

# Axygen® 50 µL Automation Tips for Hamilton® Microlab® STAR™ and NIMBUS® Workstations – Precision and Accuracy



## SnAPPShots

A brief technical report from the Corning Applications Group

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## Introduction

Automated liquid handling and high throughput screening (HTS) are widely used for drug discovery, molecular biology, and genomics. For HTS, reliable sample preparation and delivery methods have become critical to assay performance. Corning has a line of 50 µL pipet tips that have been specifically designed for applications using the Hamilton Microlab® STAR™ line and NIMBUS® liquid handling workstations. Although this precision and accuracy testing was performed using the Microlab STAR, the NIMBUS line of liquid handlers also use the same pipetting system, and, therefore, the tips are compatible with both lines.

The focus of this study was to evaluate the dispensing volume accuracy and precision of the Axxygen 50 µL tips on the Microlab STAR automation platform as compared to Competitor 50 µL tips. These criteria were measured using the Artel Multichannel Verification System (MVS®), which calculates the volume of dispensed samples using an absorbance-based measurement system. The results demonstrate that Axxygen 50 µL tips are comparable to Competitor 50 µL tips using the Microlab STAR liquid handling workstation to dispense volumes as low as 5 µL and as high as 50 µL.

## Materials and Methods

### Materials

Tips evaluated: Axxygen 50 µL tips (Corning Cat. No. HT-50-CBK-HTR) and Competitor 50 µL tips.

### Methods

The Hamilton Microlab STAR liquid handling workstation (Hamilton Cat. No. 1532) was used to assess accuracy, as percent deviation (% D), and precision, as coefficient of variation (% CV), for Axxygen 50 µL tips and Competitor 50 µL tips.

To test the ability of each brand of tips to dispense accurately and precisely, a column of 8 tips was arranged so that each tip aspirated from an Axxygen Low Profile reservoir (Corning Cat. No. RES-SW96-LP) and dispensed into 1 column of a Corning 96-well black clear-bottom microplate (Corning Cat. No. 3631). For the 5 µL test volume, each tip aspirated 5 µL of Range C solution (Artel Cat. No. MVS-205) and dispensed 5 µL into 195 µL of diluent solution (Artel Cat. No. MVS-202) in each well. For the 50 µL test volume, each tip aspirated 50 µL of Range A solution (Artel Cat. No. MVS-203) and dispensed 50 µL into 150 µL of diluent solution

into each well. To determine the volume of liquid dispensed into each well, absorbance readings for the solutions – diluted Range C solution for the 5 µL dispense and Range A solution for 50 µL dispense – were measured using an Artel ELx800NB® plate reader (Artel Cat. No. 1311197). Each study was performed 6 independent times for each brand of tips for a total of 48 tip dispenses. Evaluation criteria include percent deviation from the set dispense volume (% D) and the variability in dispense volume (% CV) for the 48 tip dispenses.

## Results/Discussion

The evaluation criteria for comparing Axxygen 50 µL tips with Competitor 50 µL tips are listed in Tables 1 and 2. The ability of the pipet tips to dispense 5 µL and 50 µL volumes accurately and precisely was determined through the analysis of the mean volume dispensed across 48 wells. The precision of each brand of tip is represented by the coefficient of variation (% CV) of the replicates. Similarly, the accuracy is represented by the percent deviation (% D) from the target volume of the replicates. It is important to note that the accuracy of liquid dispense may vary depending on the method and liquid chosen when using the automation platform. However, the method and liquid used for these studies was identical for Axxygen 50 µL tips and Competitor 50 µL tips.

**Table 1.** Evaluation Criteria for 5 µL Dispense Volume

5 µL	Axygen	Competitor
No. of Wells	48	48
Total No. of Outliers	0	1
Target Volume (µL)	5.00	5.00
% CV (n = 6 replicates)	1.32 ± 0.54%	1.50 ± 0.35%
% D (n = 6 replicates)	1.63 ± 0.24%	1.51 ± 0.31%

**Table 2.** Evaluation Criteria for 50 µL Dispense Volume

50 µL	Axygen	Competitor
No. of Wells	48	48
Total No. of Outliers	0	3
Target Volume (µL)	50.00	50.00
% CV (n = 6 replicates)	0.48 ± 0.15%	0.86 ± 0.44%
% D (n = 6 replicates)	1.22 ± 0.20%	1.22 ± 0.17%

Data in tables show ± standard deviation.

