

■ Plastic Container Leak Verification: Full Waveform Signature Analysis

Overview:

A manufacturer of plastic containers was experiencing quality problems with several key customers. Faced with the dilemma of eliminating defective containers without significant increase in cycle time, a test stand was designed to monitor the pressure of the container as it increases from 0 to 1 psi. An inline pressure transducer collected data while Signature Analysis was used to compare the signature of each bottle against a defined envelope, and also monitor the slope of the pressure decay. With no leaks present the signature will fall within the specified tolerance; containers with holes will not.

Highlights:

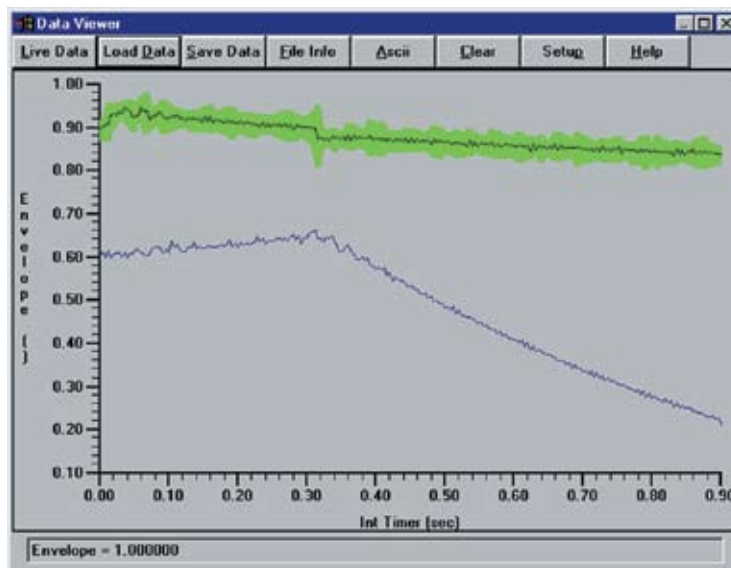
- High speed data acquisition
- High speed test and decision making
- Multiple part testing “on-the-fly”
- Multiple signature checks
- Full waveform analysis
- Full waveform review
- Envelope signature
- Data archiving
- Live screen updates

The containers under test are made from a plastic material. Therefore as the container is pressurized it expands, causing a reduction in pressure. At 1 psi the pressure is cut-off, where a subtle drop is detected. The container continues to expand and a slow decay in pressure is detected. However, if there is a pinhole in the container there is a significant change in the waveform. The initial pressurization is significantly lower and more importantly, when the pressure is cut-off noticeable differences in the decay slope are measured.



The dynamic capabilities of the SigMETER® allow multiple bottle sizes to be tested without requiring new files to be downloaded to the SigMETER® each time the test parameters change. When the manufacturer changes from one bottle size to the next, test limit specifications also change. The SigMETER® was configured such that test limits can be changed “on-the-fly” by monitoring the digital inputs and setting parameters according to the part under test. The ability to change limits on-the-fly allows one piece of test equipment to be used for multiple parts and eliminates any need to reconfigure the unit each time production changes. The SigMETER® Remote Data Utility software was also utilized in this application. The RDU is configured to display the current waveform, cycle count, number of failures, PASS/FAIL relay status, part ID number, number of passed parts, and an indicator to identify each test result at a glance.

The plastic container leak test solution was designed using the Sciometric SigMETER® and offered the customer accurate and prompt tests results for the entire product line combined with time saving capabilities when testing multiple parts. The plastic container leak test is another Sciometric® solution offering the customer a vast improvement in production quality.



RDU Screen showing Leak and No Leak Signature Waveforms.