

## Application**brief**

*Eclipse Product:* ThermJet Burners

*Submitted by:* Ernest Harvey – North American Manager, Field Technical Service

*Application:* Electric to gas conversion of Sunbeam furnace

*Description:* Athens Products, Inc. manufactures high efficiency electric compressor motors. Mr. Joe Robinson, Manufacturing Services Manager, asked Eclipse Technical Service to take on the project of converting their Sunbeam electric furnace using direct fired burners operating on natural gas. The furnace has a preheat section and an annealing section. Contaminates are burned off the rotors in the preheat section. This section does not have a controlled atmosphere but excess air levels were controlled to prevent iron oxides from forming on the parts.

It was anticipated that energy cost savings would pay for the conversion and also allow for the expansion of another process in the plant. The Eclipse Sales and Technical Service team assessed the specifications for the process and selected ThermJet medium velocity burners to cross fire the chamber creating turbulent hot gasses through the racks containing the motor rotors. The furnace heat loss and the addition of an exhaust system were factored in the engineering of the system. The customer also requested additional capacity for future production needs.

The required heat load and future capacity needs dictated the selection of the Model 040TJ ThermJet burner with a maximum capacity of 400,000 Btu/hr. gross input. The burners were commissioned with a derated high fire capacity of 250,000 Btu/hr. The present furnace requirement is 1,000,000 Btu/hr. Four burners were strategically located on the furnace sidewalls using the holes left after the removal of the electrical elements. Each burner cross fires an opposite burner with ten inch off set spacing to allow the flue gasses to create a circular agitation through the product. The system was designed to have two zone control with a ratio regulator controlling the fuel flow for two burners on each sidewall. Eclipse Field Technical Service supervised the installation of the equipment and provided the field engineering for the piping sizes and layout. The electrical interface from the panel wires terminal and the field terminal connectors were inspected and tested. The temperature controls software parameters were programmed and modified as needed for the trial run. Eclipse technicians set up the system by adjusting the manifold pressure for gas and air. The burners were set and balanced to the specifications. The unit was thoroughly tested using a system audit to test all of the safety devices. Finally, a performance test was conducted and after some fine tuning, the system not only met, but exceeded the customer's expectations. Installation and commissioning time was minimal resulting in less than expected down time. The data collected from the commissioning, testing and performance trials was documented and provided to the customer. *(Continued on page 2.)*



#### **Operational Assets:**

- Increased product throughput
- 30% energy savings
- Lower maintenance costs
- Improved product quality
- Rapid capital investment payback

#### **Customer comments:**

“The recent project by Eclipse to convert the anneal pre-heat furnace from an indirect firing approach to a direct flame application has been a tremendous success. Since the installation of the ThermJet burners two years ago we have been able to increase the capacity of our anneal furnace and improve product quality. I feel Eclipse technical support has consistently provided our facility with the professional support to meet and exceed our expectations. I look forward to meeting our future needs with the Eclipse team.”

*Mr. Joe Robinson, Manufacturing Services Manager  
Athens Products Inc.*



*The valve train was supplied pre-piped and wired. Athens Products electronic technicians used the control design logic supplied to build a new panel using Eclipse products. A Multi-Flame monitoring system was used with UDC series temperature controls. Natural gas supply at 5 psig regulated to 25" w.c. is distributed in equal volume to the manifold, splitting to the left and right zone control Eclipse ES series ratio valves. The gas and air to the burners is pressure controlled. As the combustion air increases in pressure, the gas volume out of the valve is proportional to the air. Air/gas ratio is a small percentage of excess air at low fire and near on ratio at high fire.*