

# Hamilton Reference Guide

# Pipettes





# Pipettes

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# Pipettes

We've learned that our best ideas come from listening to people in the lab who use 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. You'll feel the difference the first time that you pick one up. Hamilton's line of SoftGrip™ Pipettes are easy to use, reliable, and maximize the efficiency of your lab. Each product features a user-centric design that maximizes quality, comfort, and precision.





## Introduction

Explore the features of Hamilton pipette products and practices that keep you safe in the lab.



Introduction

P. 6

## SoftGrip™ Pipettes

This section highlights features of Hamilton SoftGrip pipette products, designed to be easy and comfortable to use—as well as accurate and precise.



SoftGrip Pipettes

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## AdvanTip™ Pipette Tips

New AdvanTip LT pipette tips virtually eliminate any retention of valuable samples and reagents.



AdvanTip Pipette Tips

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## Pipette Technical Reference

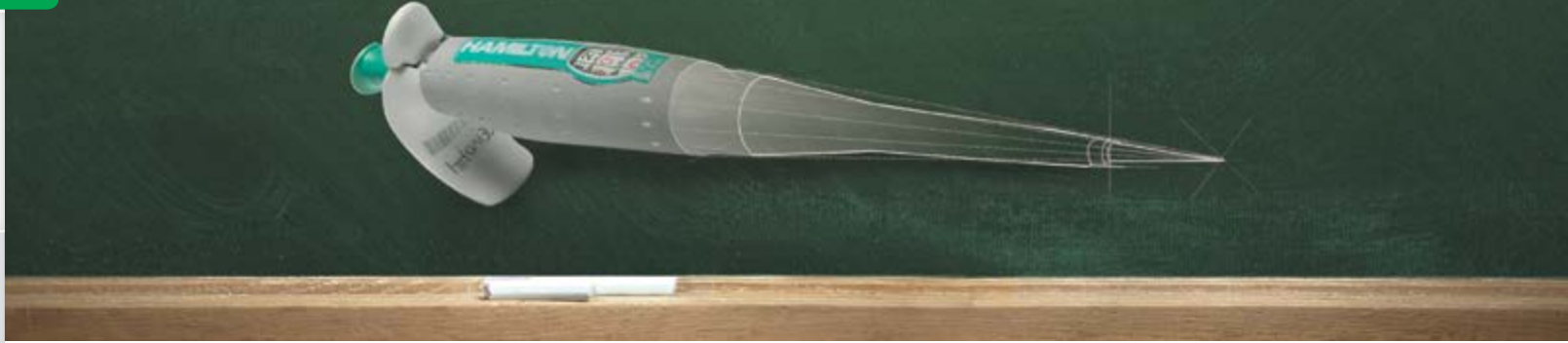
This section includes information on the care and use of Hamilton pipettes, frequently asked questions, certification, and repair services.



Pipettes Technical Reference

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# Pipettes 101:

## Features and Benefits

### The Standard for Quality, Comfort, and Precision

#### Outstanding Quality

The SoftGrip pipette, with its award-winning, innovative design\*, is built to last just like our precision syringe products. SoftGrip manual pipettes are completely autoclavable for easy decontamination and sterilizations.

\*Outstanding design awards received from Industrial Designers Society of America, Business Week for Medical & Scientific Products, and the Chicago Athenaeum Museum of Architecture and Design.

#### Total Comfort

The soft, ergonomic shape and low-force plunger 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.

#### Guaranteed Accuracy and Precision

SoftGrip pipettes deliver superior accuracy and precision. Every pipette is calibrated at the factory with standards traceable to N.I.S.T. and shipped with a Certificate of Calibration documenting the pipette's accuracy and precision. Accuracy is guaranteed with Hamilton AdvanTip Precision Pipette Tips.

