

Application Report

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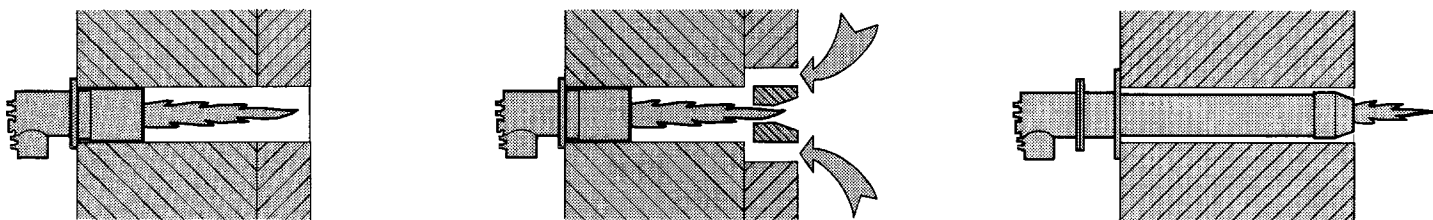
EXTENSO-JET SOLVES THICK-WALL KILN PROBLEMS

Tunnel kilns for the ceramic and brick industry have historically had very thick firebrick walls, many as thick as 50 to 60 inches. While most other kinds of heat processing enclosures have gone to fiber blanket, the tunnel kiln industry has yet to apply this technology. In addition, the inside width of kilns has increased over the years and now runs as wide as 12 to 15 feet. These thick walls and wide load areas have created problems in temperature uniformity in the fired areas. Conventional burners simply do not have exit velocities sufficient to allow the hot gases to penetrate to the center of the load. Consequently, there are major temperature variations throughout the heated sections.

In 1967, Eclipse introduced the first high velocity burner. It was designed to significantly increase hot gas penetration and circulation of the products of combustion resulting in better temperature uniformity. The first sixteen burners produced were used at the Milliken Brick Company near Pittsburgh and proved very successful in getting heat to the center of the load. High velocity burners are now used on all kinds of heat processing systems with great success. The High Velocity Tempered Air burner (HVTA) was truly a major breakthrough in gas-fired burners.

As tunnel kilns became wider, even more heat penetration into the load was required. To help achieve this, venturi blocks were placed in front of the HVTA burners and it was found that additional circulation could be obtained. The velocity of the hot gases into the venturi block creates a suction between the burner block and the venturi block resulting in this added circulation. For awhile this technique was used extensively in kilns. However, with the thickness of the kiln wall, some of the benefits of the velocity exiting from the burner is expended just getting to the hot face of the kiln. To solve these problems, Flameco-Eclipse developed a burner called the Extenso-Jet

The Extenso-Jet features a stainless steel barrel between the burner body and a silicon carbide end piece that functions as the restricted block. Gas is fed down the center of the barrel through a gas tube while air flows around the gas tube. The gas and air meet at the flame retention nozzle plate. Ignition is by direct spark and combustion takes place in the snout. During installation the burner can be inserted into thick kiln walls until the discharge opening is located at the hot face wall. This allows maximum velocity from the burner where it counts. The flow of cold combustion air



Left: Traditional high velocity burner in thick wall. Momentum is lost before reaching inner face of wall.

Center: Addition of venturi block increases furnace circulation, but burner velocity is still lost between burner and venturi block.

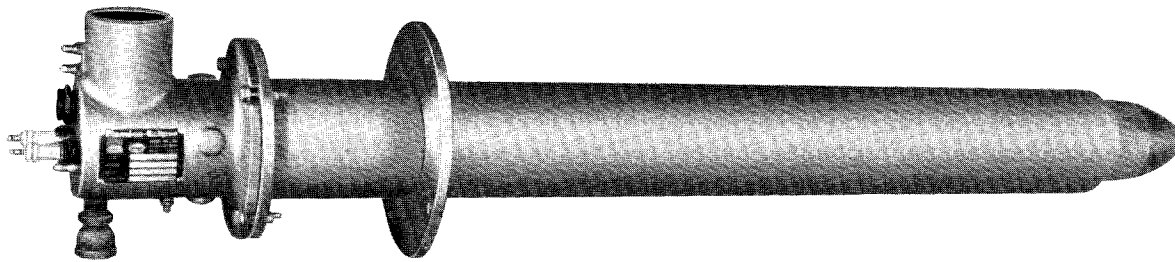
Right: Extenso-Jet burner uses steel extension to place silicon carbide combustion port at inner wall face. Velocity is developed where needed and brickwork is simplified.



