HAMILTON

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Precision and Accuracy for Every Lab

More Than 2,000 Laboratory Products for Liquid Handling, Sample Preparation, Separations, and More

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Application Highlights

More than 50 Years of Quality and Innovation, from Chromatography to Cannabis

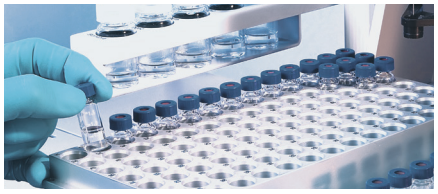
For more than 50 years, Hamilton laboratory products have been satisfying customer needs in the field of precision liquid handling and measurement. Beginning with the invention of the Microliter syringe for chromatography, Hamilton has grown its portfolio of top-quality, hand-crafted laboratory products to include HPLC columns, laboratory pH electrodes, manual pipettes, and semi-automated diluters and dispensers.

Hamilton adapts to customer needs and features several products that are helping support scientists and laboratory technicians in high demand applications, including the following:

Oligo Purification

Synthetic oligonucleotide purifications are demanding applications for silica-based HPLC columns. Using methods that are commonly performed at more than 100°C and use alkaline mobile phases, silica-based columns work well to start, but then rapidly decline in efficiency.

That's why many oligo manufacturers have turned to polymeric divinylbenzene HPLC columns from Hamilton. Hamilton's PRP-C18 offers a porous C18-functionalized polymer that exhibits excellent chemical and thermal stability. PRP-C18 does not dissolve, phase-strip, or bleed even under the most extreme operating conditions. This unlocks the power of superior resolution between long oligos and unwanted failure sequences.



Environmental Testing Throughput

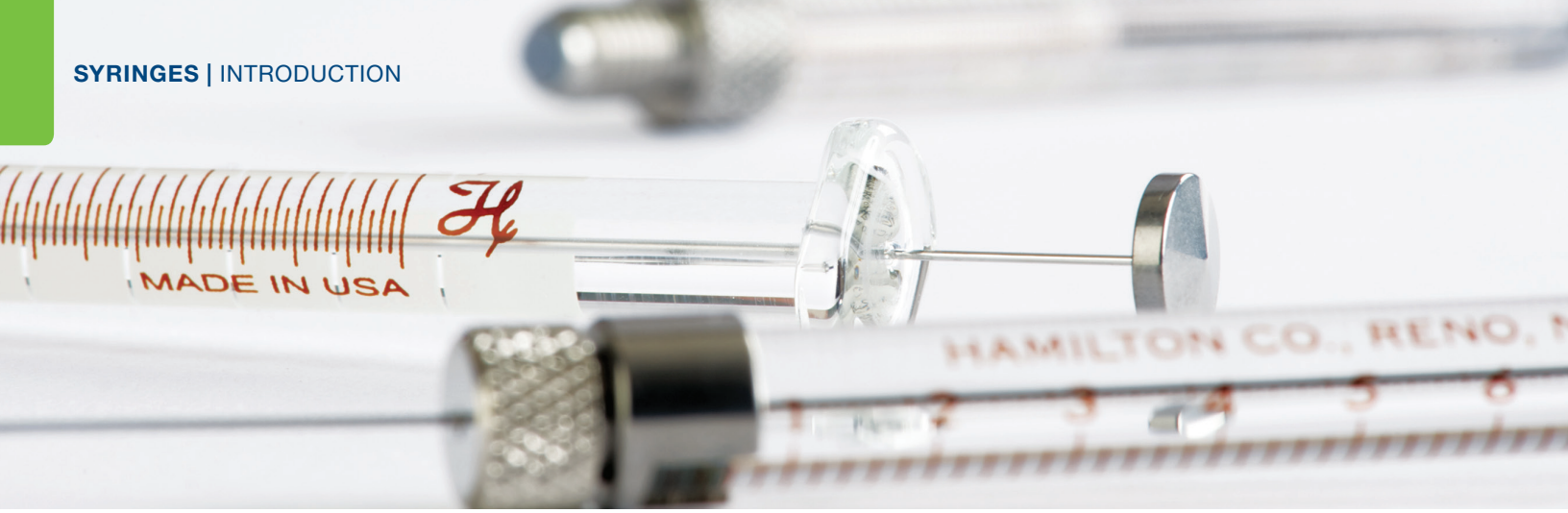
Environmental testing labs grow their business by increasing throughput and lowering per-sample costs. That is a difficult task for labs that are trying to scale their productivity through manual sample processing that suffers from technician-to-technician variability or cumbersome process controls.

By contrast, labs that have turned to Hamilton's Microlab 600 are eliminating costly re-sampling expenses and reducing sample prep time by as much as 50 percent. Methods are pre-programmed and executed without deviation while on-screen instructions guide the user through each step of dilution or dispensing activities.

Cannabis Production

Regulation of the quality of cannabis products being produced for consumption has become a top priority for the emerging cannabis industry. Laboratories throughout legal regions of the United States and Canada have found themselves searching for an affordable, effective means by which to purify and isolate such cannabinoids as THC, CBD, and CBN.