Anatomy of a Pipette

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Ergonomic Best Practices

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SoftGrip™ Pipettes in Action

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Recommended Volume Ranges

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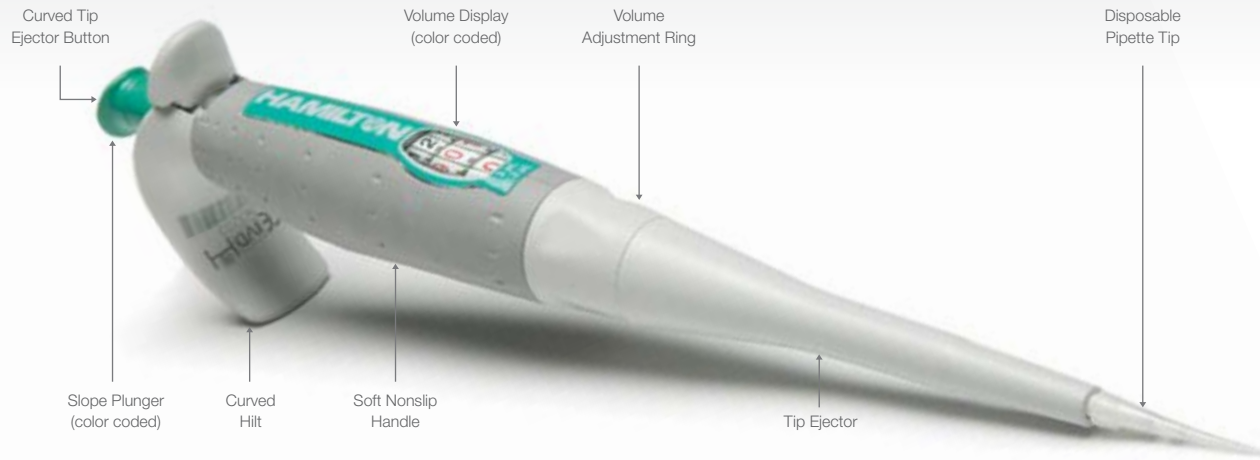
Know Your Pipette's Volume at a Glance

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# Anatomy of a Pipette



## Volume Indicator



Dual pointer simplifies volume adjustment.

## Maintains Volume Setting



Isolated volume adjustment ring prevents accidental volume changes.

## Soft Plunger Action



Low-force, sloped plunger button lessens thumb extension and overuse.

## Enhanced Comfort



Separate tip ejector button with curved shape reduces hand motion.

## Light, Balanced Feel



Curved hilt supports the pipette to provide finer control while pipetting.

## Relaxed Grip



Ergonomically contoured handle with soft, non-slip surface fits perfectly in your hand to minimize fatigue.

## Multi-Channel One Stroke Tip Ejection



Multi-channel pipettes have a lever-action ejector that removes all tips on the first stroke and is easily reset for left-handed operation.





## Ergonomic Best Practices

Ergonomics has become a critical factor in today's laboratories. Research has shown that use of traditional pipettes for more than 300 hours per year is associated with an increased risk of hand and shoulder ailments<sup>1</sup>. To address the ergonomic issues facing laboratories, Hamilton pipettes were ergonomically designed to minimize the amount of fatigue and discomfort typically experienced in pipetting. Overall, use of Hamilton pipettes decreases several of the risk factors associated with the development of repetitive stress injuries, including carpal tunnel syndrome. As proven in an independent study<sup>2</sup>, the Hamilton pipette is the best ergonomic pipette design.

In addition to using an ergonomically designed pipette, there are several steps that should be taken in the laboratory to decrease the risk of pipette-related repetitive stress injuries. Take a 1–2 minute break after every 20 minutes of pipetting, if possible. Alternate between tasks in the laboratory to minimize the duration of pipetting sessions. Ensure you are working in an ergonomic workspace; the bench should be at the proper height, and the chair should have an adjustable height with full back support.

Your feet should not be dangling; the chair should provide a foot support, or a bench should be available to rest your feet on. Use Hamilton AdvanTip Precision Pipette Tips to ensure a perfect fit on Hamilton pipettes for a positive seal without excess force during tip installation. The perfect fit minimizes tip eject forces.

<sup>1</sup> BJORSTEN, M.G., B. ALBY, and E.S. JANSSON, *Hand and shoulder ailments among laboratory technicians using modern plunger-operated pipettes*, *Applied Ergonomics*, 1994 25(2): 88-94.

<sup>2</sup> Study conducted by Ergonomic Engineering, Inc., 20 Gulf Road, Pelham, Massachusetts, 01002; tel. (800) 375-ERGO(3746). For a complete copy of the study, please contact Hamilton Company.



