

Gear Technology Launches Electronic Version

E-GT, the electronic version of *Gear Technology*, launched with our January/February 2003 issue. Feedback from our readers around the world has been tremendous.

Within 24 hours of notifying our e-subscribers that *E-GT* was available, nearly 500 of them had come to our website to retrieve the files. Many of those who have used *E-GT* have written to offer their congratulations and comments.

"I have just received your electronic version of *Gear Technology* and wish to express my satisfaction for having all the information available on my desktop. Keep up the good work," wrote the chief operating officer of a major gear and drive manufacturer in Italy.

E-GT is an exact duplicate of the printed magazine, except that it has been prepared in PDF format. *E-GT*

includes all of the same technical articles and departments found in the printed version. It includes all of the charts, graphs, figures and tables. It even includes all of the advertisements.

"I have now read the January/February 2003 issue online," wrote a gear specialist at the transmission division of a major American automobile manufacturer. "The quality of the electronic issue is excellent. All the text and figures can be easily read, even better than in the paper edition (the zoom feature is quite helpful). The uniquely electronic nature of *E-GT* is a real plus since I can search far more powerfully."

E-GT reaches nearly 1,500 subscribers in more than 50 countries—and the list grows daily. Many of those subscribers wouldn't otherwise be able to receive our content, especially those who are outside the United States.

"*E-GT* sets us apart from other trade

magazines," says publisher and president Michael Goldstein. "Through this format, we're able to deliver our information and advertising anywhere in the world. We're using *E-GT* to expand our international readership."

E-GT is available for free to qualified readers—anywhere in the world—and subscribers don't have to wait for it to be delivered through the mail.

"Thanks for mailing me the electronic version of *Gear Technology*," wrote the general engineering manager of a major industrial gear drive manufacturer in India. "I had no problems in downloading the same."

If you'd like to join our growing list of *E-GT* subscribers, visit our website at www.geartechology.com and follow the links under the *E-GT* logo, or fill out the card that's bound inside this magazine.

Ipsen Offers a New Variation of Automated Heat Treat System

A set of rails, a row of process chambers and a mobile vacuum loader make up the latest heat treat system from Ipsen International Inc.

The system's purpose: Allow companies to run different heat treat jobs at the same time and move their parts (read: gears) for quenching while keeping each gear load at its ideal temperature.

Ready for sale in October, the system was designed to make a company's heat treat operation as flexible as possible.

Called multi-i-cell, the system can include process chambers that vacuum carburize, vacuum harden or carbonitride. It also can include low temperature chambers that can nitride or ferritic nitrocarburize.

Multi-i-cell can heat treat various types of loose gears. It can also heat treat transmission and drive shaft gears, as well as axles.

In a heat treat operation, the chambers are arranged in a row and the rails are



New from Ipsen International Inc., multi-i-cell includes a mobile vacuum loader (far left) that moves on rails in front of process and quench chambers.

laid down in front of them. Riding the rails, the 2.5-ton vacuum loader moves in front of the chambers, transferring gears from process chambers to high pressure gas quench chambers or oil quench chambers.

The vacuum loader is the unique part of the system, says Thomas Wingens. A materials engineer and metallurgist, Wingens is vacuum product manager at Ipsen International's operation in Rockford, IL.

The loader transports processed loads under heat and vacuum, so a gear load can be transferred from process chamber to quench chamber without exposure to a factory's cooler air.

Also, as Wingens explains, the loader can be changed to any temperature in minutes. So, it can carry a load of gears at one temperature, then carry another load at a different temperature.

The loader's temperature can range up to 2,000°F. Lowering the temperature over a wide range, like from 1,700°F to fully cooled down, takes about six minutes and requires using the system's cooling station.

For cooling more than 500°F, the loader is moved in front of the station, which consists of blowers. The loader's door is opened, and the station's blowers

force cooler air into it.

Lowering the temperature over a narrower range, like from 1,700°F to 1,600°F, happens via natural heat loss. Increasing over such a narrow range can be done in two minutes, Wingens says.

He adds that processing temperatures usually vary within a 50–100°F range.

Multi-i-cell is the latest among a number of heat treat systems designed to process gears under vacuum and transfer them for quenching without exposing them to atmosphere.

Other systems for transferring gears without exposure to cooler air come from ALD Thermal Treatment Inc. of Blythewood, SC, and ECM U.S.A. Inc. of Kenosha, WI.

Like Ipsen's multi-i-cell, ALD's ModulTherm consists of a row of process chambers. But, ALD uses its rails to mobilize the system's quench chamber.

The quench chamber contains the loader and moves in front of the process chambers. Therefore, ModulTherm transfers gear loads directly from process chamber to quench chamber.

Introduced about a year ago, ALD's system has process chambers for plasma carburizing, chambers for vacuum carburizing and chambers for vacuum hardening. Its quench chamber can gas quench gears. ALD has sold one system.

Available since 1996, ECM's system consists of two rows of chambers. The rows face each other and are connected to a vacuum tunnel via ports on its two long "sides." Inside the large tunnel, a shuttle car moves gear loads between process chambers, a quench chamber, and a load/unload chamber.

Called ICBP, ECM's system can include process chambers that carbonitride, vacuum harden and vacuum carburize. ECM has sold more than 55 systems, in the horizontal configuration described and in a vertical configuration.

All three systems can be expanded with additional chambers. ECM's tunnel usually has a maximum of eight ports: six for process chambers, one for a

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quench chamber and one for a load/unload chamber. Still, tunnels can be created with 10 or 12 ports.

Ipsen's system can include eight process chambers with one loader. It can also include up to 10 process chambers with one quench chamber. (With nine or 10 process chambers, multi-cell would have two loaders on the same track.)

With 11 or more process chambers, a company would need to set up a second system. But, Wingens says the Ipsen system might be kept from its maximum size by other constraints, like the amount of floor space available for a row of chambers.

ALD's standard system can have up to six carburizing chambers, but the company can attach more process chambers.

The number of process chambers depends on the production volume per time unit and on the case depths that a company needs in its gears. As Wingens explains, if the gears need shallow case depths, multi-cell can consist of six process chambers, for example. If they need deeper case depths, then the system would need more process chambers, like eight, because of longer carburizing times.

Ipsen's base system—a process chamber, a quench chamber and a vacuum loader—starts at \$1.2 million. Additional process chambers cost \$300,000 apiece.

The system can handle gear loads that are 24" wide, 36" deep, 25" high, and weigh 1,100 pounds.

All three systems are fully automated and include software that schedules workloads for maximum efficiency. The more varied the heat treat processes and the tighter the time constraints, the more helpful the software for scheduling jobs.

Also, according to their representatives, all three systems have uptimes of 90% or more.

Since Ipsen finished testing multi-cell in October, it has sold the system to a commercial heat treater in Germany and a captive gear job shop in China.

Wingens says the system was designed for captive and commercial

heat treaters serving the automotive and aerospace industries.

Still, he predicts that automotive companies will process the greatest volume of parts with the system and that their greatest demand will be for carburizing gears. Ⓞ

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