Hamilton has developed the HxSil C18 HPLC column for cannabinoid analysis that can be used on any analytical HPLC system and does not require the use of special UHPLC technology. Together with a pre-canned method, excellent chemical stability from our end-capping process, and superior mass transfer effects that impart exceptional peak symmetry, Hamilton delivers a solution to start purifying cannabinoids right out of the box.



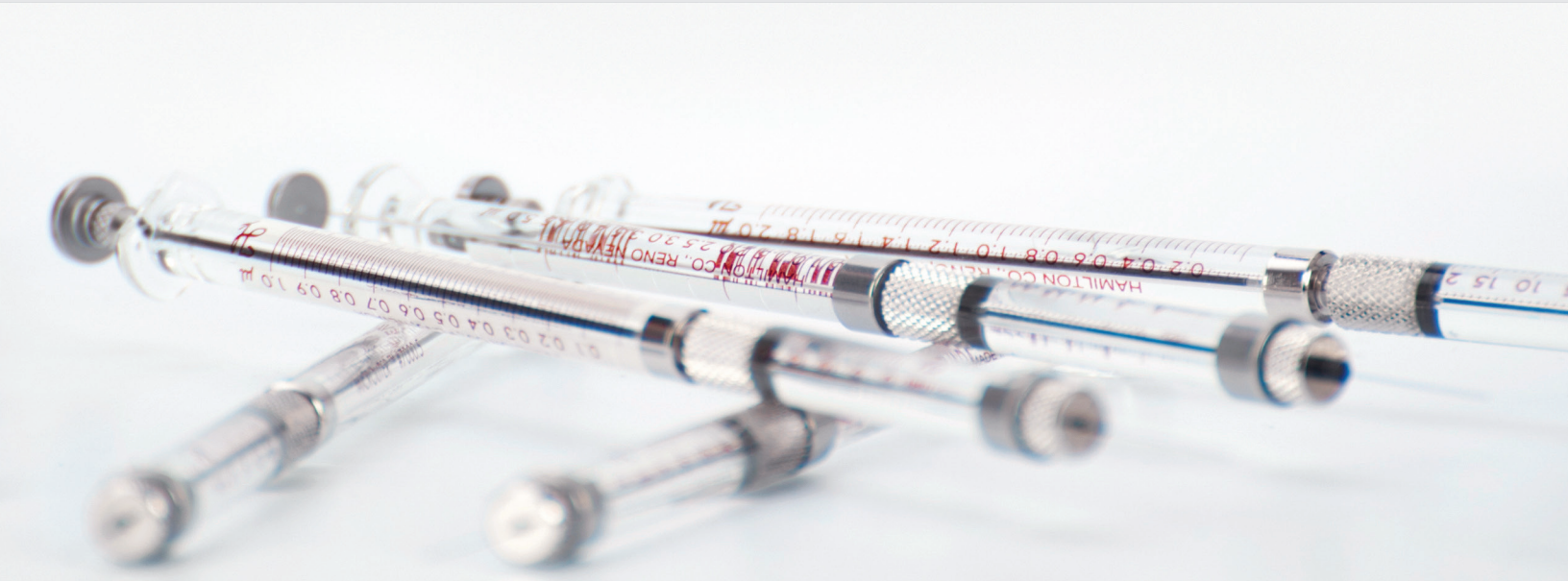
Syringes

Hamilton syringes are the finest precision fluid measuring devices available. Top quality materials and skilled workmanship ensure Hamilton syringes consistently deliver the highest possible performance for reliable analyses. With proper care and handling, Hamilton syringes provide unsurpassed performance for many years.

For manual dispenses, our syringes are accurate to within ±1% of nominal volume with a precision of 1% at 80% of the total volume. The fluid path of a Hamilton syringe is chemically inert with stainless steel, borosilicate glass, and PTFE used for most syringes. N.I.S.T. traceable certification is available as an additional service for the majority of the syringes in our product line.

Hamilton continuously researches new materials and methods to improve the form, fit, and function of our syringes. You can be confident that when you buy from Hamilton you are receiving a top-quality instrument. For the latest information on new products please visit www.hamiltoncompany.com.

Hamilton's broad product offering includes more than 2,000 syringe and accessory part numbers. This reference guide organizes these parts into logical groupings and provides supporting technical information for the most commonly asked questions.



Syringe Selection Quick Start Guide

Step 1 Does Your Application Require Microliter or Gastight?

Microliter Syringes

Hand-fitted stainless steel plungers achieve a liquid tight seal with a nearly frictionless operation, minimizing wear and ensuring longevity.

Syringe Series: 600, 700, 800, 7000

Gastight Syringes

Inert PTFE plunger tips create a gastight seal that is ideal for long dispense times, heterogenous solutions, or viscous liquids.

Syringe Series: 1000, 1700, 1800, Super Syringes

Step 2 Choose Your Dispensing Volume and Series

Hamilton offers syringes at dispense volumes that range from 0.5 µL all the way up to 2 L. Once you know your desired dispensing range, review the syringe series options available. See more information on each series on the next page.