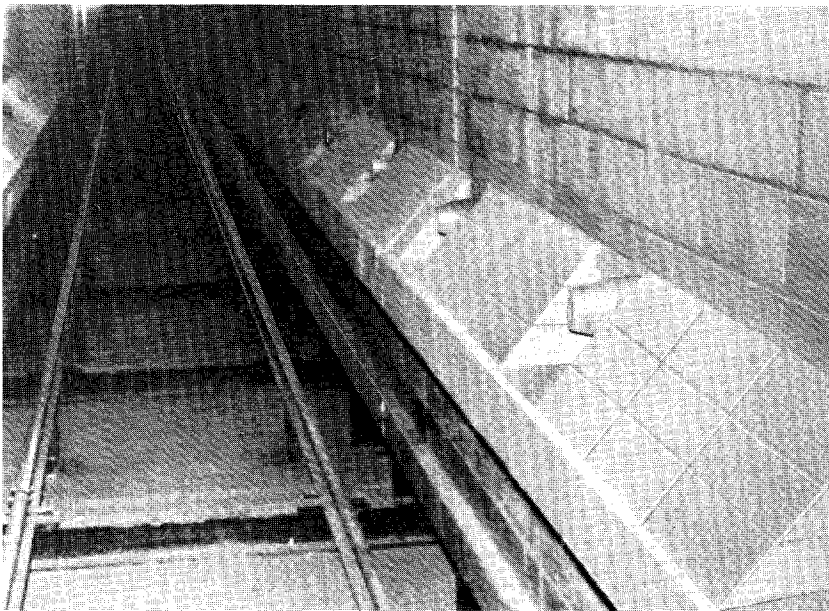
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down the extension serves to help keep the unit cool. Only the silicon carbide snout gets hot. These burners require only about 10" w.c. air pressure at the air inlet and are easily ignited by direct spark. Three sizes are now available: 275,000, 550,000, and 820,000 Btu/Hr. The basic burner includes built-in gas and air metering orifices.

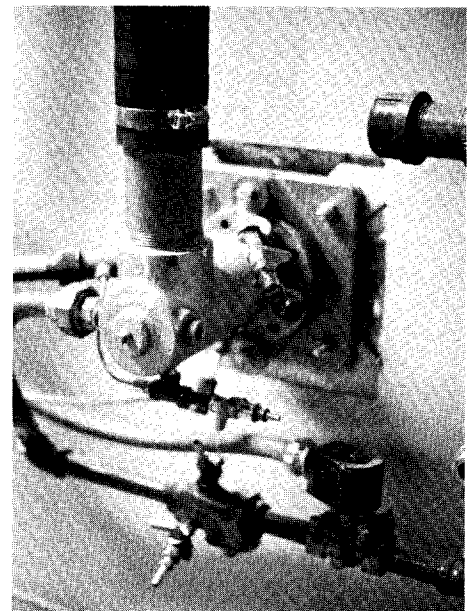
A total of thirty Extenso-Jet Burners are now in operation at Mid-States Tile Company in North Carolina and have proven to be quite satisfactory. While these burners are a bit more expensive than standard burners, the savings in brick work and the benefits of the velocity penetration have made them economically and operationally successful.



Extenso-Jet burner.



Installation shows silicon carbide Extenso-Jet tips located at inner wall face. Maximum velocity is delivered to the load.



Extenso-Jet body mounted to outer wall face.

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