

Product Innovation



Ohio Manufacturers' Innovative Spirit Alive and Well

In the "Flat World" described by Thomas Freidman, complacency is fatal; companies that find synergies with evolving markets discover new successes through an ability to adapt. This ability to adapt is, and will continue to be, a key competitive advantage in the 21st Century global economy. Ohio's ability to compete globally stems from our rich tradition of innovation which is evidenced today by our manufacturers' pursuit of new product innovations for non-traditional markets. The Ohio Third Frontier fosters this spirit of innovation by helping to address the technical needs of existing companies willing to refocus their robust strengths to create new products, industries, markets, and jobs. This innovative spirit is exemplified by the following three Ohio companies.



In 1945, **Crown Equipment Corporation** started manufacturing temperature controls for coal-burning furnaces. Its adaptive history then led the company to manufacture television antenna rotators at its facility in New Bremen, Ohio. Since 1956, **Crown** has designed,

manufactured, distributed, serviced and supported material handling products, providing lift trucks to an array of industries.

Today, **Crown's** heavy-duty lift trucks are used in a variety of applications, such as transporting goods through the narrow aisles of warehouses, distribution centers and manufacturing facilities. In an effort to further enhance efficiency in warehousing operations, Crown has been developing a fuel cell application for its warehouse lift trucks. If successful, the technology will replace batteries in warehouse vehicles, saving both resources and time.

Ohio Third Frontier funding has enabled **Crown** to accelerate its research, placing the company at the leading edge of the deployment of cost effective fuel cell technology for the lift truck market. In mid-2008, **Crown** established a dedicated test center to qualify lift trucks for commercially available fuel cells. Customer interest remains high. Five fuel cells from three different suppliers have been evaluated for all three classes of lift truck, and **Crown** is currently field testing a U.S. Department of Defense application.

Created in 1948 as Lima Tool & Die, **American Trim** was once a start-up with four employees manufacturing appliance handles for kitchen ranges. Today, the company has expanded into the areas of electromagnetic forming, physical vapor deposition,

Markets Served by American Trim

- Automotive
- Building Products
- Furniture
- Marine
- Appliance
- Fuel Cell
- Heavy Truck
- Motorcycle

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digital printing and advanced surface modification to achieve a global presence with 1,500 employees and annual sales of \$250 million.

With Ohio Third Frontier funding, and in collaboration with Lima's Rhodes State College, **American Trim** is playing a leading role in the Advanced Materials Commercialization Center and the Advanced Materials Deposition Center. Specifically, **American Trim** has opened its Lima facility to house these centers, while Rhodes State College provides the equipment to develop and commercialize these advanced product process methods. As a result of this collaboration, **American Trim** has developed a cost-effective and environmentally acceptable near-chrome finishing process which is eliminating the need to send products off-shore for chroming, reducing production cycle time, and enabling the company to retain jobs in Ohio.

Furthermore, the Ohio Third Frontier investment is contributing to student education and workforce development at the undergraduate and graduate level at Rhodes State College and Ohio Northern University, training engineering students and technicians in cutting-edge processes thereby ensuring that Ohioans have the ability to upgrade their skill sets to prepare for these jobs.

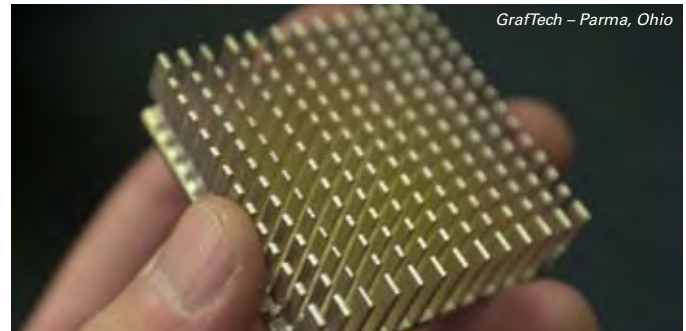
With a 120-year history in Ohio, **GrafTech**, located in Parma, has always been a leading innovator, producing the arc carbons that allowed the city of Cleveland to become the first in the world to have electric street lamps and enabling the lighting necessary for early color motion picture photography. The Ohio Third Frontier has provided R&D funding to help **GrafTech** continue to build on its innovative past with new products and market opportunities.

In recent years, **GrafTech** has revolutionized the consumer electronics world by introducing electronic thermal management solutions that enable lighter and thinner plasma television sets, laptop computers, and cell phones. Funding from the Ohio Third Frontier has supported advanced materials research that will enable **GrafTech** to develop the next-generation graphite sheet with enhanced properties at a lower cost to meet consumer product demand in the future.

With Ohio Third Frontier support, **GrafTech** has also pioneered the use of lightweight, corrosion-resistant graphite-based materials used in critical components of fuel cells. These novel materials are now found in fuel cells for hydrogen-powered automobiles, buses, fork-lift trucks and backup power applications. The company

foresees future applications in consumer electronics and stationary power.

The Ohio Third Frontier delivers assistance to Ohio manufacturing companies that sustain Ohio's global competitive advantages for product development, company growth and attraction, job creation and wealth creation. By assisting Ohio manufacturing companies to explore new opportunities and collaborations, companies are finding synergies with evolving markets and discovering new economic successes by adapting to technological and market forces.



GrafTech - Parma, Ohio

GrafTech Awards

- With a \$2.9 million **U.S. Department of Energy** grant, **GrafTech** is developing next-generation bipolar plates for automotive polymer electrolyte membrane fuel cells.
- Initial funding from the **Ohio Third Frontier** led to the award of a \$1.6 million **U.S. Air Force** appropriation to develop conductive graphite foam for aerospace heat exchangers in a collaboration between **GrafTech**, the **Ohio Aerospace Institute**, and **Ohio University**.
- In 2005, **GrafTech** won the **Frost & Sullivan Award for Excellence in Technology**.
- **GrafTech** won the **2006 State of Ohio Governor's Excellence in Exporting Award** due to expanded thermal management solution sales in Asia.
- **eGRAF®** thermal management products have won two **Research & Development 100** awards (2003 & 2004); **GRAFCELL®** bipolar plates took the award in 2007.
- **GrafTech's CEO, Craig Shular**, won the **2008 Ernst & Young Entrepreneur of the Year Award** for his company's financial successes in supporting innovation.
- **GrafTech** has maintained a continual presence in the Cleveland area since the 1880's.