

Low Volume Dispensing with the Nanodrop™

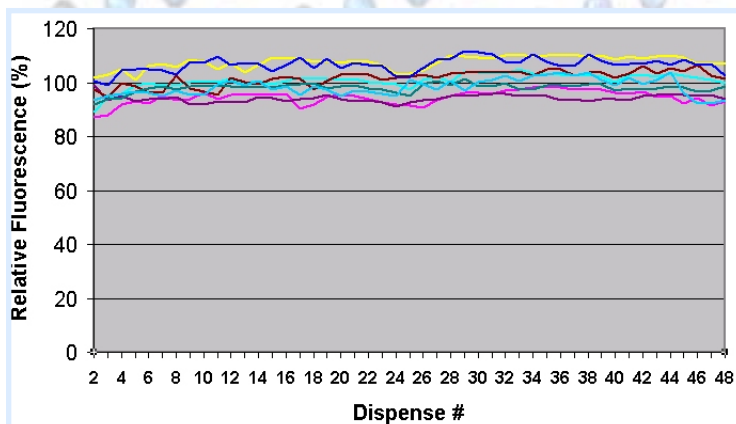


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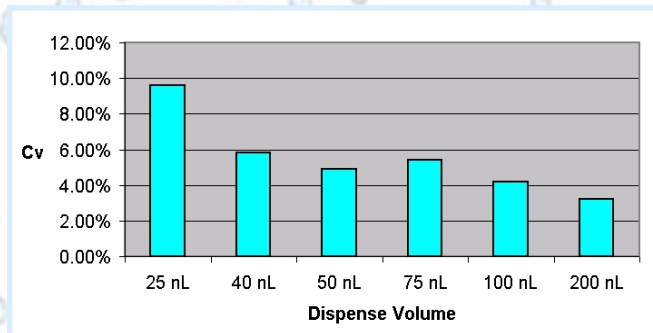
leading the way in high-precision dispensing

Reagent costs, sample scarcity and assay sensitivity are all factors that are driving liquid handling performance to lower volumes. Sub-100 nL, non-contact dispensing is required in fields such as Protein Crystallography, Molecular Diagnostics, Assay Development and High-Throughput Screening. In particular there is a strong push in pharmaceutical companies toward total assay volumes of less than 10 µL. To achieve final volumes of 2-10 µL while maintaining a 1% DMSO/Assay ratio, analytes of interest must be dispensed in sub-100 nL volumes. Innovadyne Technologies, Inc. is a provider of low volume, non-contact dispense technology that is nominally configured for use as a broadcast dispense technology in the range of 100 nanoliters to several microliters. The technology, however, is not limited to this range, but can also be used for sub-100 nL dispensing tasks.

To address the low volume requirement, a modified Nanodrop dispenser was used to evaluate dispensing volumes in this range. Utilizing a shortened tubing harness (12 inches in length), the Nanodrop dispensed multiple plates at volumes between 25 and 200 nL. The analyte dispensed was a tris-buffered saline solution with 200 mM fluorescein, which was dispensed into 384-well plates. The wells were then filled with 50 µL of the same tris-buffer solution, with the addition of a small amount of TWEEN 20 for consistent meniscus formation at the top of the wells. Quantitation was performed with a fluorescence plate reader to determine the precision of the plates. Drop volumes were calculated by interpolation from a gravimetric calibration curve.

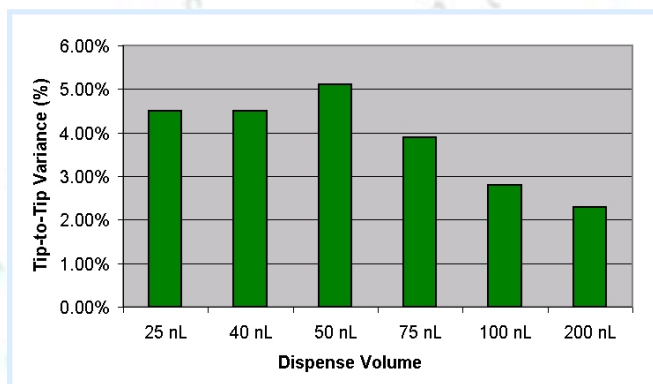


Representative Dispensing Profile for 8 Tips at 40 nL



Cv Values for Multiple Plates by Dispense Volume

The data show that successful low volume dispensing can be achieved in this configuration with Cvs below 10% for volumes as low as 25 nL, and below 5% at and above 100 nL. The graph above shows a representative dispense profile at 40 nL. Each line color represents one of the 8 channels of the Nanodrop dispenser. The x-axis shows the dispense number and the y-axis is the fluorescence of each well relative to the plate mean. The two graphs at right detail the whole plate Cvs and the tip-to-tip variance for each of the plates dispensed in this study.



Tip-to-Tip Variance for Multiple Plates by Dispense Volume

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