

■ Sealant Dispense Monitor: Bead Verification Through Signature Analysis of Nozzle Pressure

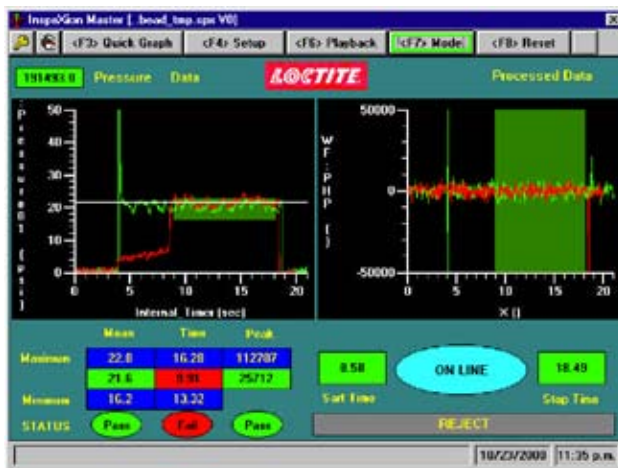
Highlights:

- Production “stable” (allows for normal process variation)
- Traceable to serial number
- Dynamic configuration
- Monitor and qualify:
 - Blocked nozzle
 - Incorrect nozzle
 - Dispense time
 - Voids
 - Nominal pressure
 - Air bubbles

Components such as valve covers, oil pan covers and various transmission assemblies often require a precise and uniform bead of sealant to ensure an oil tight integrity bond. Precise displacement pumps deliver material at a constant rate as the nozzle of the pump is moved relative to the part being sealed. Certain mechanical problems such as partially blocked, bent, or incorrect nozzles and process variations such as pressure, temperature, time and viscosity can create a situation whereby the homogeneous nature of the bead is compromised. Defects such as tiny air bubbles present an unusually difficult challenge because the bubble defect is often less than 25% of the normal and acceptable pump ripple. This is compounded by the small modulations of the nominal discharge pressure. The result is a potential leakage path not easily detected during the assembly process.



Sciometric® has partnered with the Loctite® Corporation to develop a solution for this problem which uses the advanced math tools embedded in the Sciometric software. The result is a reliable “Fluid Waveform Analyzer”, available exclusively from Loctite. The Fluid Waveform Analyzer uses the InspeXion® operating software to implement a proprietary algorithm co-developed by Sciometric and Loctite. The system can be configured to statistically “learn” the acceptable normal limits of a good bead, and then use these limits to monitor the bead delivery process and detect defects that may occur with the bead delivery process. Signature Analysis techniques are used to analyzing the pressure curve by comparing the signature waveform features against the learned acceptable limits. If the values obtained are within these limits (shown by the green envelope in the screen below) then the operator is issued a PASS command. If the values obtained exceed these limits, the operator is issued a FAIL command.



The system can be easily configured with single or multiple channel capabilities, and can be set up to monitor multiple part operations. The end result is a cost effective, compact system that offers unprecedented defect detection solutions to the sealant dispensing process.

LOCTITE
FLUID WAVEFORM ANALYZER

InspeXion Screens showing the detection of Air Bubbles in the Sealant Bead using Signature Analysis

