

Friction Behavior of Press-Fit Applications: Test Apparatus and Methodology

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Abstract— The industry has been expanding the surface material combinations used in press-fit connection systems. This paper describes the development of an instrument to measure friction coefficients at force levels typical of press fit pin applications. Our testing provides accurate and repeatable measurement of lateral force on sliding samples. Representative press fit pin blanks are dead weight loaded against a representative half plated through hole (half PTH) that is moved with reciprocating simple harmonic motion. The reciprocating motion is produced using a micrometer adjustable eccentric cam driven by a DC motor. Lateral force is measured with a 222 N (50 lb) load cell and saved using a computer data acquisition program. Data analysis is possible using commercially available computer spread sheet or analysis programs.

Combinations of maximum velocity and distance ranging between 0.02 – 20.8 mm/s and 0.125 – 12.7 mm, respectively are possible. The instrument is capable of loading forces of 4 – 93 N. A broad overview of typical results illustrates the application of the instrument.

Keywords-compliant pin; friction; test method; plated through hole