

Industry: Ceramic
Application: Separator
Product Solutions: Kaowool 1260 Paper
Location: India, Asia

December 2023

The Challenge

A leading tile manufacturer, based in India, would like to improve the productivity and quality of high alumina ceramic tiles.

An area of focus is to use a more effective separator solution in the sintering process. Currently bubble alumina powder, as separator material between the green tiles, was manually sprinkled, after which the tiles were stacked, loaded and fired in the tunnel kiln. However, due to “stickiness” of bubble alumina powder onto the fired tiles, physical force was required to separate the tiles which might lead to cracks (Figure 1). The tiles were then buffed manually to remove all traces of the powder, which was time-consuming (Figure 2).

Partnering with Morgan on materials and solutions, the customer expects to achieve the following:

- Reduce the manhours in separator material pre-firing preparation and post-firing removal
- Reduce the defects of cracked tiles and contaminated surfaces
- Increase productivity and throughput



Figure 1 Bubble alumina embedded between high alumina tile – Sticking after firing



Figure 2
Tapping and Buffing to separate and clean the tiles

Proposed Solution

After a full review of materials and production process, Morgan recommended to our Customer to use Kaowool 1260 Paper as separator sheet, instead of to bubble alumina powder.

Features

- Classification temperature is 1260 °C and melting point is 1760 °C
- Wide range of paper thickness is available that can be used as thin separator sheets
- Can withstanding the hot crushing load of tile under the temperature 1550°C in this application

The use of separator sheets, in replacement of bubble alumina powder, will improve ease of handling and reduce quality problems related to the tapping and buffing (cleaning) rework associated with application of bubble alumina powder.

Case Study: Kaowool® 1260 Paper Separator Sheet for Ceramic Tile sintering

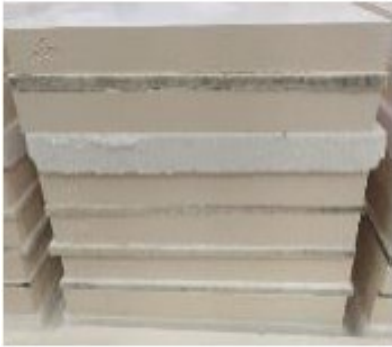


Figure 3: Separator sheet inserted between tiles



Figure 4 & 5: Separator sheets in production process

Customer Impact

3mm Kaowool 1260 Paper was used as separator sheet in sintering process with redesigned production process.

The customer had captured significant benefits in the successful trial: reduced turnover time, reduced labor cost, improved product quality and reduced overall cost of product. (Table 1)

The overall OHS (Occupational Health & Safety) was also improved with reduced dust exposure (dust created from handling of bubble alumina powder and tapping/buffing processes).

The successful trial outcome exceeded the customer's expectation'. The customer will extend the use of Kaowool 1260 paper as separator sheet in rest of sintering processes.

Table 1: Redesigned process with Kaowool 1260 Paper, and impact

	Existing Process	New Process	
	Bubble Alumina powder	Kaowool 1260 Paper	Impact
Pre-sintering preparation	Manual sprinkling of powder on surface. Skilled worker required to perform even distribution. Time-consuming	Insertion of precut sheets in between tiles, Skilled worker not required. Easy to insert and remove	Tile loading time reduced by 50%
Post-sintering: Separation of tile	Manual tapping to separate sintered tiles. Time-consuming May introduce cracks	Eliminated	Manpower reduction with savings of £2250 per day Improved product quality
Post-sintering: Cleaning of tile	Manual buffing rework Time-consuming May introduce cracks	Eliminated	Faster Turnover time Improved OHS

Customer Feedback

“We are using Kaowool 1260 paper as bedding material in the sintering furnace application by replacing bubble alumina. The product creates positive impact in both production process and product quality, with significant benefits contribution. Thank you for your prompt support and implementation.”