



A Problem Solver Application Bulletin

Measuring Part Flatness in Die

The **Signature Technologies SA-2000 "SAM"** module, and **Signature Technologies "SamView™"** software package can be used to monitor the flatness manufactured parts.

Instead of sampling selected parts using an off-line gauging fixture, the illustrated method can perform the same type of test every stroke of the machine so that each part can be individually verified as having been formed acceptably to tolerance.

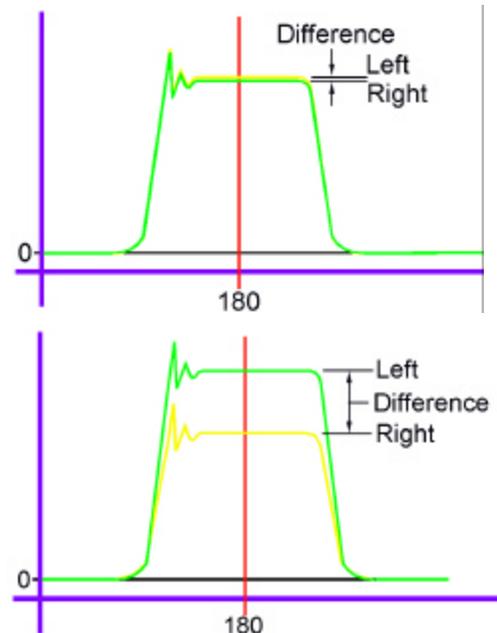
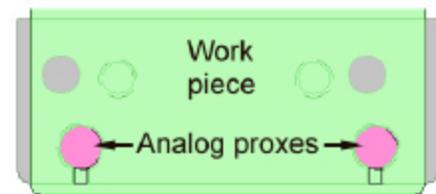
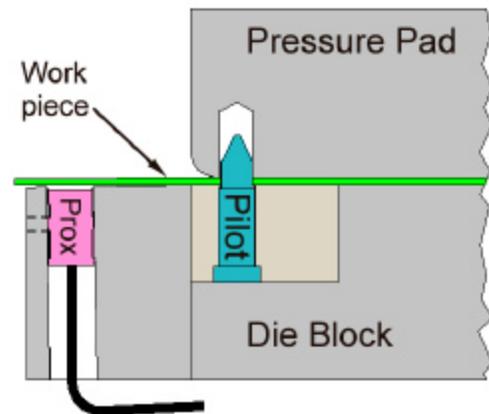
The system works by measuring the displacement of the flattened portion of the work piece relative to the dimensional sensor implanted into the forming die. Timing of the measurement is critical since the part must not be measured when it is being held in an abnormal position by the forming die. The part must be held in reference position both horizontally and vertically as shown, for example, by a pilot, and clamped vertically by a pressure pad. The area to be measured must be totally free and unrestrained by trim, or forming tooling when the measurement is made. The measurement can either be calibrated, or comparative depending on the application. Calibrated measurements will give the dimensional variation at the sensing point.

The difference between the measurements obtained from (in this case) the left and right sensors will indicate flatness.

The upper signatures show a reasonably flat component since both of the sensors indicate similar measurements

The lower signatures show a seriously "Out of Flat" situation. Note the large difference from left to right.

Signature Technologies can supply a wide variety of solutions to various manufacturing process problems dealing with measurement, verification of properties, tool condition, and machine health. We can also "close the loop" by performing process adjustments in response to specific variations in force, location, or shape of the work piece, as well as more simple controls which can track and reject specific parts which don't meet specific quality criteria.



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