

CASE OF SUCCESS

STAYING AT THE CUTTING EDGE OF SANITARY WARE FIRING



Nutec Bickley has continued to consolidate its leading position in the arena of ceramic kilns with the successful completion of a prestigious contract for a world-renowned sanitaryware manufacturer with factories across the globe.

This led to three separate projects across two sites and involved the design, manufacture and installation of two tunnel kilns and three shuttle kilns. As is standard with Nutec Bickley, the kilns were preassembled (complete for shuttles, in modules for tunnels) and also fully tested at the company's Monterrey headquarters in Mexico, before transportation, installation and commissioning.

Rodrigo González, Vice President – Ceramics, commented: *“We have once again proved – with our advanced designs, attention to detail, high performance and reliability – that we are the go-to kiln manufacturer for the world's ceramic sanitaryware industry. We don't push people down any predetermined design route; we work extremely closely with our customers, we understand all the important parameters, and our team comes up with state-of-the-art, bespoke solutions. It's the main reason for our continuing success.”*

Shuttle Kilns

The development of shuttle kilns for this customer has been an evolutionary process, with Nutec Bickley having already supplied to a different design some years ago. In the latest installations, the company was able to demonstrate that a new configuration could achieve at least what previous kilns had done, but at a reduced cost with enhanced temperature and pressure control.

It is an ROI and performance success. The new design features a three-deck (rather than four-deck) configuration, with a setting area of 9m², and as a result the total weight of the kiln furniture is reduced by 20% and the fuel usage is reduced by 7%. Furthermore, the same amount of pieces per kiln car can be fired as with existing kilns, with a useful loading volume per car of around 17m³. The capital cost of these shuttle kilns is also reduced.



Do you have a planned project that could benefit from Nutec Bickley's fabrication and installation expertise?

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With regard to combustion, the kilns employ Nutec Bickley's proprietary IMPS® (integrated multi-zone pulsing system), the benefits of which are lower fuel consumption (25% to 30% less than competitors' kilns) and great temperature uniformity. These nine-car kilns typically have a fuel consumption of 1700-1800 Kcal/kg. Depending on load, configuration and cycle, other Nutec Bickley shuttles can achieve around 1400 Kcal/kg.

IMPS also offers the user a great deal of flexibility. In more conventional systems, commonly used by other manufacturers, where there is a low firing temperature they simply don't ignite all the burners, but inevitably this leads to a lack of uniformity. With IMPS, Nutec Bickley can control from as low as 90°C (195°F) with all burners switched on. A further effect of this is that there is a reduction in the use of excess air – excess air is only used when absolutely required.



Additionally, the system employed here is capable of having different levels of internal pressure on every segment of the firing cycle. The pressure is monitored constantly by the system and controlled by the ceramic louver type damper.

The kiln operation is based on three principal modes of heating, and equally three modes of cooling. Secondary air is integrated into the kiln and this results in faster cooling, especially at the end of the cycle. The importance of this factor cannot be underestimated. In one other case, this feature has enabled the customer to achieve an additional 25 cycles per annum, equivalent to an extra month's production or, put another way, a production boost of more than 8%.

These kilns make full use of Nutec Bickley's patented ceramic fibre Jointless™ insulation modules, which can withstand temperatures up to 1350°C (2460°F), providing for minimal maintenance, improved fuel economy and extended service life. This is a one-piece system that eliminates the joints between modules and also the spaces which are typically located in the exhaust ports. It doesn't need to be covered with cordierite which reduces fuel consumption.



Tunnel Kilns

The sanitaryware tunnel kilns are around 120 metres long and are approximately 3.5 metres wide. They feature integrated car handling systems, including automatic car weighing and therefore optimised load management. Product weight is approaching 250kg per car and the fuel consumption is in the 800-1000 Kcal/kg range. As with the shuttles, by using the different IMPS modes of operation, it is possible to achieve very good temperature distribution throughout the whole firing cycle.

There is the option of recovering waste energy from the tunnel kiln ware cool exhaust, whereby the hot, clean air coming from the tunnel kiln is used as preheated combustion air in the kiln burners. The pre-heated air can be used on all heating segments while the kiln is operating above 300°C (570°F). On a typical firing cycle, this can result in substantial fuel cost savings.

Further enhancing efficiencies is the use of Nutec Bickley cordierite baffle designs. This allows for a baffle to be hung with a refractory hanging crank that can be exposed to elevated temperatures. In this way, thermal shock on the baffles and the danger of premature failure is avoided. On tunnel kiln pre-heat zones and on the transition between heating and cooling, cordierite baffles are installed to force the gases through the load, enhancing efficiency and temperature uniformity.

The sanitaryware tunnel kilns – equipped as they are with SCADA and advanced control and monitoring software – demonstrate high levels of functionality, added to which is the fact that they incorporate industrial cameras to record images of kiln cars that are planned to be loaded to a pre-defined limit. This real-time visual recorder helps kiln operators to easily identify cars that have been underloaded.

Are you planning the installation of a new, high-performance shuttle or tunnel kiln? Contact us today to discuss how we can efficiently and cost effectively bring your next project to life.

