

Chapter Four

Static Decay Test

Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

ACQUITY UPLC Diagnostics: Static Decay Test

- Diagnostics
- Binary Solvent
- Decay Ramp
- No tools are needed
 - Methanol (preferred solvent)
 - Paper towels
 - Waste container

ACQUITY UPLC Diagnostics: Static Decay Test

- When?
 - After every pump maintenance
 - Pressure fluctuates
 - Sensitivity is an issue
 - Retention time repeatability is a problem
 - Baseline is noisy

- Why?
 - To check for leaks

Performing the Static Decay Test

The screenshot displays the ACQUITY UPLC Console for System ACQUITY 2 on Node EMPCLIENT. The interface includes a sidebar with system components, a main control panel, and a performance section. A red dashed line highlights the path to initiate a static decay test.

ACQUITY UPLC Console for System ACQUITY 2 on Node EMPCLIENT - [Binary Solvent Manager]

Control **Configure** **Maintain** **Troubleshoot** **Help**

conditions
844 psi
0.050 mL/min B1 50.0 %
Degasser: 0.49 psi[a] Vent Valve: System

performance
BSM Pumped Volume: 24,550 L
pressure ripple (psi, 1 min)
Minimum Maximum Delta
835 846 11

Static Decay Test

Test Parameters

Run Time: 0.0 min

Module: A
Accumulator: 14000 psi

Results

Primary		Accumulator	
Decay Rate:	psi/min	Decay Rate:	psi/min
Leak Rate:	µL/min	Leak Rate:	µL/min
% of Stroke:	%	% of Stroke:	%
Final Pressure:	psi	Final Pressure:	psi

Static Decay Test: Binary Solvent

The screenshot displays the ACQUITY UPLC Console for System ACQUITY_UPLC3 on Node CORE-EMPOWER-27. The main window has tabs for Control, Configure, Maintain, Troubleshoot, and Help. The Maintain tab is active, showing a menu with options: Heads..., Static decay test..., Dynamic leak test..., Reset pumped volume..., and Create log entry... A red dotted line connects the 'Static decay test...' option to a separate 'Static Decay Test' window.

ACQUITY UPLC Console for System ACQUITY_UPLC3 on Node CORE-EMPOWER-27 - [Binary Solvent Manager]

Control Configure **Maintain** Troubleshoot Help

Heads...
Static decay test...
Dynamic leak test...
Reset pumped volume...
Create log entry...

