



SOUTHWEST RESEARCH INSTITUTE



## Performance Verification Testing of Valves and Components

For more than 45 years, Southwest Research Institute® (SwRI®) has provided expertise and state-of-the-art facilities for testing and evaluating mechanical and environmental effects on oil industry equipment.

SwRI recently completed the design and installation of a unique computer-controlled, fully automated valve test facility to evaluate production gate valves as recommended in API Specification 6A, Appendix F, PR2 level. The facility can accommodate up to 9-inch, 15,000-psi valves and actuators (and test fixtures). Fixture testing on stem and bonnet seals can also be performed under API-6A.

Test components are installed in a hydraulic loop with high-pressure, pneumatically operated valves that direct pressure to the upstream and downstream sides of the test item, according to the test specification. The computer system and customized software automatically control the required testing parameters.

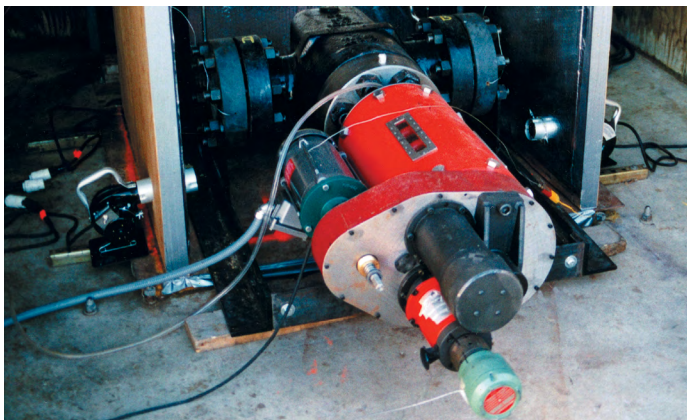
Simple machine intelligence has been built into the computer software. If a leak beyond the preset limit is detected, the program initiates a troubleshooting routine to locate the source of the problem. If it appears that the leakage occurs from a seal seating problem, the computer cycles the valve several times and restarts the test. If the leakage persists, the test is shut down. An environmental chamber is an integral part of the test loop. Used during the temperature extreme test phases, the insulated chamber contains heating elements and cooling coils that enable maximum (300°F) and minimum (-50°F) temperature limits to be maintained.

Appendix F for Specification 6A requires precise measurement of leaks across the gate and seat of the test valve. SwRI developed a sensitive electronic leak detection unit that uses a precision low-pressure transducer to measure the change in the fluid head caused by leaks. The software establishes a baseline level before control valves are opened, and then measures the differential change for the required hold period.

### API 6A – PR2 Tests

Performance verification tests include:

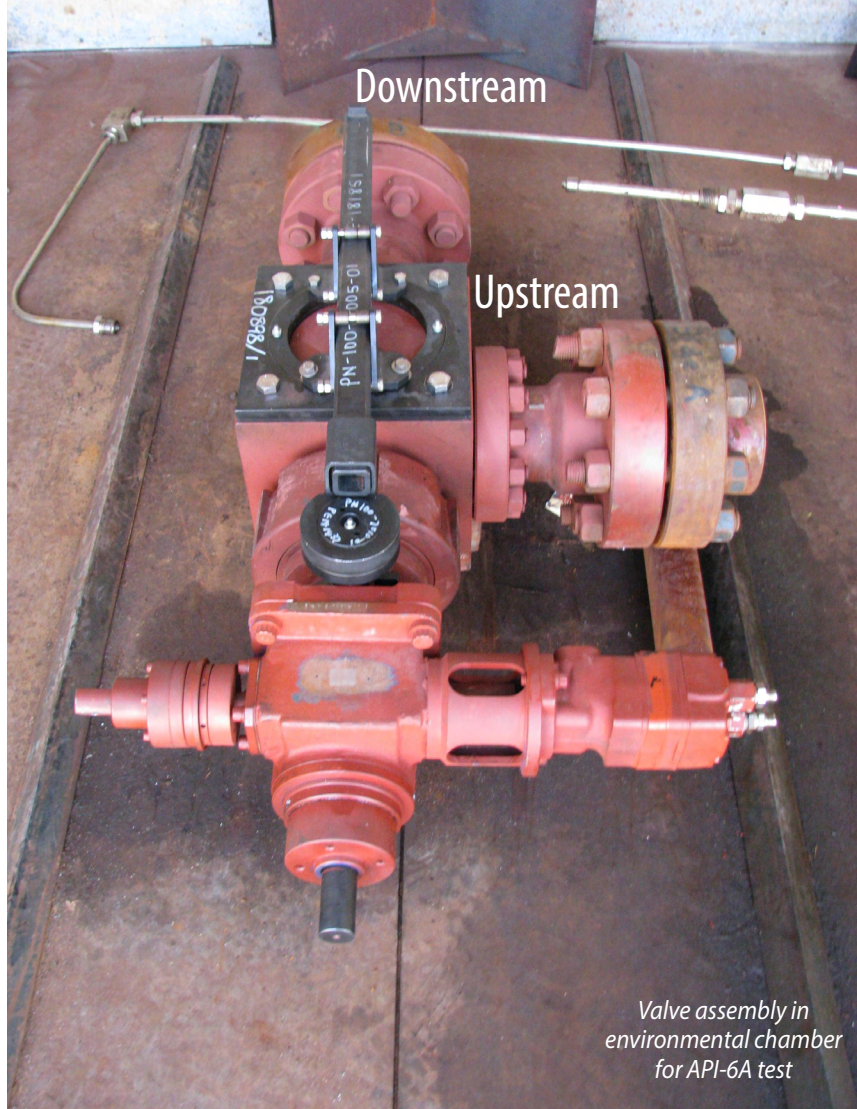
- Force measurement open/close
- Dynamic cycling at ambient temperature (160 cycles at maximum differential bore pressure)
- Maximum/minimum temperature cycling (20 cycles each temperature range)
- Pressure/temperature cycles
- Ambient temperature seal tests



Valve and hydraulic actuator assembly in test fixture for API-6A test



Valve and hydraulic actuator assembly undergoing low-temperature (-50°F) test



D017444

Valve assembly in environmental chamber for API-6A test

We welcome your inquiries. For more information, please contact:

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