



LEAK TESTING SYSTEM FOR AUTOMOTIVE AIR BAG INFLATORS



Leak testing the integrity or propellant tubes for air-bag initiators requires a combination of high sensitivity, speed and reliability. This helium mass-spectrometer system tests the parts to a sensitivity level of 1×10^{-5} atm-cc/sec and has two chambers to achieve a production rate of one part every 10 seconds (360 parts/hour). High reliability testing of these parts is achieved, in part, by using computer control of the test cycle and of the pass/fail decision, eliminating operator subjectivity. Also, at the completion of every test cycle, a NIST-traceable calibrated helium leak is opened to the test chamber and proper operation of the system is verified for each test. Any irregularity results in a “no-test” signal that must be acknowledged by the operator and requires that the part be re-tested.

The cycle time includes loading and unloading of the propellant tubes, which is presently done manually, but alternatively can be performed by robotic operation. Once the tubes are placed in position, the tester automatically connects and seals to the parts. The system control computer is operated using a bar code scanner for simplicity and it collects and stores test data. A label with a bar code serial number is applied to each part that passes the leak test. This data can be provided for the facility quality management system.