

Performance Verification Testing of Valves and Components

KEYWORDS

API-6A PR 1 Tests

API-6A PR 2 Tests

Valve/Actuator
Assemblies

Seal Assemblies

Pneumatic Actuators

Hydraulic Actuators

Manual Actuators

Elevated Temperatures

Cryogenic
Temperatures

Environmental
Chambers

XHP-HT Tests

For more than 35 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.

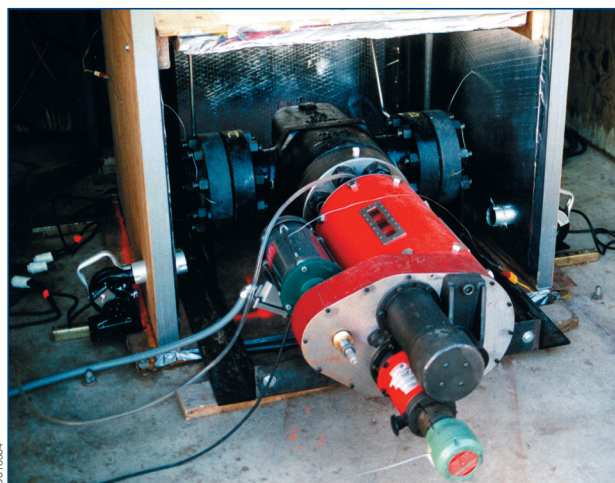
API 6A – PR2 Tests

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



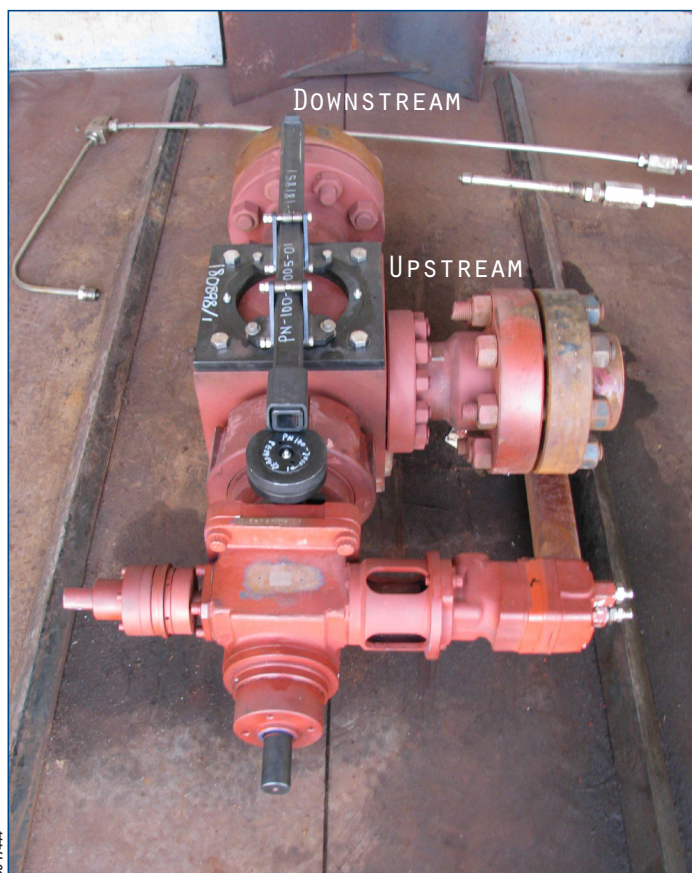
Valve and hydraulic actuator assembly undergoing low-temperature (-50°F) test



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



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*Valve assembly in
environmental chamber
for API-6A test*



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**We welcome
your inquiries.**

**For additional
information,
please contact:**

Joseph E. Crouch, P.E.
Marine & Offshore Systems
(210) 522-4295
Joseph.crouch@swri.org

Structural Engineering Department
Mechanical Engineering Division
Southwest Research Institute
6220 Culebra Road • P. O. Drawer 28510
San Antonio, Texas 78228-0510

swri.org
mechmatserv.swri.org

Anthony J. Magaro, Research Engineer
Test and Evaluation
(210) 522-3449
anthony.j.magaro@swri.org