



Ceramic – E-Book

# Kilns for Technical Ceramics



NUTEC Bickley offers an array of different kiln designs to fire Technical Ceramics.

Learn more at [nutecbickley.com](https://nutecbickley.com)

NUTEC Bickley

# A Tradition of Excellence

NUTEC Bickley has vast know-how when it comes to designing tunnel, shuttle, top-hat and elevator kilns to fire all types of technical ceramic and refractory shapes.



Fig. 1 NUTEC Bickley's Headquarters

## Experience

With a combined experience of over 75 years in designing and manufacturing continuous and batch kilns for technical ceramics, **NUTEC Bickley** ensures the outstanding performance of your equipment and superior product quality.

Having installed over 2,000 kilns worldwide, **NUTEC Bickley's** technology is considered a benchmark for firing technical ceramics. The quality of **NUTEC Bickley's** kilns is defined by their precise control, state-of-the-art technology, high performance, and remarkable efficiency.

Whether you need a Carbell® (Top Hat) kiln or a tunnel kiln, an incinerator or a heat exchanger, mass flow control or pulse firing, our versatile and robust designs guarantee the perfect firing solution.

**State-of-the-Art Equipment**

## Tunnel Kilns

**NUTEC Bickley's** tunnel kilns are manufactured for ceramic production at temperatures up to 1800°C (3270°F). With **NUTEC Bickley's** systems, process variables are under tight control from the beginning to the end of the cycle, assuring superior finished product quality.

Tunnel kilns are the best solution when large volumes of product need to be fired in consistent conditions. They offer excellent temperature uniformity and fuel consumption sometimes 50% lower than with shuttle kilns.



Fig. 2 **NUTEC Bickley's** Tunnel Kilns



#### State-of-the-Art Equipment

## Shuttle Kilns

**NUTEC Bickley** has extensive experience in designing and building shuttle kilns that meet users' precise needs. Multi-kiln arrangements with automatic car handling systems are also available. Batch firing of products offers the manufacturer the greatest flexibility.

**NUTEC Bickley's** shuttle kilns are widely adopted for batch firing in the ceramic industry. The kilns come in a wide range of capacities and with a choice of door types, combustion systems, and control designs.

Fig. 4 **NUTEC Bickley's** Shuttle Kilns

**State-of-the-Art Equipment**

## Carbell® (Top Hat or Bell) Kilns

One of our most innovative designs was the Carbell kiln. The success of this design made it a standard kiln within the technical ceramics and refractories sectors, achieving worldwide popularity, and it is still used today by internationally renowned manufacturers.

The Carbell kiln is designed for a stable and repeatable seal between the kiln and kiln car, while providing a strong and robust structure for the refractory insulation.



**State-of-the-Art Equipment**

## Elevator Kilns

The elevator kiln is generally smaller than a Carbell kiln and designed for a stable and repeatable seal between the kiln and car, while providing a strong and robust structure for the refractory insulation. This is essential for firing at high temperatures but also beneficial at lower temperatures since the kiln seal is more reliable than the door seal on a shuttle kiln.

These kilns are used extensively in the technical ceramics industry and also for pilot production of refractories and specialty ceramics.

Fig. 6 NUTEC Bickley's Elevator Kiln

**State-of-the-Art Equipment**

# Roller Hearth Kilns

For special technical applications, **NUTEC Bickley** has provided roller hearth kilns as an alternative to shuttle or tunnel kilns. Ceramic rollers are supplied in different materials (mullite or silicon carbide) depending on the application requirements.

Roller kilns are continuous kilns that carry the load through the firing process on rollers. The product is either loaded directly on to the rollers or can be carried on plates/tiles or in saggars/cassettes.



## Features

# Incineration Systems, Afterburners, RTOs (Regenerative Thermal Oxidizers)



Fig. 8, 9 **NUTEC Bickley's** Regenerative Thermal Oxidation (RTO) systems

- Reducing emissions with the addition of an afterburner or incineration system for products that have any volatiles or flammable materials.
- Energy recovery systems to ensure the lowest fuel consumption.

The energy that is introduced into the kiln via the burners is typically used to heat the product, kiln walls, kiln furniture and cars. The remaining energy is usually lost in what we term 'loss to atmosphere'.

**Regenerative Thermal Oxidizers (RTOs)** are designed to undertake the critical task of destroying volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and other industrial organic contamination. Their deployment is just one of the strategies aimed at enhancing sustainable processing and manufacturing, mitigating environmental impacts, reducing the level of harmful emissions, and conserving fuel resources.

