

Make it Electric



Energy information to help you manage your operation

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The finishing touch

Industrial Finishing Services gains a clear edge with facility, equipment upgrades

Big and small parts. Flat and round parts. Metal, fiberglass, and plastic parts. Industrial Finishing Services (IFS) provides the finishing touch for almost any parts that need coating.

IFS—a custom coater with headquarters in Perham, Minnesota, and three ISO 9001:2000 certified plants in the state—finishes approximately 6.5 million parts a year for equipment manufacturers around the country and ships them all over the world. Companies such as Bobcat, General Motors, IBM, Mercury, and Thermo King all rely on IFS.

Growing competition leads to change

IFS has been a strong player in the competitive world of industrial finishing since its inception in 1996. Three years ago IFS was a \$3 million-a-year business. Last year the company more than tripled that figure. To stay competitive, IFS needed to get bigger or invest in equipment and electric technologies to make it more efficient. The company did both. In 2006 IFS completed a \$4 million expansion and upgrade that doubled the size of the Perham facility, added

a new liquid line in Perham to supplement the Deer Creek operation, and improved the efficiency of its powder line with two movable application booths and two infrared (IR) curing ovens.

After upgrading its plants last year, IFS can give any industrial coater a run for its money, says Operations Manager Keith Aune. “Whatever a customer needs, we can do it with our new state-of-the-art systems,” he said, “and we probably can do it better and faster.”

Productivity by the foot

“In industrial coating, it all comes down to line speed, or feet per minute, and throughput, or parts per hour,” said Aune. “It’s pricing, quality, and all of that. But throughput is how you get paid.” And IFS had two bottlenecks to take care of in its powder line before the company could increase throughput.

The powder line is a conveyor system that winds its way along the ceiling of the plant carrying parts in and out of rooms, through paint application

booths, and into the oven. The first bottleneck was in the paint application booths.

IFS offers powder coating in 250 colors and usually does about four color changes a day. This meant that the line had to be down for an average of two hours every day so employees could clean the booths for each color change. IFS cut downtime to seven minutes by replacing its old booth with two portable booths that roll in and out of the line.

The second bottleneck was in the company’s large natural gas-fired convection oven. The oven did the job for IFS but slowly and with high fuel costs. And it took about an hour to heat it to the necessary temperatures.



A look inside:

PROTHERM

Meeting the growing demand for electricity

Off-peak service and incentives

During downtime, IFS had two choices: keep heating the oven—and waste energy—or shut down the oven—and deal with the lost time and wasted energy of reheating.

“The convection oven did what it did, but we couldn’t run fast and we didn’t have a lot of control,” said Aune. “With the line extension and roll-in/roll-out booths, we could run quickly, but we couldn’t cure parts rapidly enough. The solution was an electric infrared oven system.”

The finishing touch

IFS went to another Otter Tail Power Company customer, Process Thermal Dynamics, or PROTHERM, in Brandon, Minnesota, (see story page 3) to get the ideal system.

PROTHERM’s challenge was to design an infrared oven that had movable heater banks, met IFS’s throughput requirements, and literally turned corners to fit into the existing IFS space. PROTHERM delivered, and the 840-kilowatt system was installed in August 2006.

Since then IFS has installed a second IR system for smaller parts. The company still is working to maximize productivity and energy efficiency, but the systems already are making a big difference where it counts. Overall, the IR has increased the average line speed from 6.5 to 9.7 feet per minute.

“By no means are we masters of the IRs yet, but we’re getting closer every day,” said Aune. “There’s also a value in being on the cutting edge, and these systems are going to allow us to continue to grow. They’ve already changed our way of thinking and running a business. Instead of being a step for us, this is a leap.”

A partner in efficiency

Otter Tail Power Company worked with IFS:

- In upgrading the electrical systems for its Perham expansion.
- In helping IFS decide what size infrared system to buy.
- In providing a rebate through the Commercial and Industrial Energy Saver Grant program.
- In helping IFS switch to a commercial time-of-use electric rate, which provided an incentive for using power during lower-cost periods to save even further on energy costs.