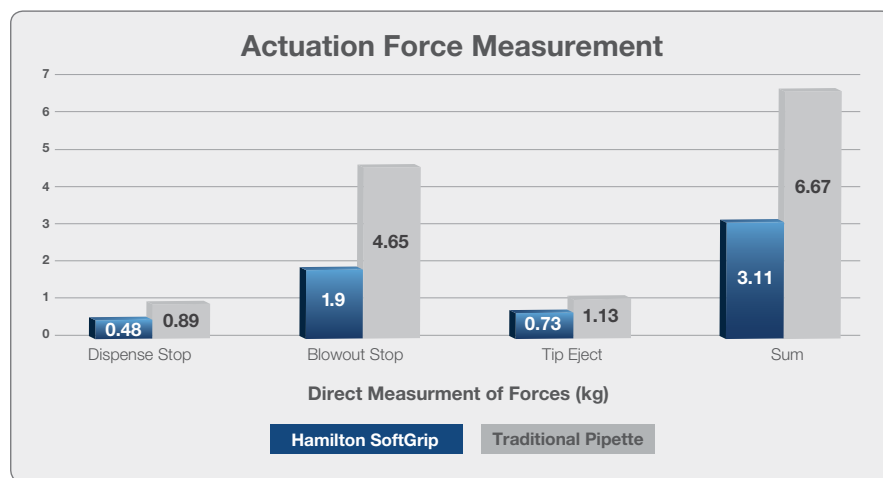


# SoftGrip™ Pipettes in Action

## The Best Ergonomic Pipette, Proven Scientifically in an Independent Study

Use of the SoftGrip pipette decreases several of the risk factors associated with the development of repetitive stress injuries, including carpal tunnel syndrome.

### Less Force = Less Fatigue and Discomfort



### ACTUATION FORCE

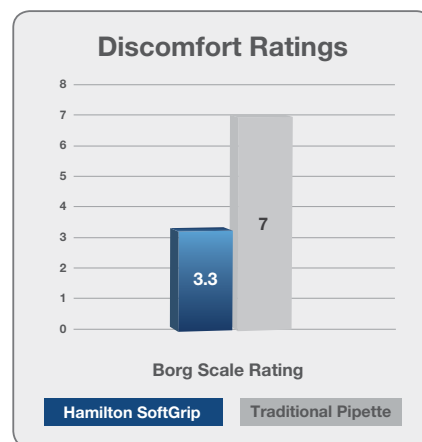
Pipette actuation force measurements were taken for the three pipetting actuation forces: (1) Dispense Stop, (2) Blowout Stop, and (3) Tip Eject. SoftGrip pipettes require less than half the overall force when compared to a traditional pipette.

### Less Fatigue and Discomfort = Increased Customer Satisfaction



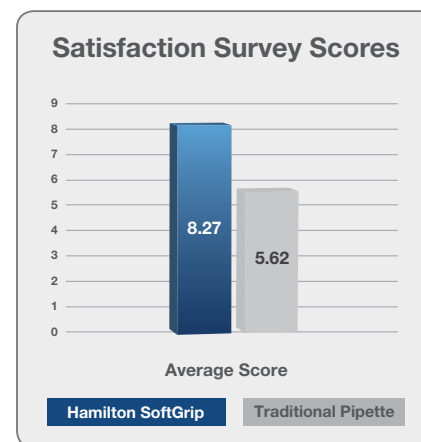
### FATIGUE EXPERIMENT

Loss in strength was measured following a one-hour pipetting session. Power grip strength retention was more than five times better with SoftGrip pipettes. Pinch grip strength loss was nearly half that experienced with a traditional pipette.



### DISCOMFORT RATING

Using the widely accepted Borg 10 point scale for discomfort, the SoftGrip pipette showed less than half the discomfort experienced with a traditional pipette after a one hour pipetting session.



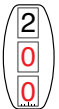
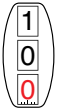

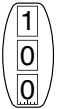
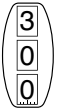
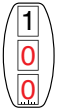
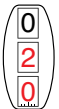
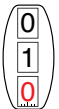
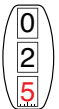
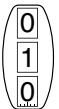
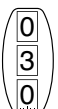
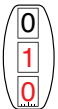
### HIGHEST USER SATISFACTION

The SoftGrip pipette received the highest average score out of 10 possible for 11 different aspects of a pipette, including plunger and eject forces, weight, diameter, and texture.



