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Waters UPLC I-Class System (SM-FL) Performance Specifications

The Waters Acquity UPLC I-Class System's holistic design is targeted for investigative analysis. When maximized peak capacity, throughput, and sensitivity are critical, the I-Class is perfectly suited for running any MS based application. The system is comprised of a Binary Solvent Manager (BSM) and a Sample Manager with Fixed-Loop (SM-FL); this design offers lowest dispersion performance and is suitable for running 1.0 mm columns. The Acquity UPLC I-Class System may be available with a choice of column management options.

Acquity UPLC I-Class System Features	
Total system bandsread, 5 σ	4 to 7 μ L (see ACQUITY UPLC I-Class System Specifications document for conditions)
Total system delay volume	<95 μ L, default configuration
Integrated leak management	Leak sensors, as standard, and safe leak handling
System synchronization	Injection synchronization between both pumps and the sample manager enhances retention time reproducibility
Operating flow rate range	0.010 to 2.000 mL/min, in 0.001 mL increments
Maximum operating pressure	18,000 psi up to 1 mL/min, 12,000 psi up to 2 mL/min
pH range	pH 2 to 12
Unattended operation	Leak sensors, full 96-hour diagnostic data display through console software
Injection cycle time	<15s inject to inject, with load ahead enabled (see ACQUITY UPLC I-Class System Specifications document for conditions)

Binary Solvent Manager	
Number of solvents	Up to four, in combination of two, A1 or A2 and B1 or B2
Solvent conditioning	Integrated vacuum degassing, six lines with two allocated for the injector needlewash/purge solvents
Gradient formation	High pressure mixing, binary gradient
Gradient profiles	11 gradient curves [including linear, step (2), concave (4), and convex (4)]
Primary check valves	Intelligent Intake Valves (i2Valve)
Flow accuracy	±1.0% of set flow rate at 0.500 mL/min as per SystemsQT™
Flow precision	0.075% RSD or 0.01 min SD, (0.2 to 2.0 mL/min), whichever is greater using premixed solvent
Composition ripple (baseline noise)	<1.0 mAu (see ACQUITY UPLC I-Class System Specifications document for conditions)
Pump compositional precision	<0.2% RSD, or 0.02 min SD, whichever is greater (from 0.2 to 2.0 mL/min)
Pump compositional accuracy	±0.5% absolute from 5% to 95%, 0.2 to 2.0 mL/min
Compressibility compensation	Automatic, no user intervention required
Priming	Wet priming runs at a flow rate of 4 mL/min
Pump seal wash	Equipped with a programmable active wash system to flush the rear of the high pressure seals and the plungers
Flow ramping	Automatic
Primary wetted materials	316L stainless steel, UHMWPE blend, MP35N, titanium alloy, gold, sapphire, ruby, zirconia, Nitronic 60, DLC, fluoropolymer PEEK and PEEK blend
Mixing options	Standard: 50 µL Optional: 100 µL and 380 µL

Sample Manager – Fixed Loop (Sm-Fl)

Injection volume range	0.1 μ L to 250.0 μ L, in 0.1- μ L increments.
	10 μ L loop standard with 1, 2, 5, 20, 50, 100 and 250 μ L optional loops
Injection linearity	>0.999, (default needle) from 20% to 75% of loop, Partial Loop Uses Needle Overfill mode, (PLUNO), per SystemsQT protocol
Injection mode	Three – Full Loop mode, for optimal quantitation and dispersion, Partial Loop mode for fastest
	cycle time, and Partial Loop Uses Needle Overfill mode, default mode, for optimal quantitation
	using partial loop injection volumes
Sample manager precision	<1% area RSD 0.2 to 1.9 μ L injection
	<0.5% area RSD 2 to 10 μ L injection
	(See ACQUITY UPLC I-Class System Specifications document for conditions)
Number of sample plates	Any two of the following:
	<ul style="list-style-type: none"> • 96 and 384 microtiter plates
	<ul style="list-style-type: none"> • 48 position 2.00-mL vial plates
	<ul style="list-style-type: none"> • 48 position 0.65-mL micro-centrifuge tube plates
	<ul style="list-style-type: none"> • 24 position 1.50-mL micro-centrifuge tube plates
Maximum sample capacity	768 in two 384-well plates, or 96 in 2-mL vial holders, plus 4 additional positions for dilution functions
Sample compartment temperature range	4.0 to 40.0 $^{\circ}$ C, settable in 0.1 $^{\circ}$ C increments; maintains 19 $^{\circ}$ C below ambient with a tolerance range between -2 and +4 $^{\circ}$ C
Temperature accuracy	\pm 0.5 $^{\circ}$ C at sensor (See ACQUITY UPLC I-Class Systems Specification Guide for conditions)
Temperature stability	\pm 1.0 $^{\circ}$ C at sensor (See ACQUITY UPLC I-Class Systems Specification Guide for conditions)
Injection needle wash	Integrated, active, programmable, dual wash
Minimum sample required	3 μ L residual, using Waters' total recovery 2-mL vials (zero offset)