To learn more about Industrial Finishing Services, call 218-346-3975 or visit them online at www.industrial-finishing.com.

“The [infrared curing ovens have] already changed our way of thinking and running a business. Instead of being a step for us, this is a leap.”

*- Industrial Finishing Services
Operations Manager Keith Aune*



Finishing and infrared primers

Powder coating

Color is added to a finely ground and electrostatically charged mixture of pigment and resin. The mixture is sprayed onto the parts, which hold an opposite charge causing the powder particles to adhere. The powder is melted in a high-temperature oven and then cooled to produce a hard, abrasion-resistant finish. This process does not include solvents so it’s more environmentally responsible than those that do.

Infrared curing

Infrared (IR) is a type of radiant heat. *Radiant* refers to the transfer of heat using invisible electromagnetic waves of energy from a heat source to the part being heated. These energy waves—or IR rays—are the warmth you feel from sunlight. The rays travel in a straight line to the object, and no air is heated in the process so it’s fast and extremely efficient.

Infrared offers several advantages over convection curing. Infrared:

- Produces more attractive and durable finishes by heating paints and coatings from the inside out.
- Reduces curing and drying times by acting directly on the coating.
- Increases precision by directing rays only where they’re needed.
- Increases energy efficiency with no preheating time.
- Compact modular ovens leave more usable floor space and make it easy to expand and upgrade production lines.

Growing demand for electricity Meeting the need as reliably and economically as possible



Demand for electricity is increasing in the American economy. Advancing technologies and penetration of electronics are major factors contributing to growing energy use in our country.

Conservation and energy management

Otter Tail Power Company’s service area is no different. Growth in energy use has occurred despite our conservation efforts. Between 1992 and 2005 in Minnesota alone customers participating in our Conservation Improvement Program have saved the amount of electricity that approximately 1,800 average elementary or secondary schools, or 90,000 average homes, in our service area would have used in a year. And we continue to develop tools to help customers identify and correct factors that contribute to high energy use.

Meeting the need

Energy from our power plants, renewable energy, and energy conservation all work together to provide the electricity necessary to meet growing customer needs. And while the cost of living has risen nearly 90 percent since 1986, Otter Tail Power Company hasn’t raised rates in Minnesota or South Dakota since then or in North Dakota since 1982. We’ve been focusing our attention on efforts to keep your rates low and still provide reliable electric service.

Rising costs

Unfortunately, these efforts no longer are enough. We’re subject to a wholesale energy market that’s heavily influenced by significant increases and volatility in natural gas and other fossil fuel prices. And overall costs to run our business continue to rise along with electricity use.

To meet our customer needs and ensure we have all the competitively priced electricity necessary, many utilities will need to increase rates to pay for new lines and energy resources while continuing to maintain their current electric systems. Otter Tail Power Company will file a rate case in Minnesota on or before October 1, 2007, to address growing energy use, rising costs, and the Minnesota Public Utilities Commission’s recommendation. And we anticipate filing rate cases in North Dakota and South Dakota sometime within the next three years.

Focus remains on exceptional service

We value you as a customer, and we understand that you spend a significant portion of your budget on electricity. To help secure a bright future, we promise to remain diligent about finding the most efficient, responsible, cost-effective ways to provide exceptional service, as we have since 1909. And we will continue to share information about upcoming rate cases with you as soon as we are able.

Custom-designed infrared systems

PROTHERM attributes company's growth to satisfied customers

Bob Beattie has been in the infrared business for nearly four decades, with more than two of those as owner of Process Thermal Dynamics, or PROTHERM. Ask him anything about the technology and how it's best applied, and he'll have your attention for hours. But one question stumps him: What is the life of a PROTHERM infrared system?

"I don't have a clue," Beattie says. "We put the highest quality materials we can find into our heaters to extend their lives. We have heaters out there that have been running for 20 years without a glitch. We build it right, and we build it once. That's what makes our business."

Heating up business

PROTHERM, in Brandon, Minnesota, is a turn-key infrared (IR) system provider that builds electric IR heaters, full oven assemblies, and complete systems—including prewired UL-certified controls—exclusively for industrial applications. Every heater and system is custom designed and fabricated entirely at PROTHERM, from heaters as small as 1.5 kilowatts to complete systems larger than 1000 kilowatts.

