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The Miniaturization and Reproducibility of the Cylinder Expansion Test[1] CHAD RUMCHIK, RACHEL NEP, GEORGE BUTLER, C. MICHAEL LINDSAY, US Air Force — The cylinder expansion test (aka Cylex) is a standard way to measure the Gurney energy and determine the JWL coefficients of an explosive and has been utilized by the explosives community for many years. More recently, early time shock information has been found to be useful in examining the early pressure time history during the expansion of the cylinder. Work in the area of nanoenergetics has prompted Air Force researchers to develop a miniaturized version of the Cylex test, for materials with a sufficiently small critical diameter, to reduce the cost and quantity of material required for the test. This paper will cover the development of the half inch diameter miniaturized Cylex test as well as the results of a measurement systems analysis performed on the miniaturized test and the one inch diameter standard Cylex test using nitromethane sensitized with EDA as the explosive. Both tests yielded the same Gurney values with similar levels of variability - approximately 2%.

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