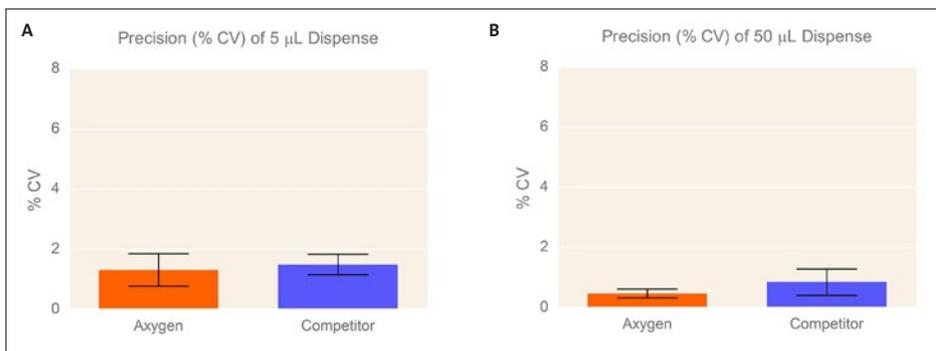
As demonstrated in Figure 1, Axygen® 50 µL tips displayed comparable precision to Competitor 50 µL tips using the Microlab® STAR™ automation system. There was no significant difference in the precision of each brand of tips when dispensing 5 µL (Figure 1A) or 50 µL (Figure 1B).

As demonstrated in Figure 2, Axygen 50 µL tips displayed comparable accuracy to Competitor 50 µL tips using the Microlab STAR automation system. There was no significant difference in the

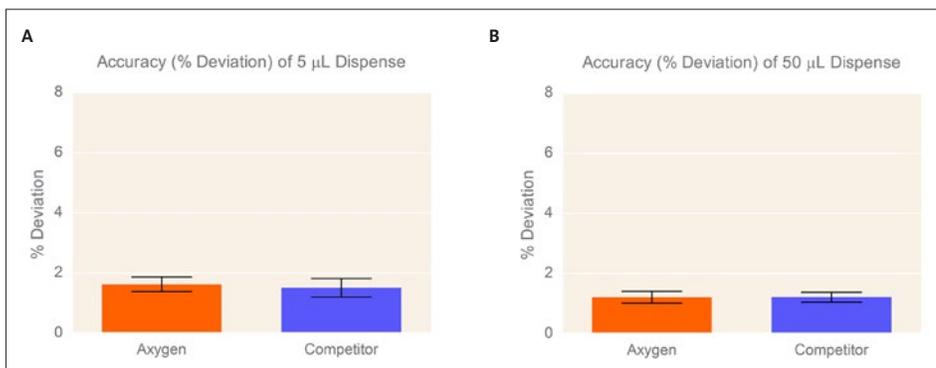
accuracy of each brand of tips when dispensing 5 µL (Figure 2A) or 50 µL (Figure 2B).

## Conclusions

Axygen 50 µL tips demonstrate comparable precision and accuracy to Competitor 50 µL tips using the Hamilton Microlab STAR liquid handling workstation to dispense volumes as low as 5 µL and as high as 50 µL.



**Figure 1. Precision (% CV) analysis of 50 µL tips.** The % CV of Axygen and Competitor 50 µL tips dispensing (A) 5 µL and (B) 50 µL using the Microlab STAR liquid handler was determined using the Artel MVS® System. There was no significant difference in % CV between each brand. Data shown with standard deviation (SD). n = 48.



**Figure 2. Accuracy (% D) analysis of 50 µL tips.** The % D of Axygen and Competitor 50 µL tips dispensing (A) 5 µL and (B) 50 µL using the Microlab STAR liquid handler was determined using the Artel MVS System. There was no significant difference in % D between each brand. Data shown with SD. n = 48.

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