Syringe Type	Delivery Volume	Syringe Series
Microliter (Liquid Only)	0.05 µL–0.25 µL	7000 Series
	0.25 µL–0.5 µL	600, 7000 Series
	0.5 µL–5 µL	600, 700, 800, 7000 Series
	5 µL–250 µL	700, 800 Series
	250 µL–500 µL	700 Series
Gastight (Gas/Liquid)	1 µL–100 µL	1700, 1800 Series
	100 µL–250 µL	1000, 1700, 1800 Series
	250 µL–500 µL	1000, 1700 Series
	500 µL–50 mL	1000 Series
	50 mL–100 mL	1000 Series, Super Syringe
	100 mL–2 L	Super Syringe

Step 2 Choose Your Dispensing Volume and Series (Cont.)

600 Series Syringes

This series offers low-volume, removable needle solutions that only require half of the standard stroke length, making them ideal for one-handed operation such as with animal injections.

700 Series Syringes

This series is the original Hamilton syringe. They were designed to solve the general liquid handling requirements of manufacturing and research laboratories and remains the industry standard.

800 Series Syringes

This series has the same liquid handling capabilities as the 700 series but with the addition of an aluminum syringe holder designed to eliminate plunger damage.

7000 Series Syringes

These zero-dead-volume syringes employ a plunger wire inside the needle to accurately dispense ultra-low volumes. The needle is bored to extremely accurate tolerances to accommodate the plunger wire.

1000 Series Syringes

This series is the mid-volume solution for all liquid and gas handling needs.

1700 Series Syringes

This series is the Gastight version of the original Hamilton 700 series syringe. They are designed to meet the low volume liquid or gas handling needs of research and manufacturing laboratories.

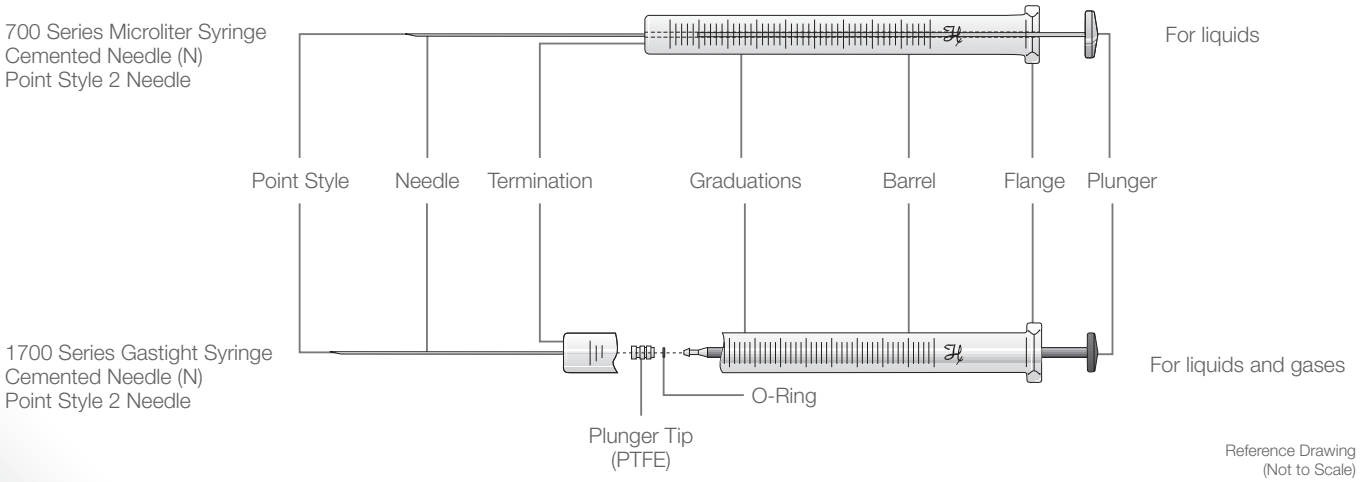
1800 Series Syringes

This series is designed to eliminate the possibility of plunger damage. They have the same liquid handling capabilities as the 1700 series but the extended plunger eliminates breakage and allows the user some control over the dispense speed.

Super Syringes

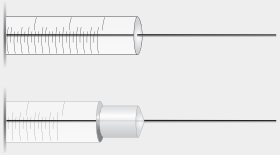
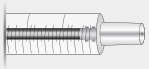
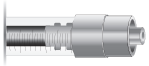
Super syringes are designed primarily for air sampling, preparing gas standards, calibrating reservoirs, and pneumographs.

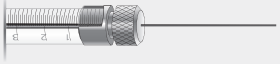
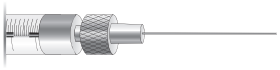
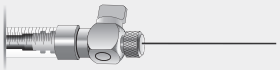
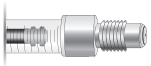
Examples of Hamilton Microliter and Gastight Precision Syringes



Step 3 Choose Your Syringe Termination

Hamilton's nine syringe terminations are designed to accommodate a wide range of application needs like low-volume, high-pressure, or special needles. Learn more at hamiltoncompany.com.

