

# Hydraulic Flow Bench

For more than 60 years, Southwest Research Institute® (SwRI®) has helped industry and government develop specialty hydraulic systems, while identifying and resolving pneumatic and hydraulic fluid power problems. SwRI can conduct testing of various hydraulic components with a pressure capacity of up to 7,000 psi.

Using commercial and SwRI-developed hardware and software, SwRI engineers and technicians conduct performance simulation for hydraulic components and systems, including:

- Valves
- Accumulators
- Actuators
- Integrated systems
- Hot and cold temperature testing

## Specifications

### Hydraulic System

- 200 hp (149 kW) of hydraulic power with variable flow capabilities up to:
  - 378 lpm (100 gpm) at 220 bar (3,200 psi)
  - 170 lpm (45 gpm) at 482 bar (7,000 psi)
- 757 liter (200 gallon) reservoir capacity
- 20 lpm (5 gpm) flowmeter
- 230 lpm (60 gpm) flowmeter
- 530 lpm (140 gpm) flowmeter (optional)
- Integrated control manifold
- Solenoid-actuated dump valve
- 3,000-watt reservoir heater
- Kidney-loop cooling circuit with dedicated pump

### LabView-based Data Acquisition System

- 32 analog inputs
- 8 analog outputs
- 8 digital I/O lines
- 16 thermocouples (type K)
- 5 pressure transducers

## Capabilities

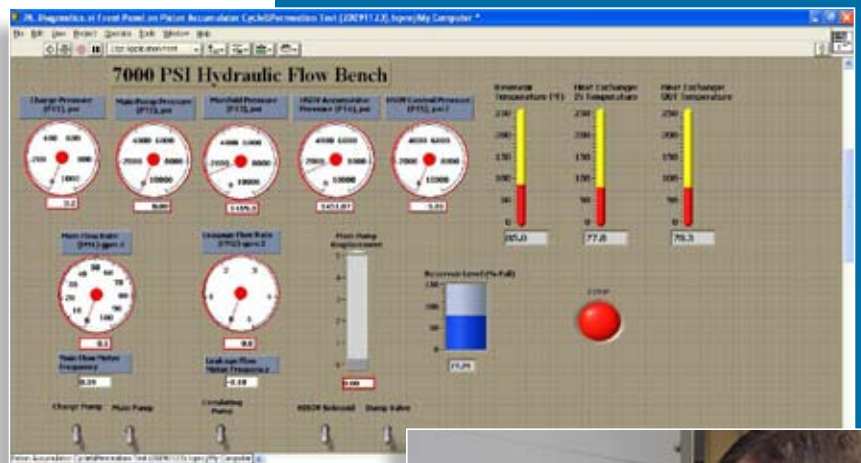
### Analysis

SwRI engineers analyze the operating characteristics of hydraulic components and systems to improve existing designs or develop and optimize new ones. Analytical techniques include:

- Linear and nonlinear finite element analysis
- Structural optimization
- Thermodynamic evaluation
- Computational fluid dynamics
- Kinematic analysis
- Modal evaluation
- Torsional analysis
- Tribological analysis
- System dynamics



SwRI staff perform evaluation and analysis of lightweight composite hydraulic accumulators for use in hydraulic hybrid vehicles.



SwRI engineers routinely conduct tests that verify the operation of commercial, prototype and SwRI-developed hydraulic components.

## Evaluation

Using flexible and well-equipped facilities, SwRI engineers evaluate hydraulic components and systems to verify and validate new designs and to measure existing design characteristics. SwRI evaluates a wide range of hydraulic-related characteristics, such as:

- Efficiency
- Flow loss
- Proof pressure
- Durability
- Noise

## Quality Accomplishments

The Office of Automotive Engineering (OAE) at SwRI is certified to ISO 9001:2008, "Quality Management Systems – Requirements," accredited to ISO/IEC 17025:2005, "General Requirements for the Competence of Testing and Calibration Laboratories," and certified to ISO 14001:2004, "Environmental Management Systems." The OAE has also achieved Ford Tier 1 status for providing engineering services and the Engine, Emissions and Vehicle Research Division has received the Ford Q1 Quality Award. In addition, the Petroleum Products Research Department is a Nuclear Procurement Issues Committee (NUPIC)-approved laboratory and the Fuels and Lubricants Research Division has maintained its status as an American Chemistry Council (ACC)-approved laboratory.



*Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,200 employees who perform contract work for industry and government clients.*



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