materials, which can be found in nature.

→ Silica sources (fine, pure sand or quartz)

- **Quartz** is the most **common form of crystalline silica** and is the second most common mineral on the earth's surface. It is found in almost every type of rock i.e. igneous, metamorphic and sedimentary

→ Lime (quicklime or calcium hydroxide)

→ Cement

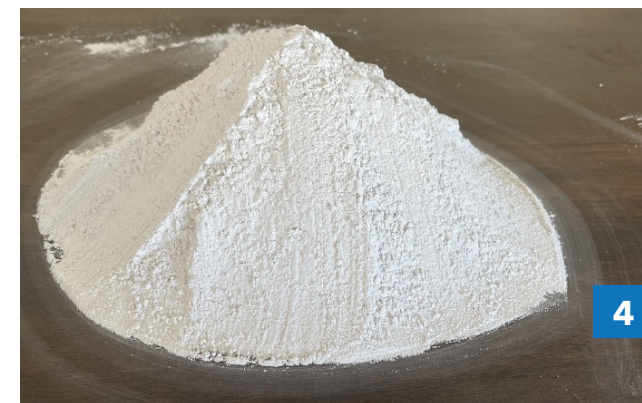
→ Reinforcing fibers (recycled cellulose or mineral fibers)

→ Wollastonite

Key steps in this preparatory stage:

- **Wet grinding** of fine sand to achieve the desired fineness.
- **Slaking of quicklime** to ensure optimal reactivity.
- **Fiber processing**, including grinding and dispersion, to ensure a uniform distribution in the final mix.

Ingredients:



Ingredients:

1. Wollastonite
2. Lime
3. Cement
4. Sand - Quartz
5. Recycled cellulose

THE PRODUCTION PROCESS FOR PROMATECT® BOARDS

1. Raw Material Preparation

- **Slaking:** The process begins by slaking quicklime (calcium oxide) in a large stainless-steel vessel. During slaking, water is added under controlled conditions, triggering an exothermic chemical reaction that transforms quicklime into calcium hydroxide (slaked lime).
- **Sand Addition:** Fine silica sand is then added to the slaked lime. This sand serves as the source of silica (SiO_2), which is essential for forming calcium silicate crystals in the next phase. The mixture is thoroughly homogenized to ensure a consistent chemical base.

2. Hydrothermal Reaction (Xonotlite Synthesis)

- **Reactor Processing:** The slaked lime and sand mixture is pumped into large, high-pressure reactors (autoclaves). Under these hydrothermal conditions, the calcium hydroxide reacts with silica to form **lightweight xonotlite crystals** – a highly stable calcium silicate hydrate phase.
- **Suspension Creation:** The resulting product is a water-based suspension of xonotlite particles. This phase is essential for achieving the desired thermal and fire-resistant properties of the final board.

3. Formulation and Reinforcement

- **Cooling and Transfer:** After the reaction, the hot slurry is cooled and transferred to a large industrial mixer.
- **Fibre and Additive Integration:** Special reinforcing fibres (e.g. cellulose or inorganic fibres) and proprietary additives are introduced at this stage. These materials enhance the

mechanical strength, thermal stability, and dimensional integrity of the final boards. The mix is agitated to ensure even fibre dispersion and optimal rheology for pressing.

4. Shaping and Pressing

- **Hydraulic Pressing:** The slurry is poured into moulds and shaped using an **industrial hydraulic press**. The press compacts the mix to the desired **thickness and density**, removing excess water and initiating physical bonding among particles.

5. Energy-Efficient Drying

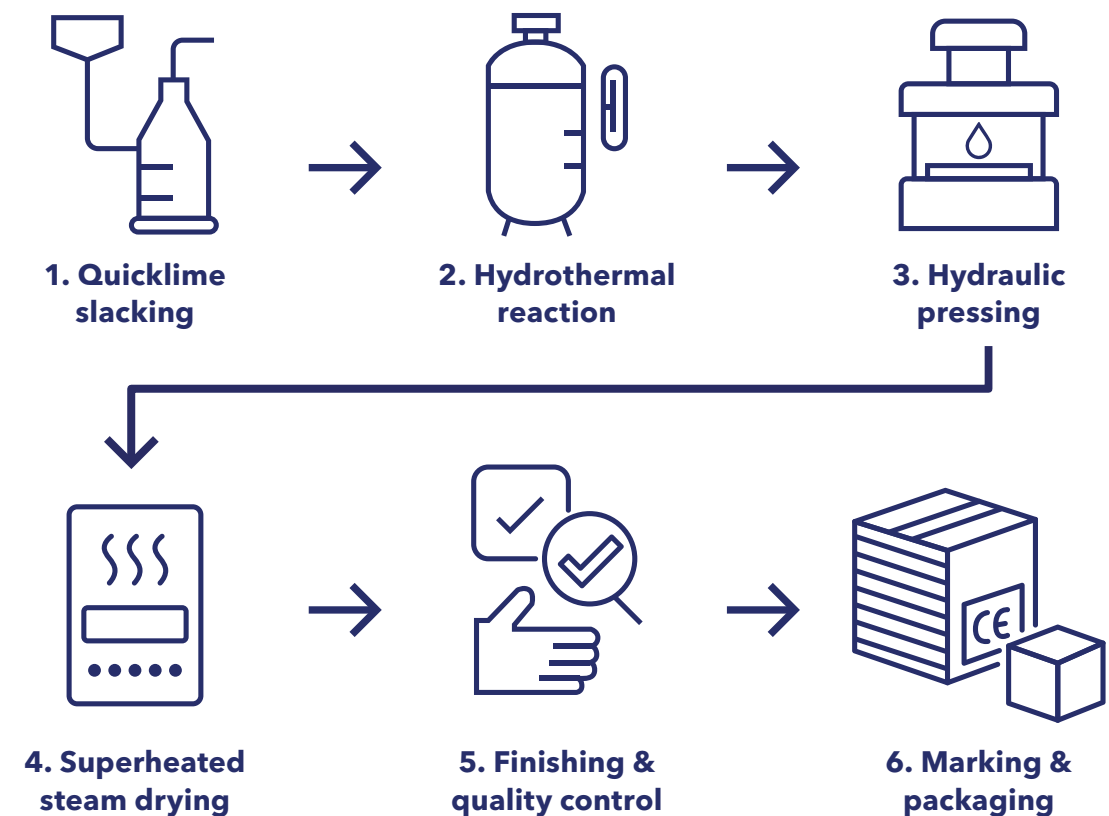
- **Superheated Steam Drying:** The wet green boards are dried in an advanced **superheated steam** dryer equipped with **heat pump recovery technology**. This system recycles energy and offers up to **70% energy savings** compared to traditional drying methods. It ensures uniform drying, minimal shrinkage, and preservation of the board's internal structure.

6. Finishing and Quality Control

- **Trimming and Sanding:** Once dried, the boards are trimmed to their final dimensions and sanded for surface uniformity, improving flatness and appearance.
- **Inspection and Testing:** Each board undergoes **visual inspection**, and **systematic sampling** is conducted for **mechanical, thermal, and dimensional quality control**. This step ensures every batch meets the strict performance standards for calcium silicate boards.

7. Marking and Packaging

- **Traceability:** All finished boards are marked with a **CE label** and a **unique batch number**, allowing for full traceability and regulatory compliance.
- **Packaging:** Finally, the boards are stacked, protected, and packaged for shipment, ensuring safe transport and easy handling at the job site.



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