ID	Termination Style	Termination
N and SN		Cemented Needle
LTN and LTSN		Luer Tip Cemented Needle
LT		Luer Tip
TLL		PTFE Luer Lock

ID	Termination Style	Termination
RN		Removable Needle
KH		Knurled Hub
SL		SampleLock™
C		ChemSeal

Step 4 Choose Your Needle Specifications

Hamilton needles come in gauges ranging from 18 to 33 (some limitations apply) and can be typically cut to any length between 0.4 and 12 inches. The final decision you will need to make is which point style is most appropriate for your application.

ID	Point Style	Description
2		10–12° sharp, beveled, curved non-coring
3		Blunt, electro-polished
4		Sharp 10–12° beveled needle
5		Conical with side port for penetration without coring
AS		Conical, non-coring designed to withstand multiple injections

Manual HPLC Syringes

Manual HPLC syringes are equipped with a point style 3 (blunt) needle to fit HPLC injection valve seats without damaging the rotor seal. Hamilton Company manufactures a complete range of high performance liquid chromatography (HPLC) syringes and thin-layer chromatography (TLC) syringes.

Benefits

- HPLC syringes are designed for manual or autosampler injection ports.
- The needle is blunt and electro-polished to slide smoothly into the injection port, reducing the wear on critical seals.

Gastight Syringes

Syringe Termination	VWR Cat. No.	Volume (µL)	Model	Gauge	Removable Needle VWR Cat. No.
Cemented Needle N	60376-656	25 µL	1702	22s	—
	60376-660	50 µL	1705	22s	—
	60376-664	100 µL	1710	22s	—
Cemented Needle LTN	60376-668	250 µL	1725	22s	—
	60376-672	500 µL	1750	22	—
Removable Needle (RN)	60373-985	10 µL	1701	22s	82007-208
	60373-987	25 µL	1702	22s	82007-208
	60373-988	50 µL	1705	22s	82007-208
	60373-990	100 µL	1710	22s	82007-208
	60373-992[1]	250 µL	1725	22s	82007-206
	60373-994	500 µL	1750	22	82007-248

All Needles are 2 in (51 mm)
[1]22 gauge needle

Microliter Syringes

	VWR Cat. No.	Volume (µL)	Model	Gauge
Cemented Needle (N) Syringe (point style 3)	60373-946	10 µL	701	22s
	60373-957	25 µL	702	22s
	60373-968	50 µL	705	22s
	60373-979	100 µL	710	22s
	60373-345	250 µL	725	22
	60373-323	500 µL	750	22

All Needles are 2 in (51 mm)

Manual GC Syringes

Hamilton provides a variety of syringes that are designed for use with manual GC injection ports. GC syringes are fitted with a point style 2 (beveled) needle to pierce injection port septa without damage. Manual GC Microliter™ syringes are used for liquid samples and manual GC Gastight® syringes can be used for gas and liquid samples.

Syringes for Manual Injection of Liquid Samples

Syringe Termination	VWR Cat. No.	Volume (µL)	Model	Gauge	Removable Needle VWR Cat. No.
Cemented Needle (N) Syringe (point style 2)	60373-370	5 µL	75	26s	—
	60372-091 60372-025 (6 pk)	10 µL	701	26s	—
	60372-105	25 µL	702	22s	—
	60373-028	50 µL	705	22s	—
	60373-040	100 µL	710	22s	—
	60373-061	250 µL	725	22s	—
	60373-083	500 µL	750	22	—
Removable Needle (RN) Syringe (point style 2)	60373-375	5 µL	75	26s	82010-238
	60373-470 60372-025 (6 pk)	10 µL	701	26s	82010-238
	60373-505	25 µL	702	22s	82010-240
	60373-538	50 µL	705	22s	82010-240
	60373-560	100 µL	710	22s	82010-240
	60373-593	250 µL	725	22s	82010-268
	60373-629	500 µL	750	22	82010-264

Zero Dead Volume Syringes

	VWR Cat. No.	Volume (µL)	Model	Gauge
Knurled Hub (KH) Syringe (point style 2)	60374-004	0.5 µL	7000.5	25
	60375-158	10 µL	7001	25
	60374-008	25 µL	7002	25
	60374-012	50 µL	7105	24

HPLC Autosampler Syringes

HPLC autosamplers enable the automatic introduction of samples into the sample loop as well as some sample preparation.

Hamilton maintains a large catalog of replacement syringes for the most popular HPLC autosamplers.

