



BLASDEL

Paint & Powder Applications

Case Study: Brake Shoe Refurbishing and Brake Pad Powder Coating Oven

Blasdel Enterprises Infrared Ovens reduces high oven maintenance costs for brake shoe and brake pad manufacturing company



Refurbishing brake shoes



Background

Blasdel Enterprises was contacted by a re-manufacturer of brake shoes to help the facility reduce the cost of their oven maintenance and increase production. The customer was using an epoxy powder coating as a rust inhibitor.

The operation was initially designed with seven separate remanufacturing cells. Each line contained one four-foot long shortwave oven utilizing T3 lamps with a reflective housing. Gas convection ovens were initially considered for the application, but required a large amount of floor space. The shortwave ovens have the advantage of a small footprint and reasonable energy consumption. The disadvantage is their maintenance requirements. Several months after the facility opened, the heaters began to fail. Two of the shortwave ovens had to be repaired every week which required an average of

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seven hours per week of labor plus the cost for parts. The cost of parts and labor combined were \$26,000 per year. Downtime and its associated overtime costs contributed to the maintenance costs, as well.

The engineering team decided it was time for a new approach. Because of the past problems, the team decided that long term testing was required before implementing new heating technology. After two years of testing, that new approach was approved. The decision was made to install seven replacement medium-wave electric infrared ovens from **Blasdel Enterprises**.

Blasdel Enterprises' medium-wave infrared oven achieved all of the goals for a new curing oven including:

- Faster production capability
- Minimal floor space
- Reduced maintenance requirements
- Low energy consumption
- Reasonable capital expenditure

Advantages of using infrared for this application



Floor Space

The new medium-wave infrared ovens are either 6' or 10' long depending on part size and weight. The shortwave infrared ovens were 4' long. All the new ovens are 3' wide. The shortwave ovens were operating at full power to cure the powder, whereas the new medium-wave **Blasdel** ovens were designed to operate at less than 50% power. The new ovens provide for future increases in line speed without adversely affecting floor space despite their length increase over the old ovens. A convection oven would have required a minimum of 50' for the same project.



Maintenance

The shortwave infrared ovens require an average of seven hours per week of preventive maintenance. After two years of operation, no heaters have prematurely failed in the **Blasdel** medium-wave oven as a result of any heater problems. Several heaters were damaged by conveyor problems, but this is not related to heater design. With a typical life expectancy of 25,000 hours for Solar Products' panel heaters, the customer will continue to operate for a long time without experiencing very many maintenance problems.



Energy Consumption

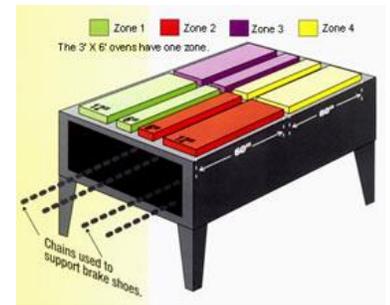
Input power rating is often viewed as the actual power usage for an electric infrared oven. In this case, the 10' oven for producing 9" brake shoes requires 108 kW of electric infrared energy. But, in actual operation, its energy usage is 41 kW. The energy calculation is 41 kW/hr x 6 cents per kW/hr= \$2.46 per hour of operation. Based on the current production rate, it costs \$.011 cent to cure five brake shoes. The energy consumption for paint and powder applications typically accounts for less than 1% of the product selling price. Our guess is that this amount is well below that 1% margin. The best part is that Solar Products' panel heaters maintain a consistently high radiant efficiency (80%) over time.



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Note: Each 18" oven half can operate independently. This allows the heater output power to be adjusted to part weight. Because the brake shoes range in weight from 1.5 - 15 pounds, they each require different temperatures to match their curing times. The 10' oven is used for heavier parts. The brake shoes range in size from 7" - 12" in radius, and there is a heavy brake shoe for trucks (15 lbs). The information relates to a 9" brake shoe in a 10' long oven.



Specifications	Part Details	
Part description	Steel brake shoes	
Coating	Black epoxy powder - 2.0 mils thick	
Coating application	Automatic electrostatic spray gun in booth	
Length of oven	6' Oven	10' Oven
Zones per oven	One Zone	Four Zones
Input power	64.8 kW	108 kW
Actual power usage	25 kW per hour	41 kW per hour
Oven type	Medium wave electric infrared	
Heater type	Solar Products' medium wave panel heaters	
Conveyor type	Dual chain conveyor	
Conveyor speed	2.75 fpm	
Weight of part	1.5 - 15 lbs.	
Gel and cure time	(dwell time) 3.6 minutes	

Follow-up

This company began purchasing multiple companies that powder coated brake pads as well. Most convection ovens in these facilities have been replaced with Blasdel Enterprises' medium wave infrared ovens utilizing Solar Products' ceramic panel heaters for preheating and curing powder on brake pads. Some facilities had dip lines for their brake shoe refurbishing lines, which now utilize Blasdel's medium infrared ovens.

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