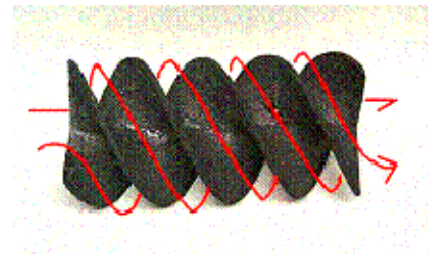


NEW TECHNOLOGY BRIEF

SpyroCor Inserts for Metal Heat-Treating Furnaces

Focus on Energy and the CleanTech Partners (CTP) have teamed to bring a new natural gas saving technology to Wisconsin's metals industry. Demonstrations of the SpyroCor technology are underway at two Wisconsin companies and a case study documenting the results of this demonstration project will be produced shortly. Preliminary results show natural gas savings ranging from 10 percent to 30 percent. Spinworks, the technology's developer, has accurately predicted the savings in each of the four furnaces where the technology has been installed.

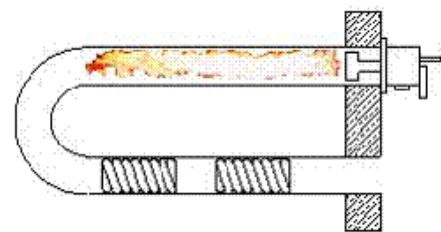
SpyroCor is a high tech ceramic (silicon-carbide) insert that can reduce natural gas use in radiant tube heaters by 10 percent to 30 percent. Radiant tube heaters are used in metal heat-treating furnaces that maintain temperatures of 1,000° to 2,000° F. Tube heaters, typically U-shaped, have a natural-gas fueled burner at one end to produce a flame. The heated gas then flows through the tubes to produce heat for conditioning metals (e.g., strengthening them or otherwise changing some of their properties).



It is estimated that Wisconsin has 90 heat-treating locations, most locations having multiple furnaces. A furnace may have a dozen tubes. Among the 90 customers there could be as many as 6,000 radiant tubes. It takes about three to six SpyroCors units per tube, with a typical cost of \$325 per unit. Energy savings estimates can vary among furnaces due to differences in the types of metal processed, hours of operation and the presence or absence of recuperators or other devices. A typical tube burner uses 2.5 therms of natural gas per hour, with some furnaces operating over 8,000 hours per year.

How a SpyroCor Saves Energy

The patented twist design of the SpyroCor produces non-turbulent, high convection flow resulting in better and more uniform heat transfer. As a result, SpyroCor inserts reduce heat loss and the total energy demanded by the process. SpyroCor inserts may have other benefits to customers including reduced cycle duration, more uniform product heating, and reduced NO_x and CO₂ emissions. SpyroCor inserts can be installed "hot" during furnace operation. At the demonstration sites, plant staff members were able to install SpyroCor inserts after a short training session. Upon installation, savings impacts were immediately measurable with paybacks estimated at less than one year. The lifespan of a SpyroCor unit is more than five years.



How SpyroCor Came to Wisconsin

CTP first identified SpyroCor inserts as a technology candidate in October 2004 at a U.S. Department of Energy-sponsored venture capital conference. After the conference, an initial assessment of the

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SpyroCor technology showed that its benefits warranted a more in depth assessment. CTP staff further assessed the technology and the company to ensure they deliver on their promises. Spinworks, LLC, founded in 2001, is headquartered in Erie, PA. SpyroCor, Spinworks' first product, was developed, in part, using funds provided by the New York State Energy Research and Development Authority, with additional funding provided by two Pennsylvania economic development agencies.

As is typical with new energy-related technology startup companies, Spinworks initially marketed SpyroCor near its home base and targeted other areas deemed to have a large market potential. Wisconsin was not on their list of target markets. As a new company, Spinworks had few staff and funds to market outside their target region. In addition, the funds they received during product development came with disincentives for them to move toward markets beyond the states that originally funded their research and development. While most states support technology development, very few support commercialization activities like Wisconsin. Wisconsin heat-treaters were unaware of SpyroCors despite their limited availability in Pennsylvania, and with no independent verification of the technology or the vendor, Wisconsin firms were unlikely to try SpyroCors and put their processes at risk.

In an effort to overcome these commercialization hurdles, CTP partnered with Spinworks and developed a plan to commercialize this technology in Wisconsin. A \$350,000 loan from CTP is being used to hire a sales representative focusing on Wisconsin, and to help Spinworks expand its business and product offerings. Once verification of energy savings was completed, Focus on Energy was able to provide incentives to eligible industries that installed the technology.

Spinworks plans to introduce two additional products (HeatCor and FireCor) over the next three years. HeatCor is a ceramic heat exchanger and FireCor is an entire tube replacement system. Combined, the SpyroCor, FireCor, and HeatCor products can reduce fuel consumption by over 50 percent, with six-to-twelve-month paybacks.

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About Focus on Energy

Focus on Energy is a public-private partnership offering energy information and services to energy utility customers throughout Wisconsin. The goals of this program are to encourage energy efficiency and use of renewable energy, enhance the environment and ensure the future supply of energy for Wisconsin. Since July 2001, the program has helped Wisconsin's businesses and residents cut their annual utility bills by more than \$98 million - reducing their energy consumption by nearly 811 million kilowatt-hours of electricity and more than 40 million therms of natural gas. For more information, call 800.762.7077 or visit focusonenergy.com.

About CleanTech Partners, Inc.

CleanTech Partners, Inc., founded in 2002 as the Center for Technology Transfer, Inc., is a private nonprofit, 501(c)(3) organization that facilitates the commercialization of new technologies to improve the competitiveness of Wisconsin's key industry clusters. CleanTech Partners also provides financing for the installation of energy-efficiency best practices when financing from traditional sources is not available. CleanTech Partners' activities have the added benefit of keeping money in Wisconsin by reducing the amount of energy purchased from other states and nations. CleanTech Partners is sponsored in part by Focus on Energy, Wisconsin's energy efficiency and renewable energy initiative.