- Agilent HPLC
- Antec HPLC
- Beckman Coulter HPLC
- Bruker Varian HPLC
- CTC/LEAP PAL HPLC
- Dionex HPLC
- Grace Alltech HPLC
- Hitachi HPLC
- Kontron HPLC
- Perkin Elmer HPLC
- Shimadzu HPLC
- Spark Holland HPLC
- Spectra Physics ThermoFinnigan HPLC
- Waters HPLC

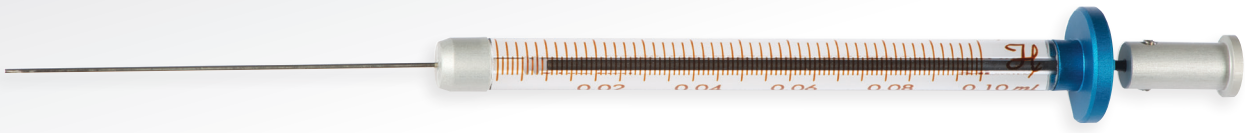
Featured Product: X-Type Autosampler Syringes

Hamilton, together with CTC Analytics, designed the X-Type syringe for use with PAL System liquid chromatography (LC) autosamplers. The syringes feature near zero carryover and a long-lasting plunger tip to meet the requirements of sensitive, high-throughput LC applications. The X-Type syringe is designed for sensitive LC samples such as proteins, peptides, phospholipids, or smaller amines.

Benefits

- The syringe glass barrel is polished and sealed for inertness and enhanced lifetime.
- The needle is deactivated to reduce sample adsorption.

X-Type Syringes



VWR Cat. No.	Volume	Gauge	Needle Length	Point Style	Standard Needle Dead Volume
89368-698	100 µL	22	2 in (51 mm)	3	6.81 µL
89368-700	100 µL	22s	2 in (51 mm)	3	1.13 µL
89368-696	25 µL	22s	2 in (51 mm)	3	1.13 µL
76074-218	50 µL	22s	2 in (51 mm)	3	1.13 µL

All syringes above are Gastight with a Fixed Needle termination.

GC Autosampler Syringes

GC autosamplers enable the automatic introduction of samples into the injector of the gas chromatograph (GC). Hamilton maintains a large catalog of replacement syringes for the most popular gas chromatography autosamplers.

- Agilent GC
- Bruker Varian GC
- CTC/LEAP PAL GC
- Perkin Elmer GC
- Shimadzu GC
- Thermo Finnigan GC

Benefits

- The point style AS (for autosampler) is designed to withstand repeated puncturing through the GC injection port septa.
- Syringes for headspace injection come with a point style 5 (conical with side port), which is ideal for large gas volume injection.
- Autosampler syringes are available in various gauges depending on the type of injector used.

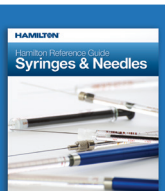
Featured Product: HDHT Headspace Syringes

A cement-free connection between the needle and the glass barrel make HDHT-type syringes a perfect choice for applications where temperatures up to 200°C will be used.

Modern GC headspace analysis requires injecting over large temperature ranges. Conventional headspace syringes use a rubber O-ring sealed plunger which has a limited sealing performance at high temperatures due to varying thermal expansion between the different materials. HDHT-type syringes employ a unique spring in the plunger tip which compensates for the materials' different expansion coefficients, creating a superior seal over a larger temperature range, improving syringe lifetime.

HDHT Headspace Syringes

VWR Cat. No.	Model Number	Volume	Gauge	Needle Length	Point Style	Standard Needle Dead Volume
10836-936	1001 GF	1 mL	23	2 in (51 mm)	5	4.76 µL
10836-938	1001 GF	1 mL	26	2 in (51 mm)	5	2.70 µL
10836-940	1002 GF	2.5 mL	23	2 in (51 mm)	5	4.76 µL
10836-942	1002 GF	2.5 mL	26	2 in (51 mm)	5	2.70 µL
10837-054	1005 GF	5 mL	23	2 in (51 mm)	5	4.76 µL
75778-158	1005 GF	5 mL	26	2 in (51 mm)	5	2.70 µL



Find the Right Replacement Syringe for Your Autosampler

Request a Printed Copy of Hamilton's Syringe & Needle Reference Guide at hamiltoncompany.com/reference-guides