What **NUTEC Bickley** heat recuperation systems seek to achieve is the reuse of energy carried by the gases that normally exit via the flue, in order to reduce overall gas consumption.

## Design Flexibility

## Features

### 1. Firing temperatures up to 1800°C (3270°F)

Our designs can include technologies such as oxygen-enriched combustion, volume flow control and mass flow control, allowing us to achieve temperatures up to 1800°C (3270°F). With high temperatures it is normal to equip the kiln with heat exchangers or preheated air technology.

### 2. Excellent Temperature Uniformity

**NUTEC Bickley** systems control the different variables of the heating curve inside the kiln, such as internal pressure, heating rates, air movement and air/gas ratio, with the help of our control software.

The control system allows the user to regulate the temperature in each of the zones of the kiln to ensure a uniform temperature, lower fuel consumption and to achieve superior quality in the final production.

### 3. Power Failure Protection System (PFPS)

**NUTEC Bickley's** PFPS prevents a lot of downtime; it protects the load from being damaged due to a failure in the power supply by keeping the burners alight for up to one minute in the case of a power outage, thereby maintaining kiln safety. This system eliminates the need to manually relight the kiln once the power supply is restored or the emergency generator has started.

Features

# SCADA Systems

With our **SCADA** systems, kiln operators are able to have complete but simple control of their firing process, enhancing efficiency and productivity. Different access levels are password protected.

Our latest Industry 4.0 platform integrates state-of-the-art technology to monitor the process, and also to keep the kiln operating at peak performance with smart maintenance protocols.

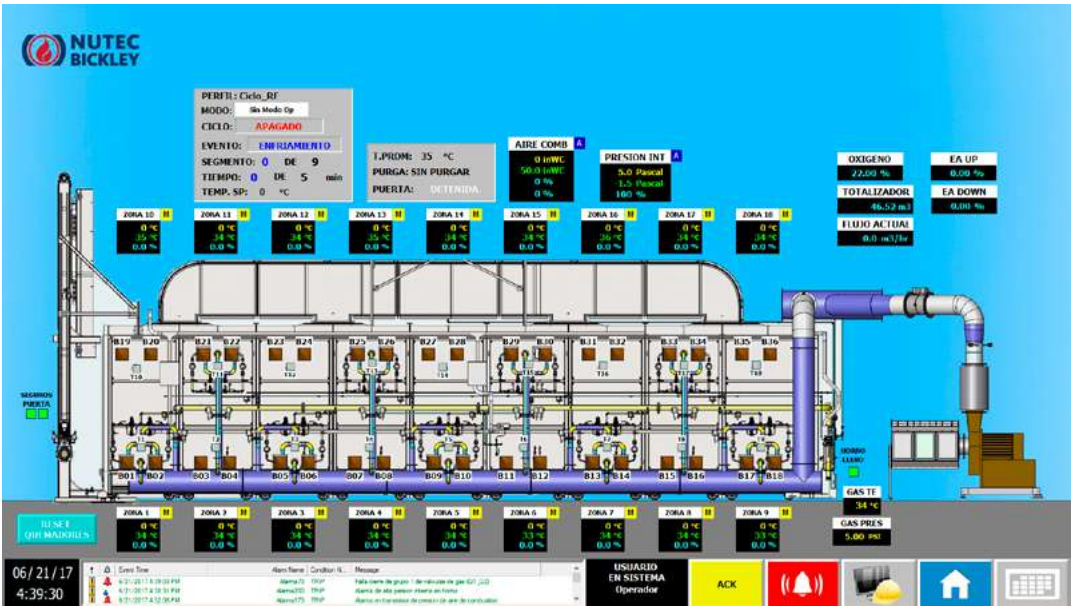


Fig. 10 NUTEC Bickley's SCADA System

Features

# Car Handling Systems

**NUTEC Bickley** provides heavy-duty automated systems for kiln car loading and movement, to make product loading and unloading easier.

Equipment includes manipulators, transfer cars, turntables, elevators, pushers, plus combined equipment such as elevator/turntables, transfer cars with integrated roller conveyors and transfer cars with pusher systems, among others.



Fig. 11 NUTEC Bickley's Car Handling Systems



Learn more at [nutecbickley.com](https://nutecbickley.com)

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