

Performance Maintenance Protocol

Solvent Manager

(ASM, BSM/IVD, BSM PLUS, μ BSM)

*For ACQUITY UPLC, ACQUITY UPLC I-Class Series, nanoACQUITY UPLC,
ACQUITY UPLC M-Class, and ACQUITY UPLC H-Class Binary Systems*

<i>System name:</i>	
<i>PM date:</i>	

Guidelines

This performance maintenance (PM) protocol outlines maintenance tasks you should regularly perform on Waters systems. Regular maintenance ensures optimum performance and uninterrupted, trouble-free operation.

Schedule

Waters recommends that performance maintenance visits be performed once a year. Systems that are under heavy use or that use aggressive solvents need more frequent maintenance. For detailed maintenance schedules, refer to the appropriate user guide located on www.waters.com. Failure to follow the maintenance schedules as described in the user guide might result in unreliable operation and inaccurate laboratory results.

Safety considerations

Some protocols might involve removing instrument covers, exposing the performer to high voltages, high currents, and moving parts. This presents risks of electric shock and damage to the instrument. To reduce these risks, Waters recommends that these protocols be conducted by certified Waters field service engineers with access to the latest information on Waters products. Waters is not responsible for actions initiated by an unqualified performer. If you are unsure, have a Waters certified field service engineer conduct the performance maintenance activity.

Waters Quality Parts

Waters designs and manufactures Waters Quality Parts™ to the same strict regulatory standards it uses for its high-performance Waters systems. Waters recommends using Waters Quality Parts for all maintenance activities. Failure to use Waters Quality Parts might compromise laboratory results and reliability.

Customer Education

Waters offers courses on operating and maintaining its high-performance systems, as well as courses designed to help you maintain professional competency and further your knowledge in chromatography, mass spectrometry, and Waters data systems. For more information on available training courses, visit [Customer Education](http://www.waters.com) on www.waters.com.

Qualification/Compliance Services

Waters Compliance Services help you achieve and maintain the regulatory compliance of your LC and MS instruments and software with a combination of expertise, compliant-ready systems and software, and a portfolio of services to ensure that you consistently obtain quality data. To learn more, visit [Qualification/Compliance Services](http://www.waters.com) on www.waters.com.

PM task overview

Table 1 is an overview of the PM tasks performed.

Note: For instructions on performing these procedures, refer to the online Help or the appropriate user manual on www.waters.com.

Note: References to the ACQUITY UPLC™ I-Class System (including instruments) also pertain to the Series System.

Note: References to the BSM also pertain to the BSM PLUS and μBSM.

Table 1 – PM tasks

Inspect	Replace/rebuild	Verify
Firmware version	Plunger seals	Initialization diagnostics
Fan	Seal wash seals	Static decay test/dynamic leak test
Waste management system	Plungers	Reset pumped volume
Error logs	Solvent filters	
	Check valves ¹	
	Inline filter	
	Filter/mixer	
	PTFE O-rings	
	Air filters	
	Tubing and fittings	

¹ Use Performance Maintenance Kit 201000173, if the ACQUITY UPLC™ BSM uses passive check valve cartridges, and use 201000197 if the BSM uses *i*² Valve cartridges.

Use Performance Maintenance Kit 201000181 for nanoACQUITY, 201000289 for the M-Class μBSM, and 201000260 for an I-Class BSM/PLUS or H-Class BSM.

PM task descriptions

Performance maintenance comprises three task categories:

- Inspect
- Replace or rebuild parts
- Verify

Note: If the instrument fails pre- or post-performance maintenance inspections or verifications, it might need additional service beyond the scope of this protocol. Such service might incur additional parts and labor charges.

Inspect

1. If the instrument is off, power it on and allow it to complete software checks.
2. Inspect the firmware and, if appropriate, update it.
3. Ensure that the fan grate on the rear of the instrument is clear of debris and dust; clean it if necessary.
4. Inspect the waste management system for leaks and proper routing of waste tubing.
5. Review error logs and troubleshoot as necessary.

Replace or rebuild parts

Using the supplies in the PM kit, replace or rebuild parts as necessary.

Note: For instructions on replacing parts, see the appropriate user manual on www.waters.com.

Requirement: A Waters service engineer must perform battery replacement.

Verify

After completing the maintenance tasks, verify instrument performance:

1. Power-on the instrument and allow it to complete on-board software checks.
2. Perform the leak test.

BSM/ASM	ICS version	Leak test
UPLC	< 1.50	Static decay
UPLC	≥ 1.50	Dynamic
nanoACQUITY	< 1.30	Static
nanoACQUITY	≥ 1.30	Dynamic
I-Class	< 1.50	Static decay
I-Class	≥ 1.50	Dynamic
H-Class Binary	≥ 1.50	Dynamic
M-Class	N/A	Dynamic

Note: For ACQUITY UPLC, I-Class Series BSM (non-IVD/IVD), and ACQUITY UPLC H-Class BSM only, choose **Vent Valve** as the End Point when performing the dynamic leak test.

3. Reset pumped volume.

Results/checklist

A Waters field service engineer completes the test results, checklist, and confirmation sections.

Note: Select N/A if the task does not apply.

Test results

Table 2 – Firmware version ☐ Yes ☐ No ☐ N/A

Firmware version	
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Table 3 – Static decay test ☐ Yes ☐ No ☐ N/A

Pumps	Decay rate (psi/min)	Pass/Fail
Accumulator (Pump A)		☐ Pass ☐ Fail
Primary (Pump A)		☐ Pass ☐ Fail
Accumulator (Pump B)		☐ Pass ☐ Fail
Primary (Pump B)		☐ Pass ☐ Fail

Table 4 – Dynamic leak test ☐ Yes ☐ No ☐ N/A

Pumps	Leak rate (nL/min)	Pass/Fail
Accumulator (Pump A)		☐ Pass ☐ Fail
Primary (Pump A)		☐ Pass ☐ Fail
Accumulator (Pump B)		☐ Pass ☐ Fail
Primary (Pump B)		☐ Pass ☐ Fail

Table 5 – Reset pumped volume ☐ Yes ☐ No ☐ N/A

Total pumped volume (liters)	
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Checklist

Note: Select N/A if the task does not apply.

Inspect

All inspect tasks completed	☐ Yes ☐ No ☐ N/A
	Comments:

Replace/rebuild

Plunger seals	☐ Yes ☐ No ☐ N/A
Seal wash seals	☐ Yes ☐ No ☐ N/A
Plungers	☐ Yes ☐ No ☐ N/A
Solvent filters	☐ Yes ☐ No ☐ N/A
Check valves	☐ Yes ☐ No ☐ N/A
Inline filter	☐ Yes ☐ No ☐ N/A
Filter/mixer	☐ Yes ☐ No ☐ N/A
PTFE O-rings	☐ Yes ☐ No ☐ N/A
Air filters	☐ Yes ☐ No ☐ N/A
Tubing and fittings	☐ Yes ☐ No ☐ N/A
	Comments:

Verify

All verify tasks completed	☐ Yes ☐ No ☐ N/A
	Comments:

Performance maintenance confirmation

I confirm on behalf of _____	
<i>Company name</i>	
that this performance maintenance procedure was satisfactorily completed on: _____	
<i>Serial no.</i>	
Signed: _____	Date: _____
<i>Customer</i>	

<i>Print name</i>	
I certify that the maintenance procedure was successfully completed.	
Signed: _____	Date: _____
<i>Waters engineer</i>	

<i>Print name</i>	
Comments: _____	

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