

Applications

Norplex-Micarta serves many industries with high performance thermoset composites. In addition to **power generation**, **military/aerospace** and **oil & gas**, Norplex-Micarta enhances groundbreaking **medical device** applications from stethoscope plates to sophisticated MRI machines. In **electrical devices**, products are used in motors, transformers, control devices and power distribution. For **electronics assembly**, products appear in semiconductor vapor deposition chambers, solder pallets for PCB assembly and test fixtures for PWBs. In **construction**, StormBlocker® protects homeowners with FEMA-rated structures, while ShotBlocker® creates ballistic-resistant barriers for banks, the military and law enforcement installations. For **heavy industry**, thermoset composites withstand the high stress of machine tooling, while in **transportation**, products enhance structural, storage, bearing and braking systems.

Power Generation

A full line of certified high-temperature thermoset laminates, pre-pregs and specialty molded shapes are available, including blocking materials, low-power factor materials, electrically conductive materials, machined and molded wedge materials, ripple springs, flexible insulation and other shapes. These products provide insulation and mechanical support in high-temperature generators and transformers. Norplex-Micarta also specializes in rapid material delivery for repair and re-build when customers are faced with unplanned outages or general maintenance.

Military/Aerospace

Numerous standard and custom products meet the performance and reliability requirements of military and aerospace applications for commercial and military aircraft, as well as for military ground vehicles. Available in sheet, tube and pre-preg, these materials offer excellent thermal insulation, mechanical strength, structural support and durability. Thermoset composites withstand the initial impact force of installation; the repeated stress of inspections and repairs; as well as the rigors of aircraft take-off, flight and landing operations.

Oil & Gas

Cryogenic and fabric-reinforced materials provide thermal insulation and structural support for large-diameter transport systems, thermal insulation for storage vessels and cathodic protection between dissimilar materials. In oil & gas structures, fabric-reinforced thermosets offer excellent thermal insulation and impact resistance, and are impervious to moisture and corrosive chemicals over extended periods.

Visit our web site
www.norplex-micarta.com

About Norplex-Micarta

Norplex-Micarta is the leading manufacturer of high performance thermoset composites. Norplex-Micarta's vast product line serves power generation, alternate energy, ballistic protection, construction, electrical devices, electronics, heavy industrial, military/aerospace, oil & gas and transportation markets throughout Europe, Asia/Pacific and The Americas.

