

MVS[®] Specifications



SYSTEM PERFORMANCE

	Standard & Advanced Editions 96-Well Verification Plate	Advanced Edition Only 384-Well Verification Plate
Time Requirements	< 5 minutes	< 10 minutes
Tip Configurations	1, 2, 4, 6, 8, 12, and 96	1, 8, 12, 16, 24, 96, and 384
Traceable Volume Range	0.1000 - 350.0 μ L	0.0100 - 55.00 μ L
Operating Volume Range*	0.0001 - 350.0 μ L	0.0001 - 55.00 μ L
Uncertainty (Inaccuracy)**	0.2000 - 350.0 μ L, \pm 2.0% 0.1000 - 0.1999 μ L, \pm 3.0% 0.0001 - 0.0999 μ L, N/A	0.0500 - 55.00 μ L, \pm 2.5% 0.0200 - 0.0499 μ L, \pm 3.5% 0.0100 - 0.0199 μ L, \pm 5.5% 0.0001 - 0.0099 μ L, N/A
Random Error (Imprecision)**	0.2000 - 350.0 μ L, \leq 0.40% 0.1000 - 0.1999 μ L, \leq 0.40% 0.0001 - 0.0999 μ L, N/A	0.0500 - 55.00 μ L, \leq 0.80% 0.0200 - 0.0499 μ L, \leq 0.80% 0.0100 - 0.0199 μ L, \leq 0.90% 0.0001 - 0.0099 μ L, N/A
Operating Temperature	15 - 30 $^{\circ}$ C	
Traceability to national & international standards using Artel MVS Verification Plates	Yes	

PERFORMANCE SPECIFICATION DEFINITIONS

- When each well in an MVS Verification Plate is uniformly¹ filled with a known² volume of MVS Sample Solution and measured with an Artel MVS Plate Reader, each individual well measurement will be within the stated MVS inaccuracy specification at a statistical confidence of 95% or better.³
- The CV across the full plate (96 or 384 individual results) will also be within the stated imprecision specification at a statistical confidence of 95% or better.⁴

1. When verifying the precision performance specification of the MVS, the liquid handler used to dispense into the MVS Verification Plates must be capable of repeatable volume delivery with a CV and tip-to-tip variability at least 3 times smaller than the MVS imprecision specification.
2. When verifying the accuracy performance specification of the MVS, the liquid handler used to dispense into the MVS Verification Plates must have a demonstrated accuracy (expanded uncertainty at $k=2$) at least 3 times smaller than the MVS accuracy specification.
3. The number of wells in a single plate, or in a collection of multiple plates, showing results outside of the MVS inaccuracy specification will be less than 5% of the total wells measured.
4. The probability that a plate dispensed in this way will show a CV greater than the imprecision specification is less than 5%, or one plate in 20.

* Measurement of volumes outside of the traceable volume ranges are not traceable to the national and international standards and no declarations of relative inaccuracy and imprecision are made.

** Stated specifications apply when Artel MVS Plate Readers (ELx800 and 800TSNB) and MVS Verification Plates are used with Aqueous QualAssure and DMSO QualAssure.

ARTEL 800TSNB PLATE READER

Dimensions (DxWxH)	41.9 x 38.1 x 17.8 cm
Weight	9.97 kg
Display	Touch screen
Light source	Tungsten gas filled bulb
Wavelength selection	Metal oxide interference filters Center wavelengths: 520.2 nm (bandwidth at half-max = 6.2 nm) 730.5 nm (bandwidth at half-max = 10 nm)
Additional filters	405 nm, 450 nm, 490 nm
COM port	USB
Power requirements	Voltage: 90 - 260 VAC Frequency: 50 - 60 Hz Current: 2 A maximum

MVS TITER PLATE SHAKER

Dimensions (LxWxH)	142 x 99 x 48.2 mm
Amplitude	2.0 mm orbital
Shaking speed range	200 to 3000 rpm
Power requirements	External power supply - 100-240 V AC, 50-60 Hz

MVS CALIBRATOR PLATE

Storage Temperature	15 - 25 °C in protective case, out of direct light
Operation Temperature	15 - 30 °C
Recalibration Frequency	12 month factory recalibration required
Shelf life	1 year

MVS BAR CODE READER

Dimensions (LxWxH)	104 x 71 x 160 mm
Weight	147 g



MVS COMPUTER (minimum requirements)

