



A Problem Solver Application Bulletin

Measuring Thickness Changes During Forming

Using the **Signature Technologies SA-2000** Statistical Analysis Module (**SAM**), and the exclusive **Patented Ford Algorithm package**.

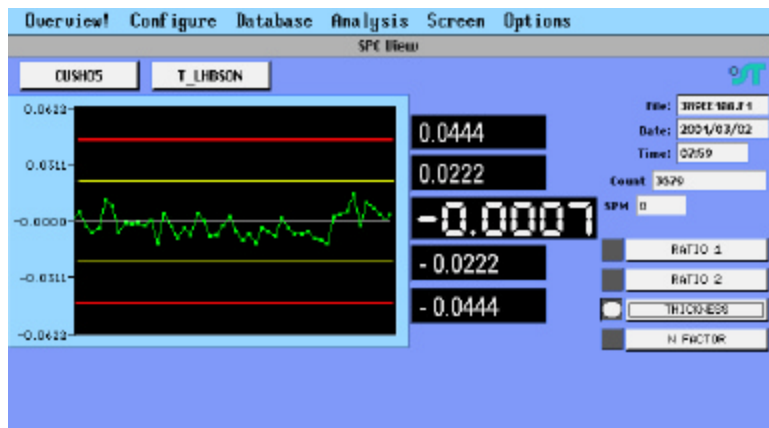
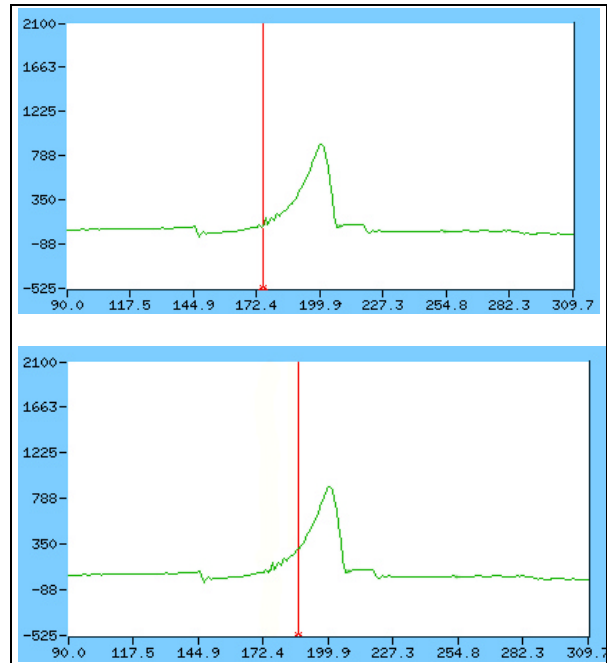
Signature Technologies has cooperatively developed with **Ford Motor Company** a means of determining percentage variation of material thickness away from nominal IN CASES where a free stretch draw is made by measuring the force during the draw and post-processing the data with algorithms developed and patented by **Ford Motor Company**.

In practice, one **ST** feature called "Ratio" is taken at the beginning of the draw process, and another "Ratio" feature is obtained later in the draw, well up the force slope. **ST** processes are used to eliminate the draw ring backpressure so that only the draw forces are considered. The system works by post processing the returns from the "Ratio" features with the patented Ford algorithm to discern changes in the amplitude, and the slope of the signature. The feature screens are shown in the **Upper illustrations**. Note the placement of the Ratio Features on the forming slope.

The **Graph** shows variations of stock thickness in fractions of a percent from nominal

The **SAM™** module can handle measurement inputs in groups of 8 up to 56 total points

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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