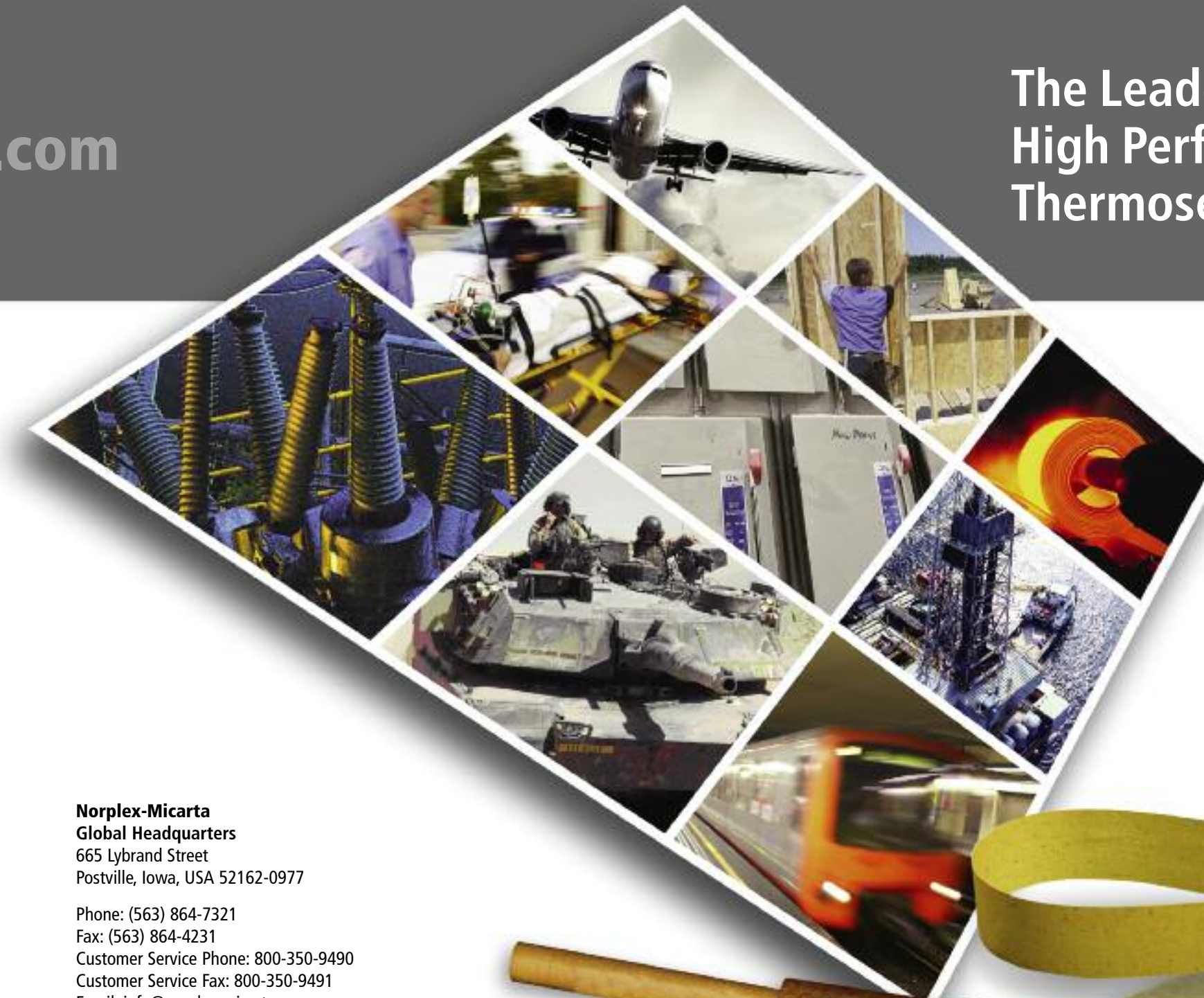


Norplex-Micarta global headquarters in Postville, Iowa, USA



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 **NORPLEX
MICARTA**
Global Thermoset Composite Solutions



The Leader in
High Performance
Thermoset Composites

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THERMOSET COMPOSITES

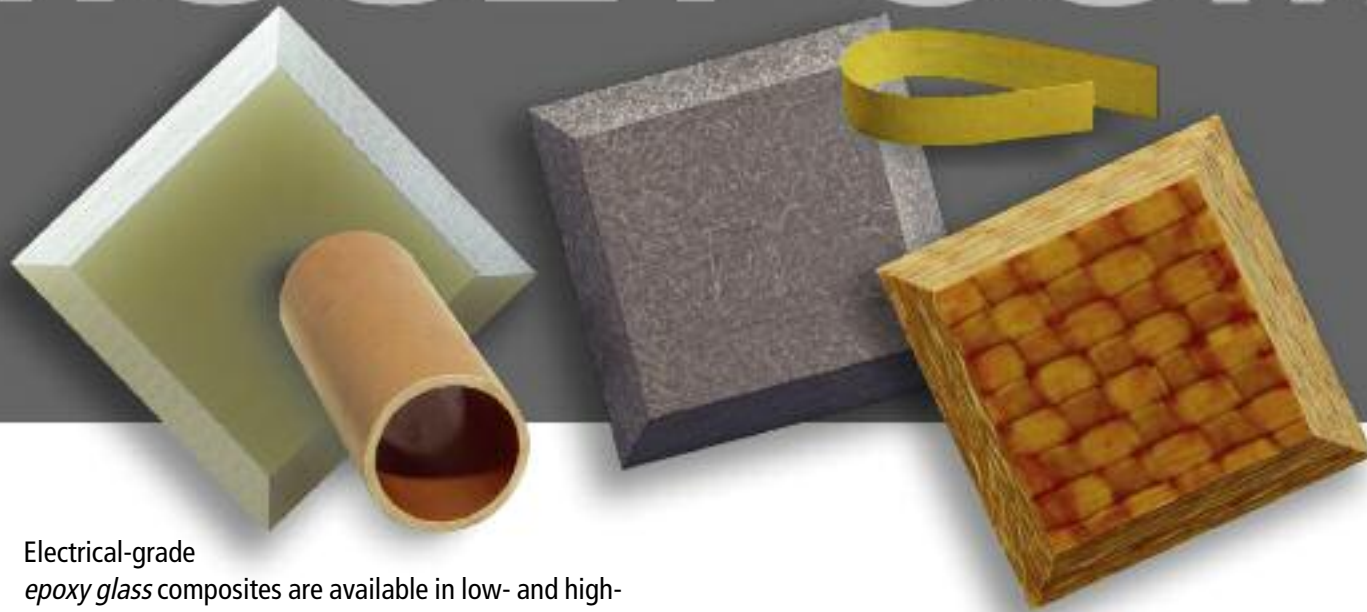
Technology Leadership

Norplex-Micarta is the leading global supplier of high performance thermoset composites to OEMs and fabricators. Building on the IL/Norplex expertise in flat sheet laminated plastics and Micarta's technology in sheet, round tubing, and molded rods and shapes, Norplex-Micarta manufactures the highest quality thermoset composites available for the world's most demanding applications.