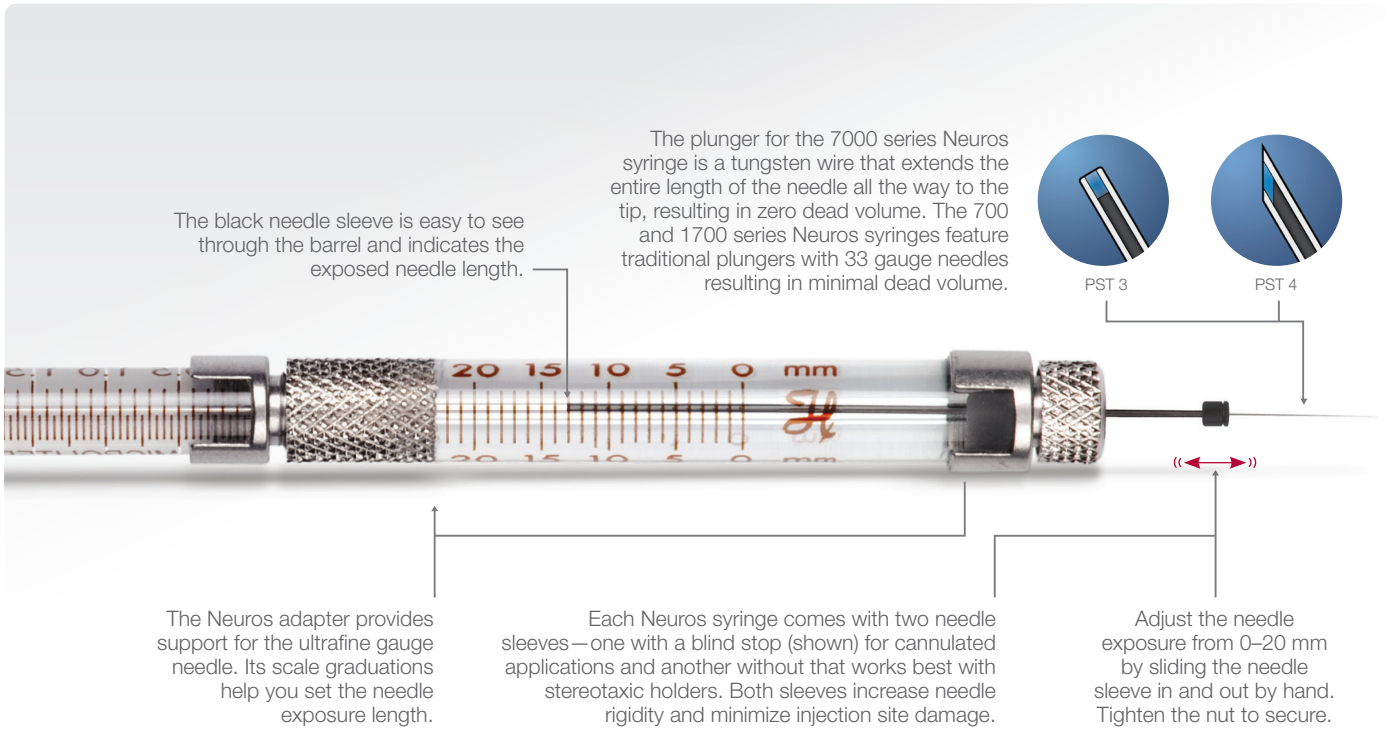
Neuroscience Syringes

Hamilton Neuros

Hamilton Neuros syringe technology provides unprecedented functionality for controlled animal injections. The Neuros accurately dispenses volumes between 50 nL and 100 µL through an ultrafine needle. Developed specifically for neuroscience applications, the Neuros enables the delivery of microvolumes to an exact location while minimizing injection site damage. Neuros syringes come with two types of protective sleeves. The sleeve with a blind stop is perfect for cannulated applications and ensures targeted administration with an adjustable penetration depth. The version without a blind stop works best with stereotaxic holders. Both models provide an adjustable needle exposure of 0 to 20 mm.

Benefits

- Needle rigidity improves insertion path accuracy.
- Minimal tissue damage reduces injection variability.
- Reduced sample loss saves money and materials.
- A fine gauge needle creates smaller injection sites.
- Compatibility with most infusion pumps and stereotaxic holders means an easy integration into existing processes.



Neuros Syringe Assemblies

VWR Cat. No.	Volume	Gauge	Point Style	Syringe Series
89218-264	0.5 µL	32	3	7000
10852-624	0.5 µL	32	4	7000
89218-266	1.0 µL	32	3	7000
10852-626	1.0 µL	32	4	7000
89218-268	2.0 µL	30	3	7000
10852-628	2.0 µL	30	4	7000
89230-212	5.0 µL	33	3	700
10852-630	5.0 µL	33	4	700
89230-214	10 µL	33	3	1700
10852-632	10 µL	33	4	1700
89230-216	25 µL	33	3	1700
10852-634	25 µL	33	4	1700
89230-218	50 µL	33	3	1700
10852-636	50 µL	33	4	1700
89230-220	100 µL	33	3	1700
10852-638	100 µL	33	4	1700

Neuros Accessories

VWR Cat. No.	Volume	Gauge	Point
89218-272	Needle 5–100 µL–6 pk	33 ga	3
10852-642	Needle 5–100 µL–6 pk	33 ga	4
89218-270	Adapter Kit for 5–100 µL RN syringes	33 ga	3
10852-640	Adapter Kit for 5–100 µL RN syringes	33 ga	4

Sample Preparation and Dilution

The Microlab® 600 is a highly precise syringe pump with a touchscreen interface designed to quickly and easily dilute and dispense fluids. This positive displacement system provides better than 99% accuracy, independent of a liquid's viscosity, vapor pressure, and temperature. The inert fluid path minimizes sample carryover and is compatible with harsh chemicals.

Microlab 600 Diluter and Dispensers

The Microlab 600 offers labs a way to securely monitor processes and greatly increase efficiency. No more adjusting pipettes and recalculating dilutions. Quickly recall stored dispenses and dilutions with the Favorites Menu. Trigger the hand probe or tap the foot switch to actuate the syringe drives according to a predefined program. These are just some of the conveniences of the Microlab 600.

