



Bogh Industries LLC

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**Quench Recovery Equipment
Furnace & Oven Installation,
Startup, Modifications Consulting
Project Management, Service**

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High Temperature Furnace Retrofit.

Bogh Industries LLC has completed design, plus mechanical and electrical upgrades to a 1976 high temperature car bottom furnace. The furnace had twelve 1 Mill BTU North American flat flame burners arranged in groups of three for a total of 12 Mill BTU input. The burner train was no longer per code. The furnace operated as a four zone furnace with the operator manually setting temperatures and stepping the furnace up to the desired set-point. Both main burners and pilots were operated in triplets. This caused maintenance trouble when a burner would not light or had to be adjusted.

To allow the furnace to accommodate a new larger part for heat treat. The following was accomplished:

The furnace was raised 16" and a skirt was added to the furnace body. This allowed the new part to fit inside the zone. However the part would be too close to the roof burners and four new high velocity burners were added to the back wall of the furnace. These burners are used for heat treating this particular part.



The picture shows one of the four 3.5 Mill BTU high velocity burners firing at high fire during the initial testing.

Each burner on the furnace has its own individual controls and can be independently controlled by the PLC and the recipes developed for the particular heat treat.

The gas train was upgraded to comply with the latest codes, NFPA 86 and NFPA 54. Each roof burner now has individual pilot controls and can easily be adjusted for reliable light off. Each burner also fires at the proper O₂ level which is adjusted at the burner.

As seen on the picture below the old setup allowed the burners to run rich in groups of three. (Soot is visible around the burners)



The picture shows two flat flame burners at 1 Mill BTU output. One burner is running at correct O₂ level while the one to the right is running rich.



The burners firing at proper settings

The process requirements included a rapid air quench after the heat treat. BI designed two air supply plenums and one exhaust hood that allows the customer to open the 2250F furnace and automatically place the hot part and load car in front of the cooling air. Two axial supply fans and one larger axial exhaust fan support the cooling requirements.

The furnace was also upgraded with a new control cabinet with modern PLC controls and VFD's for fan control. The control cabinet was delivered by American Controls and Engineering Services



The New 3 door control cabinet

BI delivered design services, equipment and on-site supervision for the project. Our customer provided the contract labor both mechanical and electrical.

This furnace has now extended its usefulness another 20-30 years plus has additional capabilities.

If you are interested in additional information regarding this or other projects we have completed and described on this web site www.boghindustries.com please contact us by telephone 253-732-8476 or by e-mail nbogh1@ix.netcom.com. Our web site can also be used to contact us.