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Made for shade: Company's film for self-tinting windows hits market

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President Harlan Byker says Pleotint LLC plans "to sell as hard as we can" after 13 years of investing in thermochromic film for windows that dim in sunlight.

WEST OLIVE TWP. -- When he set out to invent a window that would darken automatically in bright sunlight, Harlan Byker figured it would take maybe three years to bring it to market.

It took 13.

"For 13 years, we've been investing money, and we've made none," said Byker, 56, founder and president of **Pleotint LLC**, based in West Olive Township just north of Holland.

Now he and his backers hope to realize a return on that investment.

Part of what kept them going was Byker's track record. As a researcher at Zeeland-based **Gentex Corp.** in the mid-1980s, he invented the chemistry in the self-dimming rearview mirrors now in more than 100 million motor vehicles worldwide.

Self-tinting windows would require a different process.

The Gentex mirrors are "electrochromic," using an electrical current to dim.

Pleotint's windows are "thermochromic," harnessing the sun's heat to cause a chemical reaction. The hotter the sun, the darker the tint.

As a demonstration, the company last summer installed windows in a building on the **Calvin College** campus in Grand Rapids. The temperature in a corner office sometimes soared to 90 degrees in bright sunlight, said Philip Beezhold, Calvin's director of physical plant. Pleotint's windows solved that problem, Beezhold said, adding that he would consider having them

installed in other campus buildings.

Pleotint's first commercial installation is in an office building under construction on the east side of the state, Byker said. He and Fred Millett, 57, Pleotint's director of sales and marketing, declined to identify it, saying they were sworn to secrecy.

But other sources, including the **Michigan Building and Construction Trades Council** Web site, said the windows are being installed in a Strategic Services Center being built by **Dow Chemical Co.** and **Tata Consultancy Services** near Dow's Midland headquarters. The building will include 300 5-by-10-foot thermochromic windows.

Dow Chemical spokesman Greg Baldwin declined to comment on the specific technology used for the windows.

David Walker, vice president of association services at the MacLean, Va.-based **National Glass Association**, said LEED certification and related green initiatives are driving the glass industry's push for self-tinted glass.

"There is an evolution of the industry going on here with a real push for energy efficiency in windows," he said. "Tinting has a real impact on efficiency, and it's a big opportunity for companies like Pleotint."

The market for energy-efficient windows is huge, Byker and Millett figure, particularly because interest in green technology is increasing. Pleotint, however, offers no revenue or sales projections.

"I can give you beautiful projections if you like, but I don't know how to predict the future," said Byker, who holds more than 40 patents and has a Ph.D. in physical chemistry. "We just plan to sell as hard as we can."

That's what he and Millett were doing one recent afternoon in a presentation to a small group of construction company executives. With video and PowerPoint, Millett showed the executives how Pleotint's film is laminated between two panes of glass. On a cloudy day, the windows allow 50 percent of the sunlight in but in bright sunlight reduce that to 10 percent or less.

In the company's Jenison plant west of Grand Rapids, a Pleotint executive demonstrated, holding a halogen shop light against a 5-by-10-foot window -- which Byker says are the largest self-tinted windows ever made.

He removed the light, leaving a dark gray rectangle while the rest of the window remained clear.

"It's a completely reversible chemical reaction," Byker said as the dark rectangle slowly faded, eventually matching the rest of the window.

Pleotint does not manufacture the windows but sells its thermochromic film to window companies, which laminate it between panes of glass. Windows containing Pleotint's film cost more than conventional windows, Millett said. He declined to say how much because the types of windows vary considerably.

A business or homeowner who installs the windows can offset part of the cost by not buying shades or other window treatments, he said.

But the greatest savings is in energy costs, Millett said. Byker estimated the savings will pay for

the windows in five to seven years. A study by a Holland engineering firm estimated that a building with Pleotint's windows could reduce its total energy costs 17 percent to 30 percent a year.

Controllable tinting provides more than just energy savings, said Jim Wilson, chief marketing director at **Sage Electrochromics**. The Faribault, Minn., company manufactures self-tinting windows that use the electrochromic technology found in Gentex mirrors.

"Windows are a terrible insulator and, really, are a crummy building material. We put them in buildings because people want the view," he said. "When you use blinds and pull them down, you've eliminated the reason you installed windows in the first place.

"Electrochromic windows darken when you need them to dark, blocking heat and glare, while minimizing lighting bills and maintaining a consistent view of the outdoors."

Pleotint plans to install its windows on a building at the **Iowa Energy Center** near Des Moines for a yearlong study, to see how much energy is saved compared with conventional windows.

"It's impressive," Matt Larsen, a project manager for **Wolverine Building Group**, said after the presentation. "I can think of a half-dozen construction projects I've done in the last five years that would have been perfect for this."

Developing a commercially viable product has taken years and a lot of experimenting, Byker said. He pointed to a 50-gallon tank holding the chemical solution he developed.

"That's the magic formula, the secret sauce," he said. He calls it Sunlight Responsive Thermo-chromic technology.

The chemicals are mixed with a plastic powder and fed into a \$2 million extrusion machine the company had custom-built. Out of it comes a 5-foot-wide sheet of film.

"You know what we did for two years?" Byker asked. "Every roll of film we made, we sent to the landfill."

For nine years, he and his brother, David, a venture capitalist, funded the company themselves, then raised \$10 million from other investors.

The company has 15 full-time employees and could add more as demand increases, although the process is not labor-intensive. Already, Byker said, Pleotint has shipped rolls of its film to window manufacturers in Australia, France, Singapore and China.

Said Byker: "Can you imagine a little company in Jenison, Michigan, selling stuff to the Chinese?"