



Bogh Industries LLC

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

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Cure Oven Retrofit and Energy Savings

Bogh Industries LLC have completed a modification of an existing 1991 Cure oven. The oven has a work chamber that is 40' long x 20' wide x 12'high. The oven is used for cure and aging cycles. The temperature range is 125F-500F.

The oven had been out of production for several years, and used for storage of large fixtures. New production demands made it feasible to bring the oven up to current standards and put it back into production

Bogh Industries was asked to evaluate the oven and complete the required upgrades to bring the machine up to code and into production.

	Before	After
1.	The gas train was not built per NFPA 86 and burner problems were evident per the trouble log.	New main gas train with safety check capability installed. Twelve (12) new burner gas valves are installed with proof of closure switches as required per NFPA 86
2.	Minimum two of the twelve tube fired burners were always on during operation.	All burners can now be off at low temperature operation during soak. This eliminates heat load and shift heating to the fan friction.
3.	O ₂ levels were hard to control and burner shutoff valves did not have required proof of closure switches.	Twelve (12) new Karl Dungs shutoff valves and proportionators installed and adjusted with very good results
4.	During low temperature operation the oven would creep and cooling coils is installed to cool the fresh air used for keeping the temperature down. Cooling coils is also installed in the return ducts of the oven itself to control low temperature operation. Water leaks have flooded the oven in the past and oven panels were damaged by corrosion.	Cooling water requirements eliminated and the coils and piping drained. Corrosion damage was repaired.

	Before	After
5.	Fresh air inlet blower 20HP and exhaust blower 30HP is running continuously while oven is operating. Fresh air and exhaust controlled by modulating dampers.	These fans are only used during controlled cool down.
6.	Recirculation fans (2) 250HP running at max speed during all operation. VFD used for soft start. The fans are generating about 1 Mill BTU per hour.	The PLC is now controlling the speed of the fans through the two VFD's at low temperature operation. The reduced airflow has not affected the ovens uniformity at 125F. The fans are running at 40% output at this temperature.
7.	Combustion blowers 20HP running at full speed at all burner inputs.	No change. VFD's on the motors and a pressure control setting can save about 40-50% energy on each motor.

Below are the calculations for the saving by eliminating the blowers described above from the heating cycle.

Electric motor calculations					
Operation hours	12				
Eliminated fans	HP	KW	KW per day	Operating days	KW per year
Exhaust	30	22.5	2880	300	864,000.00
Fresh air	20	15			
Recirculation HP reduction (Low temp operation)	250	187.5			
Electric cost/KW	\$0.06		Electric saving per year	\$53,568.00	

Please note that significant saving is accomplished by eliminating the burners being on during the low cure temperatures (Up to 150F) thus eliminated the gas usage and cooling tower usage for the system

The PLC program and hardware was upgraded to accept the additional inputs and the operator interface upgraded to a new touch screen device.

If you have any questions please contact me at 253-732-8476 or by e-mail nbogh1@ix.netcom.com.