Carryover (UV)	<0.004%
	<0.002% typical
	(See ACQUITY UPLC I-Class System Specifications document for conditions)
Advanced sample manager capabilities	Load Ahead and Loop Offline mode, valve cycle timed event
Primary wetted materials	316L stainless steel, UHMWPE blend, MP35N, DLC, titanium alloy, gold, sapphire, ruby, zirconia, Nitronic 60, fluoropolymer, PEEK and PEEK blend, fluoroelastomer

Column Heat Ers (Ch-A)

Column capacity: CH-A: Single column, up to 4.6 mm internal diameter (I.D.), up to 150 mm in length with filter or guard column. Mounting extends out for use with MS based detector.

Fittings: 18 K psi, low dispersion, with reusable column inlet fittings

Column compartment temperature range: 20.0 to 90.0 °C, settable in 0.1 °C increments

Column compartment temperature accuracy: ±0.5 °C at sensor*

Column compartment temperature stability: ±0.3 °C at sensor*

Solvent conditioning: Active pre-heating as standard; passive pre-heating (for legacy method support)

Column tracking: eCord Technology column information management tracks & archives column usage history

Column Management (Cm-A)

Column capacity: CM-A: Two columns, as standard (maximum length of 150 mm with filter or guard column) up to 4.6 mm internal diameter (I.D.)

Switching valves: Two nine-port, eight-position valves (CM-A only); provides programmable access switching, waste and bypass positions for rapid solvent changeover

Column compartment(s) temperature range: 4.0 to 90.0 °C, settable in 0.1 °C increments, two independent heat/cool zones*

Column compartment(s) temperature accuracy: ± 0.5 °C at sensor*

Column compartment(s) temperature stability: ± 0.3 °C at sensor*

Solvent conditioning: Active pre-heating as standard; passive pre-heating (for legacy method support)

Fittings: 18 K psi, low dispersion, with reusable column inlet fittings

Column tracking: eCord Technology column information management tracks & archives column usage history

2D: Support Optional

*(See ACQUITY UPLC I-Class Systems Specification Guide for conditions)

Sample Organizer

Sample plate capacity: Configured based on the types and combinations of plates being used:

- Maximum of 19 standard microtiter plates, up to 15.5 mm high, or
- Maximum of 9 intermediate height plates (or 2-mL vial holders), up to 40.0 mm high, or
- Maximum of 6 deep well plates (or 4-mL vial holders), up to 47.0 mm high

Maximum sample capacity: Maximum of 7296 samples in nineteen 384-well plates

Sample compartment temperature range: 4.0 to 40.0 °C, settable in 0.1 °C increments with a tolerance range between -2 and +4 °C

Temperature accuracy: ± 1 °C at the sensor

Temperature stability: ± 1 °C at the sensor

Instrumental Control

External control: Empower® Software, MassLynx® Software, UNIFI,® or standalone through console software

External communications: Ethernet interfacing via RJ45 connection to host PC

Event inputs/outputs: Rear panel contact closure and/or TTL inputs/outputs

Connections Insight: Provides real-time monitoring and automatic notification of instrument performance and diagnostic information, allowing for quicker problem resolution

Local control: Acquity UPLC Local Console Controller (LCC)

Environmental Specifications

Acoustic noise: <65 dBA, system

Humidity – Operating: 20% to 80%, non-condensing

Operating temperature range: 4 to 40 °C

Electrical Specifications

Power requirements: 100 to 240 VAC

Line frequency: 50 to 60 Hz

Power consumption:

- BSM: 360 VAC
- FTN: 400 VAC
- CM-A: 400 VAC

Physical Specifications

Acquity UPLC I-Class System, BSM, (SM-FL) CH-A :

- Width: 34.3 cm (13.5 in.)
- Height: 71.1 cm (28.0 in.)
- Depth: 71.2 cm (28.0 in.)

Acquity UPLC I-Class System, BSM, (SM-FL): CM-A

- Width: 34.3 cm (13.5 in.)
- Height: 79.6 cm (31.4 in.)
- Depth: 71.2 cm (28.0 in.)

Sample Organizer:

- Width: 25.4 cm (10.0 in.)
- Height: 96.5 cm (38.0 in.)
- Depth: 71.1 cm (28.0 in.)

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