Benefits

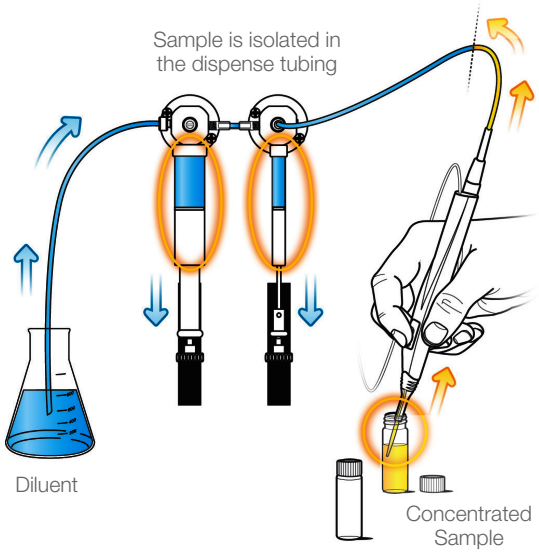
- Reduce time preparing samples or dispensing reagents
- Minimize experimental variation from one user to the next
- Manage log files from any PC
- Complies with EPA, FDA, GLP, GMP, 21 CFR Part 11, and ISO regulations
- N.I.S.T. traceable calibration

How Does It Work?

Step 1. Program sample and diluent volume.

Step 2. Trigger the hand probe to fill left syringe with diluent and aspirate sample into the hand probe with the right syringe.

Step 3. Trigger the hand probe to dispense the sample and then the diluent into the vial to complete the dilution and wash the tube for the next sample.



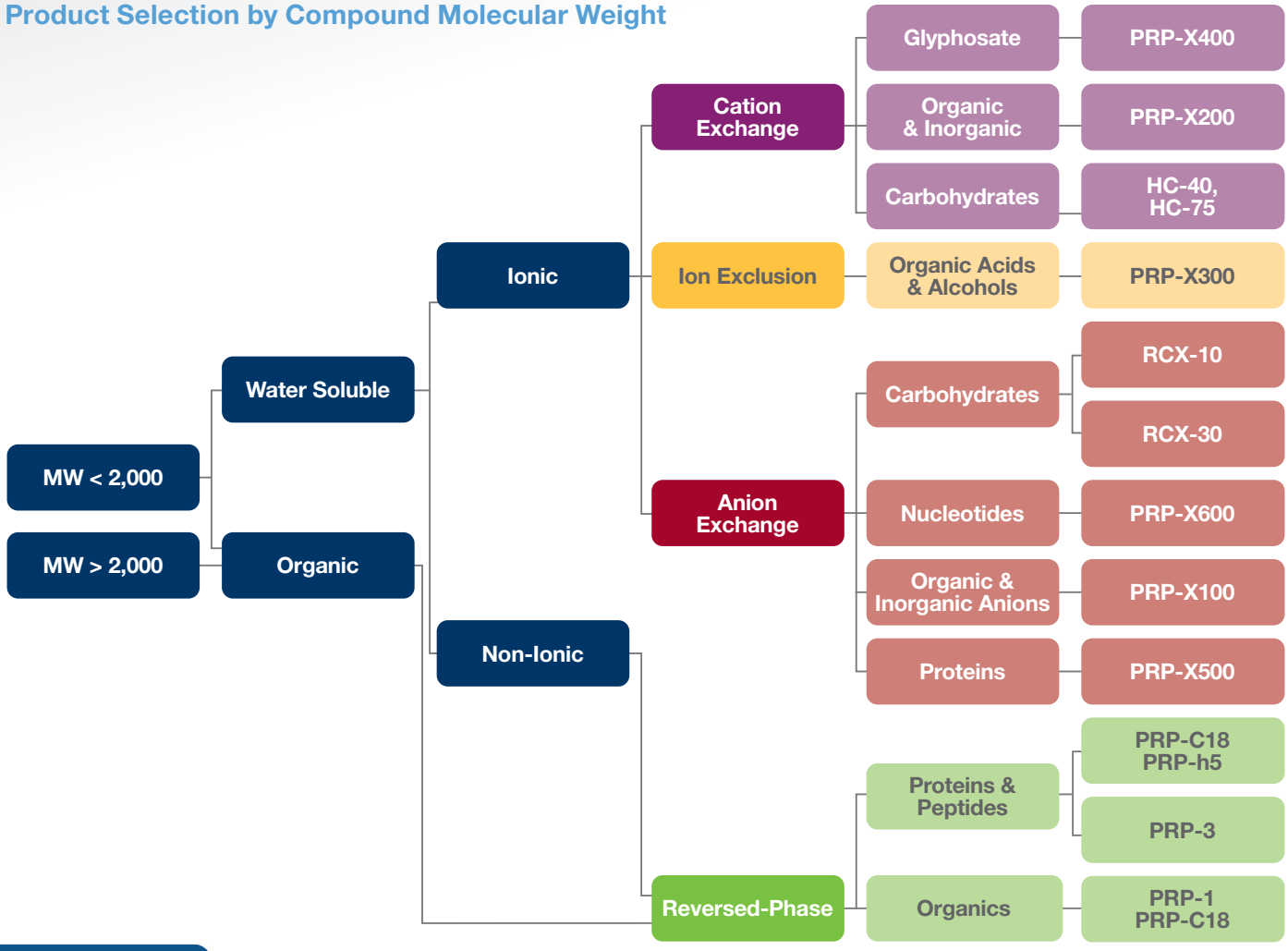
Application	Configuration	Controller	VWR Cat. No.
Dilution	PTFE Tube Diluter	Basic	89174-618
		Advanced	89174-626
	Disposable Tip Diluter	Basic	–
		Advanced	89498-984
Dispensing	Single Syringe Dispenser	Basic	89174-616
		Advanced	89174-624
	Dual Syringe Dispenser	Basic	89174-620
		Advanced	89174-628
	Continuous Syringe Dispenser	Basic	89174-622
		Advanced	89174-630
	PC Controlled Single Syringe	–	89204-982
		–	89204-984