Norplex-Micarta Products

Sheet materials are made from a variety of thermoset resins and substrates, two of which are based on cost-effective paper substrates. *Phenolic paper* composites provide mechanical isolation and thermal/electrical insulation properties that meet or exceed low-end thermoplastic materials. They are good insulators for low-voltage, dry-service electrical equipment. *Epoxy paper* composites have exceptional physical and thermal characteristics that dramatically outperform wood and metal in applications requiring tight tolerances and dimensional stability over extended periods.

Sheet grades are also manufactured utilizing cotton and linen fabrics. These are easy to machine, have excellent wear properties and operate with less noise than metal. And, because they do not spark when struck, they can be used in explosion-proof environments. *Phenolic cotton (canvas)* provides load-bearing properties comparable to brass and bronze, but has non-abrasive surfaces that will not seize to or score metal shafts. They are ideal for load-bearing applications in ships, metal-rolling mills and off-road construction equipment. *Phenolic linen* composites offer a lower coefficient of thermal expansion than metal materials, plus high strength and heat resistance. Applications include gears, pulleys, rollers, guides and other intricate parts.



Electrical-grade *epoxy glass* composites are available in low- and high-temperature versions. Low-temperature epoxy glass composites offer good chemical resistance and electrical properties under dry and humid conditions. High-temperature epoxy glass composites offer superior strength, chemical resistance and insulative properties over a wide temperature range. Applications include solder pallets, generator blocking and structural requirements at elevated temperatures.

Various combinations of resins and fabric substrates are also available for applications ranging from conveyor systems and welding equipment to electronics assembly and security.

Pre-pregs (b-stage products) are available as cotton fabrics with phenolic resins; glass fabrics with flame retardant and non-flame retardant epoxy resins, melamine resins or phenolic resins; carbon fiber fabrics combined with phenolic and epoxy resins; and a variety of custom combinations. Applications include liner panels in transportation and marine, printing and packaging, power generation insulation and tubing pre-pregs for fuse tube assembly.

Tubing grades and molded rod products are available with paper, cotton or glass fabric substrates. *Phenolic paper* grades are used in electrical and general-purpose applications. *Phenolic and epoxy cotton* grades are ideal for mechanical applications and electrical insulation. *Glass fabric* grades utilize epoxy, phenolic, melamine or silicone systems for applications requiring high-temperatures, electrical and mechanical strength and resistance to cryogenic temperatures, arcing and combustion.

All Norplex-Micarta sheet, pre-preg, rod and tube grades meet the most rigid customer, NEMA, military and ASTM requirements.

Dedication to Quality

Quality extends well beyond Norplex-Micarta products; it is infused into every aspect of the company. A strategic investment in quality assurance is reflected in state-of-the-art machine control for treaters and presses, material analysis and testing, staff training and a commitment to the future of the industry.

Norplex-Micarta utilizes real-time computerized control systems for its treating and pressing operations. These systems reduce process variation through a quality database and a proprietary process control algorithm, while driving variables toward their nominal targets. Process data is available for statistical process control and analysis, as well as manufacturing and environmental reporting.

