nanoscale synthesis

advancing chemistry with
ultra-low volume reactions

mosquito®

sptlabtech

mosquito® LV enables chemistry at nanomolar scale

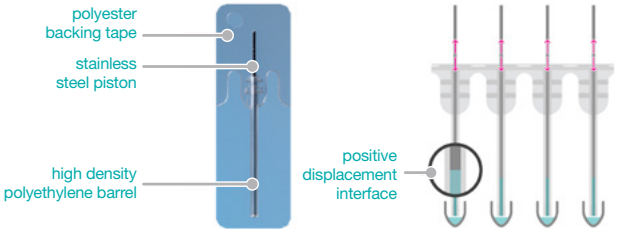
In recent years, high-throughput experimentation (HTE) has emerged as a transformative approach in chemical space exploration and lead optimization. It significantly increases the number of data points generated per experiment while simultaneously addressing the challenges associated with limited quantities of newly synthesized or rare compounds and the scarcity of substrates.

SPT Labtech mosquito® LV, with its innovative positive displacement pipetting technology, drives the field forward by enabling HTE at the nanomolar scale:

- **Simultaneously screen** over 1,500 reaction conditions in less than one day.
- **Use as little as** 0.02 mg of your starting material and 1 µL of solvent per reaction.
- **Synthesize up to** 100 times more analogues.
- **Rapidly discover** high-yielding reaction conditions.
- **Accelerate lead optimization** by coupling with biological assays without the need for purification.
- **Map reaction space** to drive information density and enrich machine learning models.
- **Reduce chemical** and single-use plastic waste associated with high-throughput experiments.
- **Easily design** your experiments with the nanoChem reaction planner software.

positive displacement pipetting:
The accurate way to handle liquids

Handling liquids with diverse viscosities, volatilities, or slurries at low volumes is a well-recognized challenge in chemical synthesis workflows.



SPT Labtech's mosquito liquid handlers excel in these challenging scenarios, utilizing positive displacement pipetting technology that ensures constant aspiration and dispensing forces through direct piston-to-liquid contact. This design is agnostic to liquid properties such as viscosity, temperature, and volatility, allowing reproducible pipetting down to 25 nL. Unlike air-displacement systems, which can be influenced by environmental variables like temperature, pressure, or humidity, mosquito maintains accuracy and precision under all laboratory conditions. By eliminating the need for liquid classification and delivering reliable performance across a wide range of reagents, mosquito enhances workflow efficiency and ensures confidence in low-volume pipetting.

technical specifications

	Pipetting range	Pipetting channels	Volumetric performance	Supported plate format	Dead volumes	Throughput
mosquito® LV	25 nL – 1.2 µL	8 or 16 channels	accuracy within 5 % of target volume; precision with an average of 3 % CVs throughout the volume range	96-, 384- and 1,536-well skirted plates	as low as 0.3 µL	2 minutes/96-well plate copy 3 minutes/384-well copy 5 minutes/4 x 384-well plate stamp out
mosquito® X1	**LV:** 25 nl - 1.2 µL **HV:** 500 nL – 5 µL	Single channel		any type, including slides		6 seconds average cycle time (aspirate, move, dispense, change tip)

product benefits

Volumetric accuracy and precision, every time
irrespective of liquid viscosity or laboratory conditions

Preservation of your starting material and prolonged use of reagents
with nanoliter pipetting and dead volumes as low as 0.3 µL

Faster result generation
rapid reaction setup and spotting in 96-, 384- and 1,536-well formats

Sample and reaction integrity
with low-cost disposable tips guarding against cross-contamination

Ease-of-use
proven intuitive software for established protocols and development of new methods

Seamless integration for 24/7 operation
robotic plate handlers, stackers, bulk liquid handlers and LIMS

Reduced single-use plastic and chemical waste
with patented tip technology and cardboard packaging

No tip boxes
save laboratory space with densely packed spool with up to 36,000 pipettes

consumables

SPT Labtech consumables are developed and manufactured to the same high standard of design and engineering as our instruments – quality that we also demand from our suppliers. The combination of cutting-edge innovation and precision manufacturing ensures accurate results in the lab, every time.

support

Stay connected and protected with best-in-class service and support. Our reliance® engineers and field application scientists partner with you throughout the lifetime of your instrument to minimize downtime, maintain optimal performance, and secure the longevity of your investment.

selection of papers:

Buitrago Santanilla A, Regalado EL, Pereira T, *et al.* Organic chemistry. Nanomole-scale high-throughput chemistry for the synthesis of complex molecules. Science. 2015; 347 (6217): 49-53.

Lin S, Dikler S, Blincoe WD, *et al.* Mapping the dark space of chemical reactions with extended nanomole synthesis and MALDI-TOF MS. Science. 2018; 361 (6402): eaar6236.

Mahjour B, Shen Y, Cernak T. Ultrahigh-Throughput Experimentation for Information-Rich Chemical Synthesis. Acc Chem Res. 2021; 54 (10): 2337-2346.

Pomberger, A, Pedrina McCarthy, A. A, Khan, A, *et al.* The Effect of Chemical Representation on Active Machine Learning Towards Closed-Loop Optimization. React. Chem. Eng. 2022, 7, 1368.

Gesmundo, N., Dykstra, K., Douthwaite, J.L. *et al.* Miniaturization of popular reactions from the medicinal chemists' toolbox for ultrahigh-throughput experimentation. Nat. Synth 2. 2023, 1082–1091.

Taylor CJ, Pomberger A, Felton KC, *et al.* A Brief Introduction to Chemical Reaction Optimization. Chem Rev. 2023; 123 (6): 3089-3126.

Mahjour B, Zhang R, Shen Y, *et al.* Rapid planning and analysis of high-throughput experiment arrays for reaction discovery. Nat Commun. 2023; 14 (1): 3924.

Stevens R, Bendito-Moll E, Battersby DJ, *et al.* Integrated Direct-to-Biology Platform for the Nanoscale Synthesis and Biological Evaluation of PROTACs. J Med Chem. 2023;66(22):15437-15452.

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