HPLC Columns

Hamilton offers a complete selection of polymer-based HPLC columns for reversed-phase, anion exchange, cation exchange, and ion exclusion as well as silica-based columns for reversed-phase.

Hamilton Polymer Column Product Selection Guide

Product Selection by Compound Molecular Weight



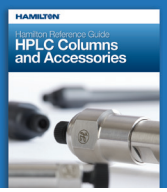
Featured Product: PRP-C18 Polymer-Based Columns

The Hamilton PRP-C18 is designed to provide high-efficiency, reversed-phase separations over an extended column life in nearly any mobile phase or pH. The PRP-C18 is a durable and effective column for general purpose HPLC and is especially well-suited for specialized applications in the clinical, pharmaceutical, environmental, food, forensics, and life sciences industries.

The properties of the PRP-C18 make it a superior column in the field of oligonucleotide purifications.

PRP-C18 Columns

VWR Cat. No.	Particle Size	Hardware Inner Diameter	Hardware Length	Hardware Material
30618-502	5 µm	2.1 mm	150 mm	Stainless Steel
30618-504	5 µm	2.1 mm	150 mm	PEEK
30618-506	5 µm	2.1 mm	250 mm	Stainless Steel
30618-508	5 µm	2.1 mm	250 mm	PEEK
30618-498	5 µm	2.1 mm	50 mm	Stainless Steel
30618-500	5 µm	2.1 mm	50 mm	PEEK
30618-514	5 µm	4.6 mm	150 mm	Stainless Steel
30618-516	5 µm	4.6 mm	150 mm	PEEK
30618-520	5 µm	4.6 mm	250 mm	PEEK
30618-510	5 µm	4.6 mm	50 mm	Stainless Steel
30618-512	5 µm	4.6 mm	50 mm	PEEK
30618-522	12–20 µm	21.2 mm	250 mm	Stainless Steel



Find the Right HPLC Column for Your Application

Request a Printed Copy of Hamilton's HPLC Columns and Accessories Reference Guide at hamiltoncompany.com/reference-guides

Pipettes

We've learned that our best ideas come from listening to people working in the lab and using our products. Responding to user demand, we have developed our pipettes putting a priority on addressing the issues of hand strain, fatigue, and other injuries caused by pipettes. The result is innovative designs that set new standards for quality, comfort, and precision. You'll feel the difference the first time you pick one up. Hamilton's line of SoftGrip™ pipettes are easy to use, reliable, and maximize the efficiency of your lab.

SoftGrip Pipettes

Outstanding Quality

The SoftGrip pipette, with its award-winning, innovative design, is built to last. SoftGrip manual pipettes are completely autoclavable for easy decontamination and sterilization. User may perform pipette calibration or the pipettes may be sent to Hamilton for calibration service.

Total Comfort

The soft, ergonomic shape and low plunger forces of the SoftGrip pipette reduce hand and wrist fatigue as compared to other pipettes. Using SoftGrip pipettes decreases the risk factors associated with pipette-related repetitive stress injuries such as carpal tunnel syndrome.

Adjustable Volume Pipettes

VWR Cat. No.	Volume Range	Increments	Color
89050-650	0.2–2 µL	0.002 µL	Aqua
89050-652	1–10 µL	0.02 µL	Purple
89050-654	2.5–25 µL	0.02 µL	Forest Green
89050-656	10–100 µL	0.2 µL	Violet
89050-658	30–300 µL	0.2 µL	Brick Red
89050-660	100–1000 µL	2.0 µL	Sky Blue

Fixed Volume Pipettes

VWR Cat. No.	Volume Range	Color
89050-662	5 µL	Steel Blue
89221-460	10 µL	Purple
89050-666	25 µL	Forest Green
89050-668	50 µL	Sandstone
89050-670	100 µL	Violet
89050-672	200 µL	Mustard
89050-674	250 µL	Burnt Orange
89050-676	300 µL	Brick Red
89050-678	500 µL	Olive Green
89050-680	1000 µL	Sky Blue

Multi-Channel Pipettes

VWR Cat. No.	Volume Range	Channels	Color
89050-682	5–50 µL	8	Sandstone
89050-684	30–300 µL	8	Brick Red
89050-686	5–50 µL	12	Sandstone
89050-688	30–300 µL	12	Brick Red

1219 Lit. No. 080047W