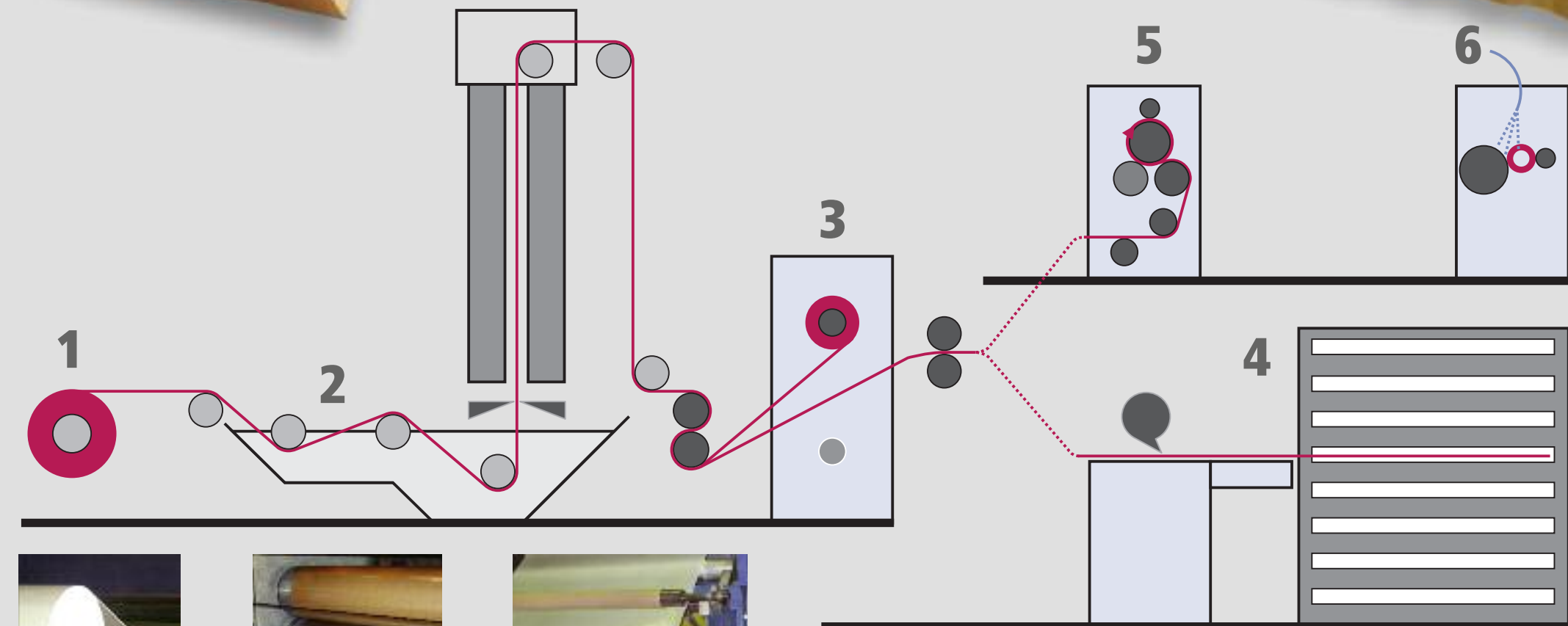
Norplex-Micarta employs engineers trained in Six Sigma and LEAN process improvement methodologies. Additionally, plant improvement teams trained in multivariable analysis, design of experiments, 5S, Kaizen and SMED eliminate variation and reduce cycle times. These quality processes lead to increased productivity, improved inventory turns, waste reduction and the elimination of unplanned downtime in production.

Norplex-Micarta's ISO-certified on-site lab provides test reports or certifications for purchased materials. The lab is also equipped to test materials from the field, or to assist customers with corrective actions.

Norplex-Micarta is committed to being the leader in high performance thermoset composites and has made several strategic investments to position itself at the forefront of the industry. These include a \$10 million upgrade to its USA headquarters for increased capacity and improved quality, as well as the addition of skilled resources in engineering, operations, sales, marketing and customer service.

Multi-Step Manufacturing Process

Norplex-Micarta utilizes state-of-the-art equipment for each step in the manufacturing process, from material preparation and treating to pressing and finishing. First, the substrate is processed through the resin compound. Then, the impregnated material is semi-cured in a treater oven. Once the material is treated, it is either issued to the customer as prepreg, sent to the press for sheet grades (see photo 4 below), or sent to the tube winding machines for tubing grades (see photo 5 below). Finally, the material is trimmed, stripped, sanded and packaged as required.



1 Substrate Roll
Norplex-Micarta has the most stringent vendor qualification process in the thermoset laminate industry, ensuring that our customers receive the highest quality composites from batch to batch.



2 Resin Metering
Precision-aligned rollers apply and meter resin to the substrate with uniform consistency and fabric wet-out. The system guarantees that the resin will completely penetrate the substrate, filling all voids.



3 Treater/Rewinder
A proprietary computer-controlled treating technology is used for the curing process. Both vertical (illustrated above) and horizontal treaters are available to fit customer process requirements. After treating, tubing and prepreg products are sent to the rewind system, which ensures consistent tension throughout the process.



4 Lamination Press
Norplex-Micarta uses multiple state-of-the-art hydraulic presses that are computer-controlled. These presses produce laminated sheets ranging from 18" x 18" to 4' x 10' in size and up to 8" thick.



5 Tube Winder
Prepreg is wrapped around precision-ground mandrels with controlled temperatures and pressure to create a convolute-wound tube. Inside diameters range from 0.094" to 48", with wall thicknesses down to 0.031". The tube is then cured by baking in an oven.



6 Wet Centerless Grinder
Tubes are wet-ground to meet outside diameter and surface finish specifications. Custom applications feature specialty products feature outside diameter tolerances as low as +/- 0.005".