Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Calibration of Wire-Like Manganin Gauges for Use in Planar Shock-Wave Experiments DAVID CHAPMAN, WILLIAM PROUD, University of Cambridge, UK — Peizoresistive gauges have been used extensively for many decades as in-material stress transducers during shock wave experiments. Manganin demonstrates a high piezoresistive response which is relatively temperature independent. As such manganin gauges have been widely calibrated by many authors for use during shock-wave experiments. The precise calibration has been demonstrated to depend on both the chemical composition and mechanical history of the manganin, and on the geometry of the gauge. The research presented in this paper refers to the calibration of a commercially available manganin gauge, Micro-measurements J2M-SS-580SF-025, generally referred to as the T-gauge owing to its geometry. The T-gauge has seen widespread use as a pressure transducer to measure lateral stress during plate-impact experiments. It has been previously proposed that T-gauges have a similar response to the grid foil-like manganin gauges extensively calibrated by Rosenberg et. al.. However, recently it has been suggested that they in fact behave in a wire-like manner. The results presented here demonstrate that the gauges behaviour is wire-like when mounted to measure longitudinal stress. A modified calibration can be applied successfully to convert the relative resistance change to the stress normal to the gauge element. These results have important ramifications for the reduction of lateral stress measurements previously made using the T-gauge.

David Chapman
University of Cambridge, UK

Date submitted: 19 Feb 2009 Electronic form version 1.4