

## **20% Increase of Oven capacity in one week**

*By Niels Bogh Owner Bogh Industries, LLC.*

*Phone 253-732-8476, E-mail nbogh1@ix.netcom.com*

Bogh Industries LLC recently completed a project to increase the length of a three zone direct gas fired Aluminum age/anneal oven by 6'. The oven originally was capable of handling material up to 30' lengths. The modified oven can now handle stock up to 36' lengths with improved uniformity. Production down time was kept to a minimum by working twelve hour days during the modification. The modification work started on a Saturday morning the next Sunday evening eight days later the oven was surveyed and ready for production.



The oven before the six foot extension.

Bogh Industries was contacted by the customer to determine if an oven extension was feasible. A site visit was completed to review oven survey data, heating capacity and measure airflow in the oven. Based on this information it was decided to develop an engineering package and installation schedule that would be the most economical for the customer. The original schedule was for two weeks of construction time. However by optimizing the time and complete floor changes beforehand it was possible to compress the schedule. Bogh Industries completed the mechanical design while the customer took care of floor and car drive modifications. The new oven parts were built by a local sheet metal manufacturing company and a local mechanical contractor provided labor and equipment for the installation. Bogh Industries provided the on site supervision.



The picture shows the new wall panels installed and the structural steel. One new supply duct is also installed. Return and supply plenum extension is not installed yet.

**The mechanical modifications consisted of the following:**

- Removal of the old supply ducts.
- Installation of 3' extension wall panels and ceiling panels on the each end of the oven.
- Installation of new structural steel to support the new oven panels.
- Installation 3' extensions on supply and return duct plenums on both ends of the oven.
- Installation of six new supply plenums with adjustable openings in the oven.
- Fitting of the two existing end walls and lift doors to the new walls.
- Adjusting louvers to achieve proper airflow and uniformity.

Electrical modification consisted of extending the conduit and wiring to the different limit switches and devises on the doors.

The uniformity surveys were performed with 40 TC's in the work zone (36'L X 9'W x 6.5'H). Temperatures were tested from 210F-750F. The oven passed the test in the first run and as an example the difference between the highest and lowest measured temperature at 350F was 5.4F during soak. Minor adjustments are planned to make the oven even more uniform in the future.

By working closely together and using local suppliers and crafts the project became cost effective and feasible for the customer. The on site supervision by the design engineer ensured that no time was wasted with minor adjustments between the new design and the old oven. The customer now has 20% more production capacity and a more uniform oven than before the modification.

Niels Bogh is the owner of Bogh Industries, LLC. He specializes in furnace, oven, quench and water filtration equipment. Tight uniformity in large ovens is one of the main specialties of his company. Several very large direct fired aluminum heat treat systems exist which have uniformity of +/- 2 deg F at 1000F based on design inputs and adjustments by Niels.

Bogh Industries is focusing its business on providing cost effective alternatives for furnace and oven upgrades, in conjunction with consulting and advising customers with new equipment and processes. Providing preventive maintenance and maintenance training are also a part of the company's business. The hands on experience of installing and starting up more than 35 quick quench and other large furnaces over the last 15 years are benefiting the customers. The article describes one project which clearly benefited from this experience. Additionally the company has more than a decade worth of experience in Poly Alkylene Glycol (PAG) reclamation. This spans from Reverse Osmosis (RO) separation, to batch and on line flow through heat separation and filtration.