

SPECIAL MACHINES BUILT AROUND HIGH SPEED ELECTRIC SPINDLE SYSTEMS TO ENGRAVE TIRE SIDEWALL MOLDS



(The use of safety guards is recommended for all high speed spindle applications).

PROBLEM SOLVED

To achieve high quality, precision and consistency in engraving letters, numbers and characters in tire sidewall molds, Quality Mold, Inc., developed and built its own CNC machines, incorporating a precise high speed spindle system to provide the high rpm needed for engraving fine details with small diameter carbide tooling.

CUSTOMER BENEFITS

- High spindle speeds and low tool pressure ensure accuracy and precision for machining tire mold details with small diameter carbide tooling.
- Spindle rigidity and low runout helps maintain accuracy and hold close tolerances.
- Complete spindle system makes it easy to integrate into the company's own machines.

PRECISE SPINDLE SYSTEM EMPLOYED

- [Type 4082](#) high speed spindle system

APPLICATION DETAILS



Quality Mold, Inc., converts tire designs into precision molds for automobile, light truck, off-the-road, motorcycle, bicycle, agriculture and aircraft tires. Now the world's largest independent supplier of tire molds, the Akron, Ohio company also has several other plants across the U.S. and in Canada.

An important part of any tire mold is the sidewall engraving that adds tire names, identification numbers, company logos and other information. The letters and designs range from small to large and from simple to complex. All must be sharp and clear to convey important product information and complement the tire's appearance. However, traditional methods of producing these details were either too slow or not accurate enough. Stamping left impressions that were not crisp and clear enough for some of the characters, and it was difficult to obtain

consistent, accurate results. Pantograph engravers lacked the necessary accuracy and repeatability, and production was too slow.

To meet increasing production needs and improve accuracy, the company built seven CNC machines, each incorporating a [precise SC 4082](#) spindle that has a speed range of 10,000 to 40,000 rpm. The 3.4 kW (4.6 hp) spindles each are powered by a **precise** frequency converter and are equipped with a liquid cooling system that dissipates the heat generated by the spindle bearings and motor. The spindles are built around a dynamically balanced quill shaft that turns in pre-loaded high precision, ceramic ball bearings and is driven by an integral motor. Spindle accuracy of 2 microns (.00008") maximum T.I.R. at the spindle nose, allows the cutting tool to work at high speeds and achieve excellent surface finish. The light load chip load and low tool pressure inherent in high speed machining make it possible to achieve highly accurate results in engraving even the finest characters.

Jim Riedl, manager, corporate quality assurance, says the machines are in operation about 20 hours per day, engraving tire mold sidewalls of either aluminum or steel. Carbide cutting tools are used, and some of the logos with extremely small details may require cutting tools approaching .010" diameter, while others can range up to about 1/4".

The Precise Corporation

3715 Blue River Ave.
P.O. Box 085000
Racine, WI 53408-5000 USA
Phone: +1 (262) 632-6173
Fax: +1 (262) 632-6730
e-mail: precise@precise-corp.com
www.precise-corp.com



Precise Präzisionsspindeln GmbH

Am Wallgraben 2 • D-42799 Leichlingen, Germany
Postfach 1461 • D-42785 Leichlingen
Telefon: +49 (0 21 75) 9 71 0
Telefax: +49 (0 21 75) 9 71 99, 9 71 97
e-mail: precise@precise.de
www.precise.de