

Application Report

AR-140

Past success sparks Copperweld Steel's interest in Eclipse ThermJet burners for stress relieving furnaces

In mid-1994, Mike Kay successfully installed a turnkey Eclipse Combustion direct-fired heating system into an annealing furnace at Copperweld Steel, a division of Copperweld Corporation, in Shelby, Ohio. His firm, W.H. Kay Co. in Cleveland, has represented Eclipse products in northern Ohio since 1936.

Copperweld Steel manufactures seamless steel tubing and piping, primarily for automotive OEMs. Initially, Copperweld contacted Kay because the North American burners and recuperators in three zones of the plant's continuous roller hearth annealing furnace were creating problems and needed to be replaced. Kay designed a new heating system, which incorporated Eclipse 63TFB burners and recuperators.

Describing that job, Kay notes: "We turnkeyed the entire project. Copperweld appreciated our efficient system design, timely delivery, complete installation and hassle-free start-up. They were even more pleased when the Eclipse burner system ran smoothly and delivered excellent performance, in terms of improved productivity, efficiency and product quality."

That's why, when Copperweld recently decided to replace older North American and Hauck burners on two of the plant's stress relieving furnaces, it's not surprising W.H.Kay Co. got the call.

Improved product quality and improved productivity were Copperweld's goals

In Copperweld's manufacturing process, steel tubing and piping are conveyed through a continuous roller hearth design stress relieving furnace operating at approximately 1000° F. This heat treating process relieves stresses in the metal and ensures product quality by preventing the steel from becoming brittle. Copperweld contracted with Kay to design all new heating systems for two of their stress relieving furnaces.

According to Kay, quality and productivity were the key reasons for Copperweld's replacement of the old heating systems. "With continuous roller hearth design furnaces," he notes, "any stoppage of production creates major problems all the way down the line. If your heating system's not up to par, you're going to be faced with productivity and quality problems. Copperweld expressly requested the newest technology available to assure uninterrupted production and superior product quality."

Kay responded by introducing Copperweld to the Eclipse ThermJet high-velocity burner, a completely new direct-fired burner design capable of providing the velocity and heat uniformity required by this demanding application.



New Eclipse ThermJet burner systems in two stress relieving furnaces have led to increased productivity and improved quality in Copperweld Steel's seamless steel pipe manufacturing process.

Eclipse high-velocity ThermJet burners set new performance standards

The new ThermJet is unlike any other high-velocity burner. Designed from the ground up, it incorporates engineering and operational features that make a vast difference in performance, flexibility and results.

For starters, the ThermJet has the highest operating velocity of any velocity burner on the market today. It's designed with exclusive integrated gas and air orifices that enable the burner to produce an intensive stream of hot gases to thoroughly penetrate the load – resulting in unequalled temperature uniformity, energy efficiency, low NOx emissions and, ultimately, better product quality. With its wide turndown range and excellent air capabilities, ThermJet also delivers these same high-velocity benefits over the entire range of the furnace, making it ideal for many applications.

In addition, an “ergonomic” design offers air and gas line access from any side, which greatly simplifies installation and maintenance by reducing piping connections and lowering air pressure requirements. Best of all, ThermJet is reasonably priced for a high-performance, high-velocity burner, delivering an excellent cost/value ratio – an important consideration for companies updating and converting furnaces and other heat treating equipment.

ThermJets have the velocity and control to do the job right

To retrofit new heating systems into Copperweld's stress relieving furnaces, Kay specified ThermJet burners in two different configurations. One system includes 58 Model 50 burners, which are rated to 500,000 BTU/hr. The other includes 26 burners – 20 Model 50s and six Model 150s, which have a capacity of 1,500,000 BTU/hr.

Although installation was completed only recently, results have already become apparent. Temperature uniformity in both furnaces has improved dramatically, resulting in better and more consistent product quality. Over the long-term, Copperweld anticipates the new ThermJet system will deliver additional benefits of increased productivity and throughput.

According to Kay, a change in Copperweld's heat system control scheme from on-ratio control firing to excess air control firing should also provide increased production capability, since excess air controls are more efficient in distributing heat uniformly to the work.

In fact, based on preliminary results experienced with Eclipse ThermJet burner systems, Kay reports Copperweld is already planning two more furnace conversions to Eclipse burners later this year.

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