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Instrumentation

Air Test Systems

Helium Test Systems

Hydraulic Test Systems

Functional Test Systems

Integrated Assembly & Test

InterTech Development Company

7401 N. Linder Avenue, Skokie, IL 60077, USA

T: 1.847.679.3377

W: intertechdevelopment.com

E-mail: sales@intertechdevelopment.com

ISO 9001 Registered
ISO 17025 Accredited

Worldwide Support:

InterTech Europe

19 rue Clement Michut 69100 Villeurbanne

T: (33)437.434.116

W: intertecheurope.com

E-mail: intertechinfo@intertecheurope.com

InterTech Shanghai Technical Center

Part D, No.3 Building, No.81 MeiYue Road,

China (Shanghai) Pilot Free Trade Zone

T: (021) 5868 2102

E: sales@intertechdevelopment.com

InterTech Mexico

Carr. Saltillo - Monterrey 5762 Km.4

Plaza Comercial San Agustin Local 12

Saltillo, Coah. 25210

E-mail: sales@intertechdevelopment.com

Will it function in the automobile as it does in the lab?

If you are an automotive manufacturer you *know* that answering this question accurately is a prerequisite to releasing any automotive part to market. Considering the extreme pressures and temperatures required for under the hood applications, automotive parts must be rigorously tested for proper functioning over a wide range of temperatures and pressures. Such testing has never been a trivial matter. The higher performance of today's automotive parts compounds the challenges of achieving consistent GR&R in various functional tests.

The Challenge

Oil Control Valves, Cam Phasers, and Center Bolts are three such products that must be exhaustively tested for multiple functions at wide temperature ranges of 10° to 150°C. GR&R must be maintained at all test temperatures and pressures.

Cam Phaser function tests are similarly performed in a pressure range of 30kPa (4.4 psig) to 650 kPa (94.3 psig) with 2% accuracy. These tests include assuring failsafe operation of eight automatic functions required by cam phaser designs such as: pin lash; pin lock test; pin unlock test; torque-to-turn; total travel test; external leakage test; timing angle; internal leakage and driving torque.

Oil Control Valves similarly require sequential tests over this wide temperature range, including measuring: max flow; midpoint leakage; midpoint current; midpoint current width; current gradient; hysteresis; flow curve fitting coefficient tests; and on/off response times.

Center Bolts require sequential tests including: max flow at ports; leakage flow at ports; maximum travel; mid-point travel; flow change at two different ports (two tests); and check valve unlock pressures.

The InterTech Solution

InterTech Hydraulic Audit Functional Test Stands, Equipped with an InterTech M1075 Functional Test Instrument, perform all tests in these varying pressure conditions and at temperatures ranging from ambient to 150°C.

GR & R is maintained as required per ISO 16949—less than 20%

The InterTech M1075 Functional Test Instrument controls the test cycle while an InterTech special design heat recirculation system maintains test fluids within $\pm 1^\circ\text{C}$ of set point, with flows up to 14 lpm. Redundant monitoring systems to shut down a machine in case of heater failure or excessive pressure loss also assure safety. Interchangeable quick-change tooling accommodates testing of multiple part configurations.

As with all InterTech test engineering solutions, seamless data handling is built into system design. Barcode scanning prior to test enables seamless data tracking. Real-time testing, data acquisition and production monitoring is done with Windows® and LabView® based software that enables remote monitoring of all assembly and test operations in real time over a factory intranet or the Internet. A NI LabView® environment provides automatic GR & R reporting and functional testing,

with user-friendly setup. Data are stored on the PC hard drive and are accessible through EtherNet TCP/IP data communications.

In addition to remote monitoring, remote access to the HMI/PLC/M1075 also enables troubleshooting of the test system and updating programs when testing new part configurations.