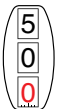
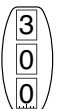
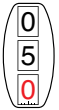
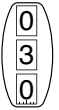
## Recommended Volume Ranges

### Single Channel Pipettes

Volume	2 $\mu\text{L}$	10 $\mu\text{L}$	25 $\mu\text{L}$	100 $\mu\text{L}$	300 $\mu\text{L}$	1 mL
<b>Pipette Color</b>	<span style="color: #00A08A;">●</span> Aqua	<span style="color: #800080;">●</span> Purple	<span style="color: #006400;">●</span> Forest Green	<span style="color: #483D8B;">●</span> Violet	<span style="color: #C00000;">●</span> Brick Red	<span style="color: #1E90FF;">●</span> Sky Blue
<b>Recommended Volume Range</b>	0.2–2 $\mu\text{L}$	1–10 $\mu\text{L}$	2.5–25 $\mu\text{L}$	10–100 $\mu\text{L}$	30–300 $\mu\text{L}$	0.1–1 mL
<b>100% Volume Setting</b>	2.000 $\mu\text{L}$	10.000 $\mu\text{L}$	25.00 $\mu\text{L}$	100.0 $\mu\text{L}$	300.0 $\mu\text{L}$	1.000 mL
<b>Reading at 100% Volume</b>						
<b>10% Volume Setting</b>	0.200 $\mu\text{L}$	1.00 $\mu\text{L}$	2.50 $\mu\text{L}$	10.0 $\mu\text{L}$	30.0 $\mu\text{L}$	0.100 mL
<b>Reading at 10% Setting</b>						
<b>Smallest Increment of the Scale</b>	0.002 $\mu\text{L}$	0.02 $\mu\text{L}$	0.02 $\mu\text{L}$	0.2 $\mu\text{L}$	0.2 $\mu\text{L}$	0.002 mL

For the 2  $\mu\text{L}$ , 10  $\mu\text{L}$ , 25  $\mu\text{L}$ , and 1 mL pipettes, the red digits on the scale represent values to the right of the decimal point. For the 100 and 300  $\mu\text{L}$  pipettes, only the last digit, obtained from the graduated scale, represents a value to the right of the decimal point. For the best accuracy and precision, use your pipette only within the recommended volume range of 10–100% of the specific pipette's total volume range.

### Multi-Channel Pipettes

Volume	50 $\mu\text{L}$	300 $\mu\text{L}$
<b>Pipette Color</b>	<span style="color: #8B4513;">●</span> Sandstone	<span style="color: #C00000;">●</span> Brick Red
<b>Recommended Volume Range</b>	5–50 $\mu\text{L}$	30–300 $\mu\text{L}$
<b>100% Volume Setting</b>	50.00 $\mu\text{L}$	300.0 $\mu\text{L}$
<b>Reading at 100% Volume</b>		
<b>10% Volume Setting</b>	5.00 $\mu\text{L}$	30.0 $\mu\text{L}$
<b>Reading at 10% Setting</b>		
<b>Smallest Increment of the Scale</b>	0.02 $\mu\text{L}$	0.2 $\mu\text{L}$

For the 50  $\mu\text{L}$  multi-channel pipettes the red digits on the scale represent values to the right of the decimal point. For the 300  $\mu\text{L}$  multi-channel pipettes, only the last digit, obtained from the graduated scale, represents a value to the right of the decimal point. For the best accuracy and precision, use your pipette only within the recommended volume range of 10–100% of the specific pipette's total volume range.



# Know Your Pipette's Volume at a Glance

All pipettes have color-coded plunger buttons and labels for easy volume identification.