Processor	x64 Processor: 1.4 GHz or faster
Memory	1 GB
I/O Ports	3 USB Connectors
Network	10/100 Ethernet and 802.11b Wireless
Storage	20 GB of hard drive space
Supported Operating Systems	Windows® 7 (64-bit) or Windows® 10 (64-bit)

MVS MOBILE WORKSTATION

Weight	147 lbs.
Dimensions (DxWxH)	20 x 34 x 40 inches
Accessories	Surge protector with 12 ft. cord

MVS DATA MANAGER SOFTWARE

- 21 CFR Part 11 compliance ready.
- Immediate display of pass/fail, dispense patterns via heat map, and volumetric results for each channel.
- Automatic flagging of all deliveries exceeding tolerance limits.
- Compatible with Microsoft Windows® 7 or Windows® 10.
- Easy exporting of data for analysis or viewing with other programs.
- Ability to re-evaluate data visually by modifying the pass/fail criteria after analysis.
- Test the performance of multiple liquid delivery devices using a single plate.
- Ability to use popular conventional microtiter plates when traceability is not a factor.
- Ability to verify and optimize a volume dispensing instrument using specific test solutions such as Dimethyl sulfoxide (DMSO).

MVS VERIFICATION PLATES

QTY per sleeve	25
Shelf Life	96-well: 60 months 384-well: 60 months
Material	Black, Polystyrene, optical bottom



96 well
standard profile
plate

384 well for
standard profile
plate

Aqueous QualAssure		
HV	200.1 - 350.0 µL	N/A
A	50.00 - 200.0 µL	10.00 - 55.00 µL
B	10.00 - 49.99 µL	2.500 - 9.999 µL
C	2.000 - 9.999 µL	0.500 - 2.499 µL
D	1.000 - 1.999 µL	0.3000 - 0.4999 µL
E		
Traceable Volume Range	0.1000 - 0.9999 µL	0.0100 - 0.2999 µL
Non-traceable Volume Range	0.0001 - 0.0999 µL	0.0001 - 0.0099 µL
Stock Solution 1	0.4 - 9.9 µL	0.1 - 2.49 µL
Stock Solution 2	10 - 49.9 µL	2.5 - 9.9 µL
Shelf Life	24 months from date of manufacture.	
Storage/Operation	15 - 30 °C tightly capped, in closed box, out of direct light. <i>For additional details regarding storage/operation outside these conditions, see the MVS User Guide.</i>	

DMSO QualAssure		
C	2.000 - 9.999 µL	0.500 - 2.499 µL
D	1.000 - 1.999 µL	0.3000 - 0.4999 µL
E		
Traceable Volume Range	0.1000 - 0.9999 µL	0.0100 - 0.2999 µL
Non-traceable Volume Range	0.0001 - 0.0999 µL	0.0001 - 0.0099 µL
Shelf Life	24 months from date of manufacture.	
Storage/Operation	19 - 30 °C tightly capped, in closed box, out of direct light. <i>For additional details regarding storage/operation outside these conditions, see the MVS User Guide.</i>	

PCRMix QualAssure		
B	10.00 - 49.99 µL	N/A
C	2.000 - 9.999 µL	N/A
Uncertainty (Inaccuracy)	2.000 - 49.99 µL, ± 4.0%	N/A
Random Error (Imprecision)	2.000 - 49.99 µL, ≤ 0.80%	N/A
Shelf Life	12 months from date of manufacture.	
Storage/Operation	2 - 25 °C tightly capped, in closed box, out of direct light. <i>For additional details regarding storage/operation outside these conditions, see the MVS User Guide.</i>	

SerumSub QualAssure		
A	50.00 - 200.0 µL	N/A
B	10.00 - 49.99 µL	N/A
Uncertainty (Inaccuracy)	10.00 - 200.0 µL, ± 5.0%	N/A
Random Error (Imprecision)	10.00 - 200.0 µL, ≤ 0.80%	N/A
Shelf Life	9 months from date of manufacture.	
Storage/Operation	2 - 8 °C tightly capped, in closed box, out of direct light. <i>For additional details regarding storage/operation outside these conditions, see the MVS User Guide.</i>	

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PATENTS

The MVS system and its components are covered by patents listed at artel-usa.com/patents.