

# TYRE PROFILE GENERATING GOOD FOR CUSTOMERS, GOOD FOR ENVIRONMENT

Since 1975, when the US mandated Corporate Average Fuel Economy (CAFE) standards, automakers have been under constant pressure to increase the fuel efficiency of their vehicles.

As they looked for cost-effective ways to meet fuel economy standards, automakers turned to their tyre suppliers. And the tyre industry responded, developing OE tyres that were lighter, with new constructions that used more sophisticated tread compounds.

But the costs incurred to meet the goal of increased tyre fuel efficiency have been high. Major players in the “environmentally green” tyre market routinely report R&D budget commitments in the millions of dollars, and development times exceeding a decade.

The Poling Group has developed an alternative for tyre makers who want to begin immediate delivery of more fuel-efficient tyres, and do so in a cost-effective way. Our revolutionary alternative is based on a simple premise: A round tyre may increase fuel efficiency. Round tyres have reduced fore and aft forces and deliver a ride that is quiet and vibration-free.

The Poling Group’s patented Profile Generating Machine (PGM) provides an accurate procedure for correction of tyre radial run-out, radial force, and conicity, in a fully-automated production environment. The PGM generates exact profiles for a wide range of tyre diameters and tread widths. Each tyre is sculptured across the tread surface to the customer’s predetermined profile and depth of cut, by tyre recipes retrieved from barcode readings as the tyre enters the machine.

## Dual Stone Grinders

The PGM has two dual stone grinders, four stones in total, dramatically decreasing grinding time from a typical grinding machine. In addition to improving values on radial runout and radial forces, the dual stone grinders remove pin vents, while opposing directional rotation eliminates heel-toe grinds.

The PGM can be installed for either inline or off-line grinding in a production facility. Being barcode reader compatible, tyres with diameters from 508 mm to 1,117 mm, and widths from 76 mm to 457mm can be profiled in automatic mode. Profiles are generated by laser scan or stored CAD

files, and by using various algorithms each grinder can follow the developed path so that even aggressive tread tyres can be ground to the same appearance as smooth tread patterns.

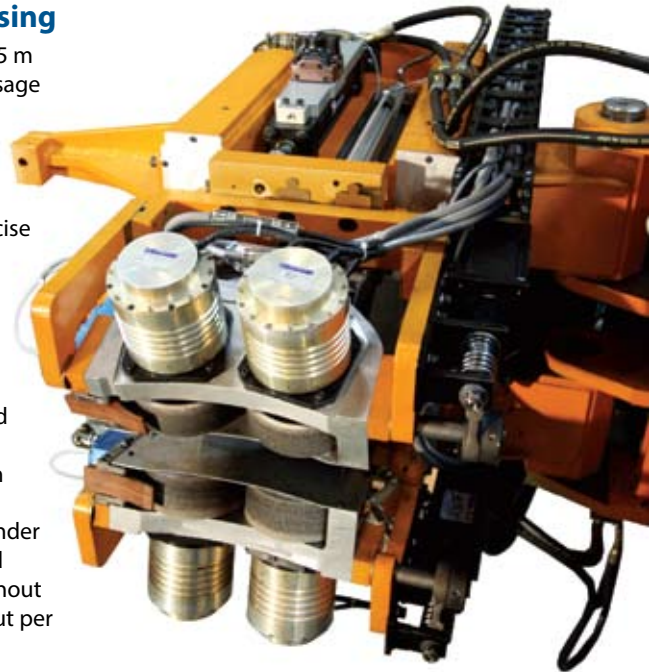
## Flexibility for Tyre Processing

With a footprint of approximately 2.5 m x 4.5 m, the PGM offers maximum usage of floor space. Because of the close tolerances needed to repeat profiles at 0.02 mm range, linear bearings and servo motors are used on axis movements for smooth, precise motion.

By controlling all aspects of the grinding process and grinding each tyre in relationship to the centerline of both tread width and rotational center, tyre diameters can be ground identically for a specific tyre type. To obtain the desired appearance, each recipe has the following adjustable parameters: Tyre rotation speed, grinder feed rate, tyre air pressure, tyre bead spacing, tread width, three radial runout positions, tyre scan type, depth of cut per pass, and number of grind passes.

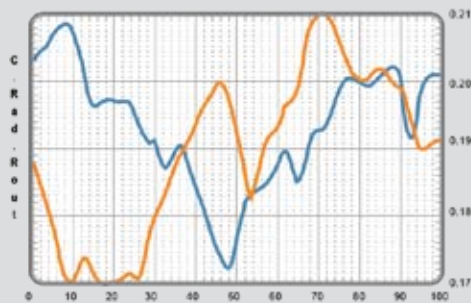
Additionally, using different grindstone grits, stone width, direction of rotation, and stone rpm, a recipe can be developed for the best results.

The combined features of PGM ensure uniformly round, smoothly-ground tyres with reduced radial force, runout, and fore and aft forces. Good for your customers, good for the environment! ▲

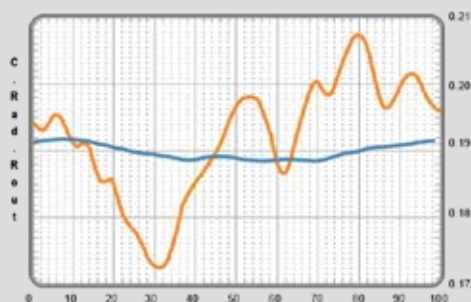


**For more information and to view an informative video, visit [PolingGroup.com](http://PolingGroup.com)**

**Before PGM C. Rad. Rout Radial Load**



**After PGM C. Rad. Rout Radial Load**



## The Results

Consider the results of this recent trial. Before profile grinding, the radial runout of a locally purchased, 15” replacement tyre was 0.932 mm and radial peak to peak force was 9.96 daN.

After a profile scan and grind of 0.71 mm, the new test waveform shows 0.07 mm radial runout and a drop to 8.7 daN of radial peak to peak forces. Conicity also was corrected from -2.3 daN to +0.13 daN

In this trial, the grinders ran at 10,000 rpm with a feed rate of 1.5 mm per second. The grinders shaved a total of 0.711 mm off the outside diameter of the tyre in two passes within a cycle that totaled 103 seconds.