Beattie founded the company in 1985 with a simple philosophy: build high-quality, dependable IR ovens and systems and treat the customer right. "We won't try and shoehorn what we have to fit into their process just to get the job. That's against our rules," he says. "If we can't make exactly what a potential customer needs, we'll tell them."

That dedication to up-front dependability drives PROTHERM's business. In June 2006 the company wrapped up its best year ever. Beattie attributes much of the growth to demand for IR booster ovens from customers in the powder coating industry, such as Industrial Finishing Services in Perham, Minnesota.

But PROTHERM manufactures heat for hundreds of applications. The company's 14 employees build IR ovens and systems for companies such as 3M, Bayer, Maytag, Rubbermaid, and Whirlpool, to name a few. PROTHERM also sells to other businesses that incorporate its heaters into their own systems.

PROTHERM ovens are integral to operations that manufacture products such as dishwashers, stoves, automotive headlight assemblies, closet organizers, glue-spreading equipment, and five-gallon bottles. Many of PROTHERM's customers resell its products, so PROTHERM can't be entirely certain how everything is being used.

But PROTHERM's products are being used extensively around the world. They're curing and heating parts and processes from China to Germany, Egypt to Australia, Saudi Arabia to Mexico. In fact, PROTHERM equipment is in so many places that a couple of years ago the company gave up keeping track.

That tells Beattie his little company is doing something right.

"It all starts with one heater," he says. "A customer calls us with a need, and it might be for only one heater. We solve his problem with that one heater and, when he requires heat down the line, he's going to call us. In the meantime, he's going to tell other people about us."



PROTHERM™

PROTHERM continued

In one door, out the other

Potential customers seldom approach PROTHERM and say, "This is the oven we want." Instead, they rely on the company's expertise to create the system they need. The company also offers free testing of parts and processes so prospective customer can be sure PROTHERM will deliver before they enter into a contract.

From there, PROTHERM builds the heater, oven, or system from the ground up. Everything comes into the plant as raw material—sheet metal, elements, fireproof ceramic tiles—and goes out as finished product.

Part of the plant is a full-service metal fabrication operation where employees take the raw material and shape it, cut it, punch it, drill it, tab it, weld it—whatever is necessary to make a quality customer-specific system. Once it's delivered, PROTHERM consults on installation, start-up, and ongoing operation.

According to Beattie, independent tests by the Electrotechnologies Laboratory of Hydro-Quebec have proven PROTHERM heaters are the most efficient on the market. Generally, infrared rays heat only what they are aimed at, but Beattie

and his crew know from experience that various materials conduct heat to the point that every surface doesn't need to be in the rays' direct line for proper curing. With that in mind, they're able to design and build the most efficient systems available.

"There are people who are far smarter than me, I'm sure, but I've been doing this for 38 years, and I don't know of any new way to build a heater," Beattie said. "With my people, I can beat any fabrication shop out there and deliver the best, most reliable product you can get."

To learn more about PROTHERM, call 800-793-2077 or visit them online at www.pro-therm.com.



"We put the highest quality materials we can find into our heaters to extend their lives...."

We build it right, and we build it once. That's what makes our business."

- PROTHERM Owner Bob Beattie

Manage your energy costs

Boost your bottom line

Off-peak service and incentives can help you save money!

If your operation is flexible and could tolerate interruptions in electric service—such as water-heating systems with storage, thermal-storage heating, or dual-fuel systems where a backup fuel is available—consider saving with our controlled-service rates that are **1/3 to 1/2 the**

standard price of electricity.

With controlled service, you allow us to use radio signals to interrupt service to predetermined electric equipment during peak or emergency situations.

Incentives are available on certain energy-efficient electric installations, including water heating, thermal storage, cooking equipment, and

more. If you plan to install new electric equipment, we can help you select the most cost-effective options. Incentives vary by rates and location. Financing is available for qualifying installations.

For more information, call our **Idea Center at 800-493-3299.**



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