conditions

-4 psi
0.000 mL/min B1 10.0 %

performance

BSM Pumped Volume

Degasser: 0.46 psi[a] Vent Valve: System

Static Decay Test

Test Parameters

Module: A
Accumulator: 14000 psi

Run Time: 0.0 min

Start << Results Close

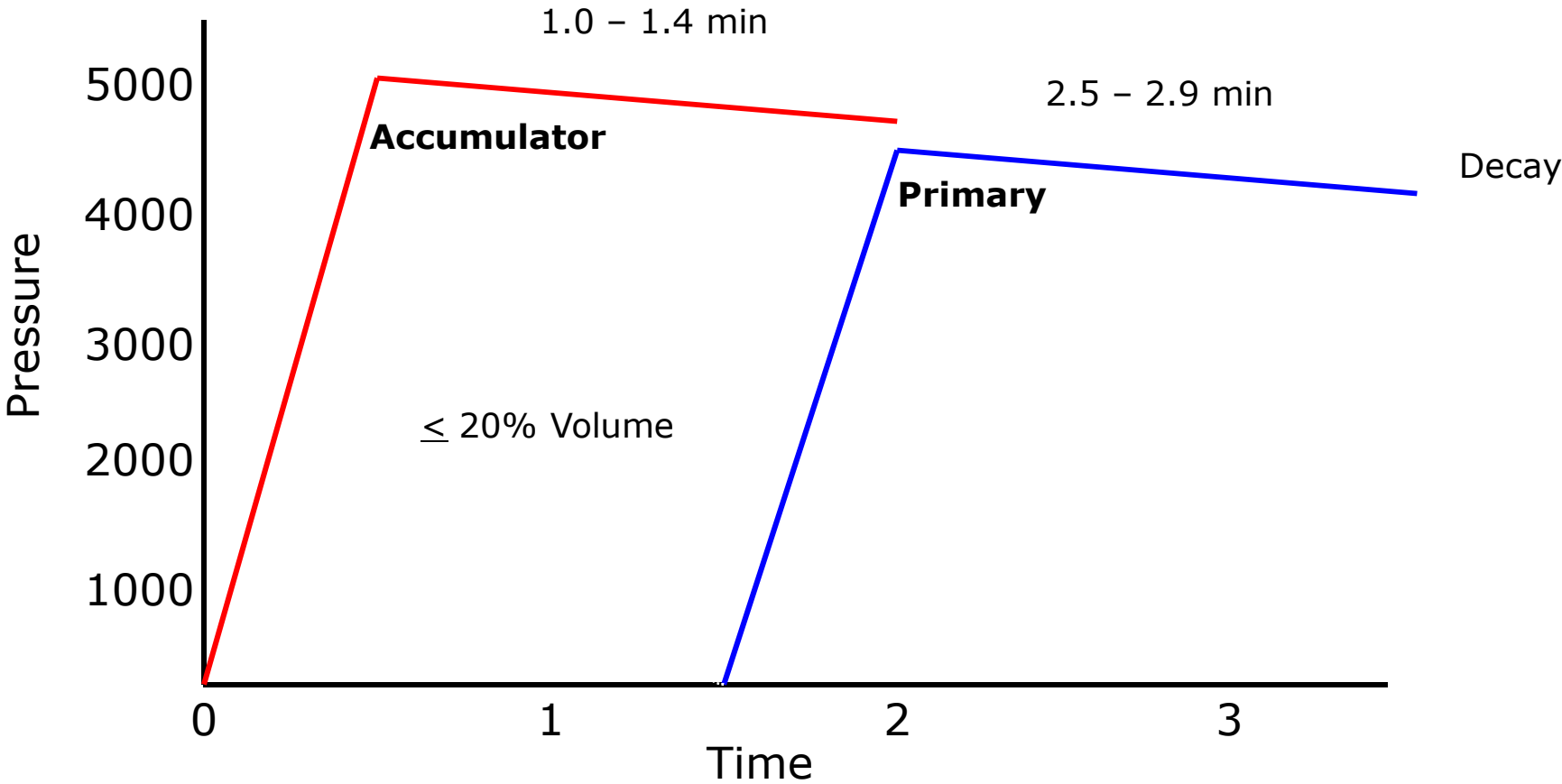
Results

Print...

Primary		Accumulator	
Decay Rate:	psi/min	Decay Rate:	psi/min
Leak Rate:	µL/min	Leak Rate:	µL/min
% of Stroke:	%	% of Stroke:	%
Final Pressure:	psi	Final Pressure:	psi

Static Decay Test

Decay Ramp



Static Decay Test Results

Static Decay Test

Test Parameters

Module: **A**

Accumulator: **14000** psi

Run Time: **0.0** min 0.0 4.9

Results

Primary

Test Passed

Decay Rate: **110** psi/min

Leak Rate: **0.074** μ L/min

% of Stroke: **13.3** %

Final Pressure: **11424** psi

Accumulator

Test Passed

Decay Rate: **111** psi/min

Leak Rate: **0.077** μ L/min

% of Stroke: **15.2** %

Final Pressure: **13357** psi

Acquity
Ultra Performance LC

Static Decay Test

User: Student
System: ACQUITY 2
Instrument: ACQ-BSM#L04UPB403R

Binary Solvent Manager Static Decay Test

Pump A Results:

Accumulator:

Test Passed

Decay Rate: 111 psi/min

Leak Rate: 0.077 μ L/min

Percent of Stroke: 15.2 %

Final Pressure: 13357 psi

Primary:

Test Passed

Decay Rate: 110 psi/min

Leak Rate: 0.074 μ L/min

Percent of Stroke: 13.3 %

Final Pressure: 11424 psi

Summary

- Static decay test checks for leaks in the high-pressure part of the solvent management system.
- Run the system at 4500 psi (310 bar) for 5 to 10 minutes before performing the test.
- Run the test when:
 - You suspect you have a leak or faulty check valve.
 - You rebuild or repair the pump heads.
 - You change high pressure fittings or tubing on the solvent management system.