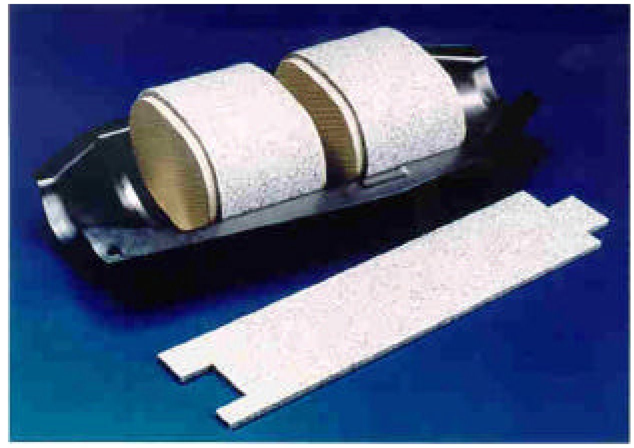
Application for Measurement & Analysis of Catalytic Converter Canning

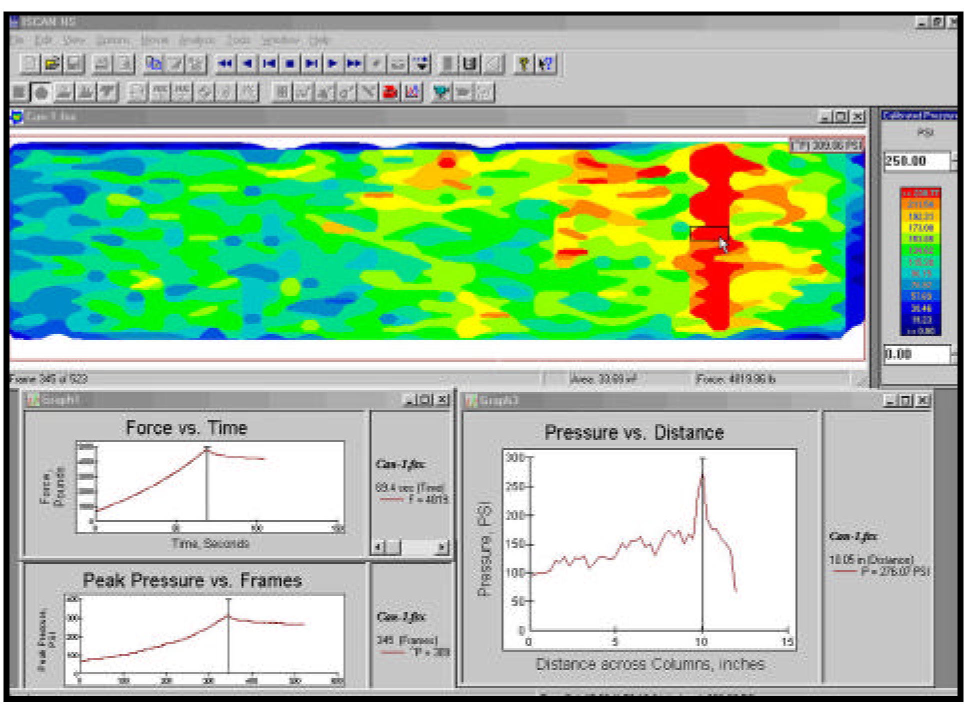
Magnetorheological finishing (MRF) of precision optical surfaces offer the promise of improved surface characteristics compared to conventional polishing. Careful control of several factors including impact pressure distribution is crucial to achieving this potential. Properties of MRF in the polishing zone are difficult to study because the fluid is opaque, and the complex interactions of particles in the magnetic field are difficult to see or model with other techniques.



Conventional polishing typically involves abrasives and backing materials that result in minute cracks in the glass surface that translate into impairment of theoretical optical performance. Magnetorheological (MR) fluids are microcenter sized magnetic suspended in a carrier fluid, and "stiffened" by a magnetic field. There is no backing material.

Figure 1 shows a MR fluid discharge nozzle on the left, and rotation of the wheel takes it to the right. A strong magnetic field "stiffens" the flow so it polishes the optical surface as desired.

Sensor model 5051, shown in the inset of *Figure 1*, measures the normal forces due to hydrodynamic flow against a stationary part. *Figure 2* shows a top view and oblique view of the "D" shaped removal "spot" is representative of material removal without part rotation. *Figure 3* shows a two dimensional pressure map provided by the I-Scan® system. This facilitates experimentation with different magnetic fields, wheel rotation rates, and other geometric variations to optimize the polishing process.



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