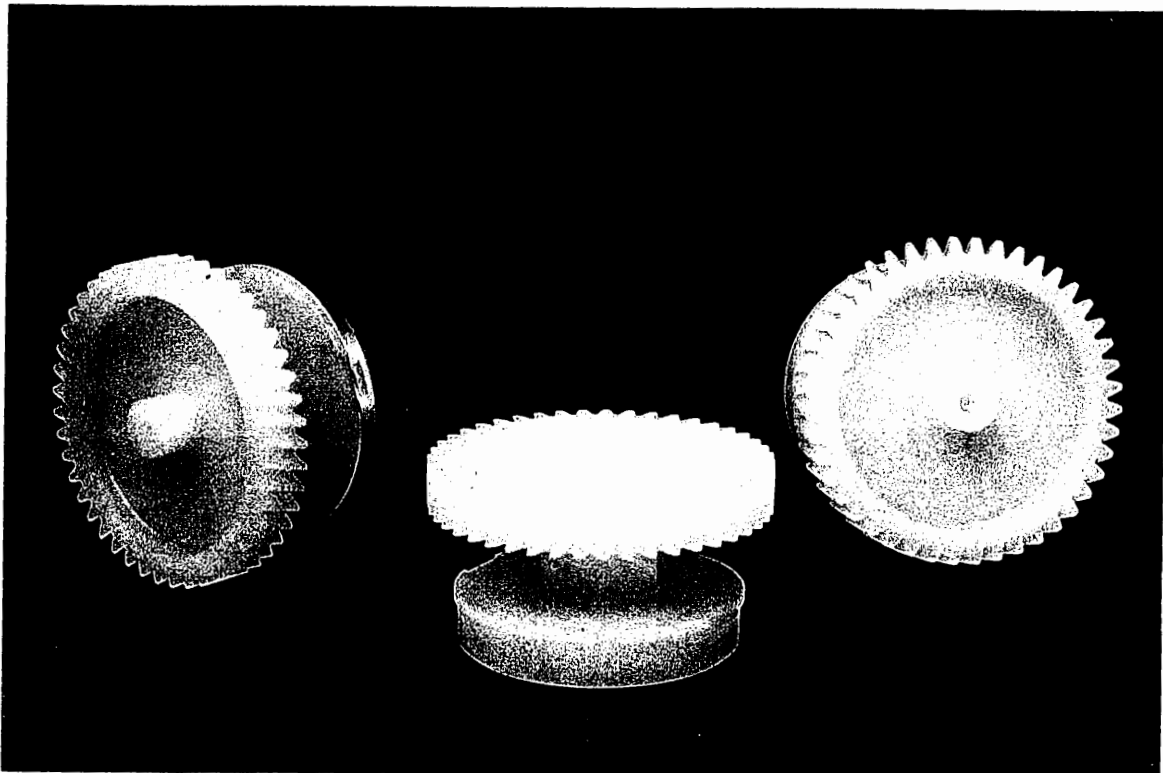




Shell Chemicals

CARILON POLYMERS CASE HISTORY

Lexmark Optra™ R Printer Gears



The combination of high performance, ease of processing and lower cost made CARILON™ Polymers a natural choice for Lexmark International. CARILON Polymers replaced a higher priced lubricated acetal. The 40 mm gear is part of the toner cartridge assembly in Lexmark's Optra™ R laser printer. For more information about CARILON Polymers, call 1-888-CARILON (888-227-4566).



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PRESS INFORMATION

CARILON Polymers Provide High Performance for Laser Printer Gears

Lexmark Optra™ R Case History

When Lexmark Engineer Frank Carroll first got a look at Shell Chemicals¹ CARILON² Polymers, he immediately thought of a small but critical gear in Lexmark's laser printer toner cartridge.

"It is essential that the gear functions smoothly – without wear – against the mating gear," says Carroll. "If not, it causes 'jitter' in the machine, resulting in poor print quality."

The 40mm gear is part of the photoconductor drum assembly within the toner cartridge used for Lexmark's high-end Optra R network laser printer. When the cartridge is inserted into the printer, the gear meshes with a mating gear in the machine. Essential performance qualities for the gear material include toughness, quiet operation with no noise or squeaks, wear resistance and creep resistance.

"This issue of tribological characteristics – friction and wear – is basic to the function of engineering thermoplastics in a wide variety of machine applications," explains Shell Chemicals Research Engineer John Kelley. "The whole function of a gear is to transfer power and/or motion as smoothly as possible, and any wear on the teeth of the gear affects that smoothness. One plus with CARILON Polymers is that, unlike polyamides and polyacetals, they better resist wear against themselves and against other polymers."

In fact, CARILON Polymers provided the same high quality tribological performance in a neat (unfilled) form, needing no lubrication to do the job, as the higher-priced lubricated polymer they replaced.

"We found that the neat version of CARILON Polymers performed as well as the lubricated version of the polyacetal we had been using," notes Stephen DeFosse, of Lexmark's Plastics Technology Center, who consulted on the evaluation of CARILON Polymers.

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¹ The expression 'Shell Chemicals' refers to the companies of the Royal Dutch/Shell Group which are engaged in the chemicals business. Each of the companies which make up the Royal Dutch/Shell Group of companies is an independent entity and has its own separate identity.

² CARILON is a Shell trademark.

Carroll and DeFosse still needed one more attribute – processability. It was important that the anticipated cost savings of using CARILON Polymers not be absorbed by retooling expenses. With its broad processing window, CARILON Polymers successfully passed this test.

"With CARILON Polymers, we found we did not have the hydroscopic problems of nylon or polycarbonates," DeFosse points out. The combination of high performance, ease of processing and lower cost made a clear business case for CARILON Polymers. Lexmark is now beginning to use the CARILON Polymers gear on a production basis, and anticipates that it will fully replace the previous gear material in the future.

"Lexmark demonstrated real leadership by stepping forward to test this new polymer," says Michelle Londa, CARILON Polymers' marketing manager – Americas. "They were quick to recognize and take full advantage of the superior value and performance advantages of CARILON Polymers – and their innovations paid off.

"CARILON Polymers are great new players in the polymer market," says DeFosse. "I'm already researching them for other applications."

CARILON Polymers are engineering thermoplastics with a unique combination of physical properties compared to traditional materials such as polyamides and polyacetals. These properties include strength, stiffness, performance over a broad temperature range, toughness, superior wear and friction characteristics, low hydrocarbon permeability and resistance to a variety of aggressive chemicals.

CARILON Polymers are available in extrusion grades and a variety of injection molding grades, including glass reinforced, flame retardant, mineral filled and lubricated compounds. The polymers can be easily processed on conventional molding and extrusion equipment, and their fast set-up can lead to significantly reduced cycle times in injection molding applications.

For more information on CARILON Polymers, visit Shell's Web site at www.shellchemicals.com. In the United States, customers can write to Shell Chemical Company, P.O. Box 2463, Houston, Texas 77252-2463 or call toll free at 1-888-CARILON (1-888-227-4566). In Europe, customers can write to Shell Chemicals Ltd., Shell Centre, SEI 7NA or call +44 171 934 3300.

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