

Volume Measurement in Greiner Bio-One 655101 96-Well Polystyrene Microplates Using the Scarlett™ 01 Volume Analysis System

Summary

The Scarlett™ 01 Volume Analysis System successfully measured liquid volumes in Greiner Bio-One 655101 96-well microplates across multiple liquid types and dispense volumes. Measurements demonstrate strong agreement with calibrated reference volumes throughout the evaluated range.

Key Results

- Scarlett successfully measured liquid volumes in **Greiner Bio-One 655101** 96-well polystyrene microplates.
- Successful volume measurement from **40–300 µL**
- Liquids evaluated:
 - **DI H₂O**
 - **DI H₂O + Tartrazine**
 - **DMSO (≥99.9%)**
 - **Cell Culture Media (DMEM/F12 (1X))**
- Maximum observed Inaccuracy: **±1.6%**
- Observed Precision (CV): **0.16 - 2.1%**
- Measurements demonstrated good agreement with calibrated syringe reference volumes across the tested volume ranges.

Performance Overview

Table 1. Test Summary

Parameter	Value
Plate Manufacturer / Model	Greiner Bio-One 655101
Plate Type	96-Well, Round-well, Flat-bottom, Polystyrene
Volume Range Evaluated	40–300 µL
Liquids Evaluated	4
Maximum Inaccuracy	±1.6%
Maximum CV	2.1%

Verification Results

Across all tested liquids, measured volumes closely matched calibrated reference volumes. Inaccuracy values ranged from -1.6% to +0.9%, while coefficient of variation (CV) values remained below 2.1%.

Table 2. Measurement Performance Results

Liquid	Reference Volume (μL)	n	Mean Volume (μL)	^a Inaccuracy	CV
DI H ₂ O	59.82	6	58.87	-1.60%	0.65%
	199.12	6	200.88	0.89%	0.43%
DI H ₂ O + Tartrazine	59.94	6	60.26	0.54%	0.74%
	179.76	6	178.49	-0.71%	0.38%
DMSO	59.82	6	59.76	-0.11%	0.67%
	80.20	6	80.87	0.83%	0.91%
	99.56	6	99.41	-0.15%	1.72%
	199.12	6	200.37	0.63%	0.75%
	279.32	6	281.72	0.86%	0.42%
DMEM/F12	39.76	4	39.45	-0.79%	1.44%
	49.88	6	49.28	-1.21%	2.06%
	159.50	6	159.55	0.30%	0.22%
	199.12	4	195.98	-1.58%	0.38%
	298.68	4	299.49	0.27%	0.16%

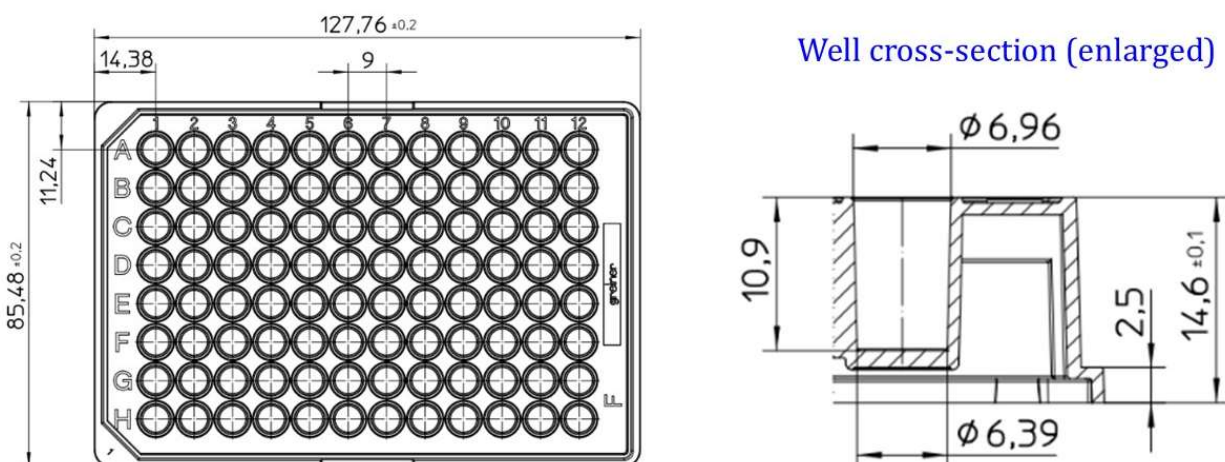
^a – Inaccuracy (%) is calculated relative to calibrated syringe reference volumes

Measurement Method

Measurements were performed using plate- and liquid-specific calibration curves. Calibration curves were generated using reference volumes dispensed by Hamilton glass syringes calibrated by RISE (Research Institutes of Sweden) according to ISO 8655 procedures. Reported inaccuracy values are relative to calibrated reference volumes.

Conclusion

The Scarlett 01 Volume Analysis System demonstrated accurate and precise liquid volume measurements in Greiner Bio-One 655101 microplates using water, water + tartrazine, DMSO, and DMEM/F12 media over a volume range of 40-300 μL. These results support reliable volume verification and quality control workflows in laboratory and automated liquid handling environments.

**Figure 1.** Plate and well geometry for the Greiner 655101.