## Adjustable Volume Pipettes

Volume	2 $\mu$ L	10 $\mu$ L	25 $\mu$ L	100 $\mu$ L	300 $\mu$ L	1 mL
Pipette Color	<span style="color: #00A090;">●</span> Aqua	<span style="color: #800080;">●</span> Purple	<span style="color: #008000;">●</span> Forest Green	<span style="color: #4169E1;">●</span> Violet	<span style="color: #DC143C;">●</span> Brick Red	<span style="color: #6495ED;">●</span> Sky Blue

## Fixed Volume Pipettes

Volume	5 $\mu$ L	10 $\mu$ L	25 $\mu$ L	50 $\mu$ L	100 $\mu$ L
Pipette Color	<span style="color: #4682B4;">●</span> Steel Blue	<span style="color: #800080;">●</span> Purple	<span style="color: #008000;">●</span> Forest Green	<span style="color: #D2691E;">●</span> Sandstone	<span style="color: #4169E1;">●</span> Violet

Volume	200 $\mu$ L	250 $\mu$ L	300 $\mu$ L	500 $\mu$ L	1 mL
Pipette Color	<span style="color: #FFD700;">●</span> Mustard	<span style="color: #FF8C00;">●</span> Burnt Orange	<span style="color: #DC143C;">●</span> Brick Red	<span style="color: #008000;">●</span> Olive Green	<span style="color: #6495ED;">●</span> Sky Blue





## PIPETTES

# SoftGrip™ Pipettes

The SoftGrip manual pipettes are available in volumes from 0.2  $\mu$ L to 1 mL. A soft contoured handle and a curved hilt allows the pipette to rest comfortably in your hand, giving Hamilton the most ergonomic pipette in the market. The isolated volume adjustment makes it so there's no need for a locking mechanism to prevent accidental volume adjustment.





## Single Channel Pipettes

Hamilton SoftGrip Single Channel Pipettes are available in six adjustable-volume and ten fixed-volume pipettes, covering 0.2  $\mu$ L to 1 mL.



Single Channel Pipettes

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## Multi-Channel Pipettes

Hamilton SoftGrip Multi-Channel Pipettes are available as 8-channel and 12-channel adjustable volume manual pipettes in two volume ranges, covering 5  $\mu$ L to 50  $\mu$ L and 30  $\mu$ L to 300  $\mu$ L.



Multi-Channel Pipettes

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# Single Channel Pipettes

- Wide Selection of Ergonomic Pipettes
- Completely Autoclavable
- Guaranteed Accuracy and Precision

SoftGrip pipettes routinely receive the highest user satisfaction score of 10 on 11 different aspects of a pipette, including plunger and eject forces, weight, diameter, and texture. Choose from six adjustable-volume and ten fixed-volume SoftGrip pipettes, covering 0.2  $\mu$ L to 1 mL. All pipettes have color-coded plunger buttons and labels for easy volume identification.

SoftGrip air-displacement pipettes are built from high quality, state-of-the-art materials designed to provide years of reliable service. All pipettes are completely autoclavable for easy decontamination and sterilization without the need for disassembly and recalibration.

The isolated volume ring prevents accidental volume changes. A magnified, easy-to-read micrometer ensures reproducible, accurate volume setting. Each pipette meets or exceeds industry standards for accuracy and precision when used with Hamilton Universal AdvanTip Precision Pipette Tips.

## Adjustable Volume Pipettes

### 0.2 $\mu$ L–1 mL

P/N	Volume	Increments	Color	At 10% of Pipette Volume		At 100% of Pipette Volume	
				Accuracy within $\pm$ %	Precision within + %	Accuracy within $\pm$ %	Precision within + %
55019-30	0.2–2 $\mu$ L	0.002	● Aqua	8.00	4.00	1.20	0.60
55019-32	1–10 $\mu$ L	0.02	● Purple	2.50	1.20	0.80	0.40
55019-34	2.5–25 $\mu$ L	0.02	● Forest Green	4.50	1.50	0.80	0.20
55019-36	10–100 $\mu$ L	0.2	● Violet	1.80	0.70	0.60	0.15
55019-38	30–300 $\mu$ L	0.2	● Brick Red	1.20	0.40	0.40	0.15
55019-40	100 $\mu$ L–1 mL	2.0	● Sky Blue	1.60	0.50	0.30	0.12





# Fixed Volume Pipettes

## 5 µL–1 mL

P/N	Volume	Color	At 100% of Pipette Volume	
			Accuracy within ± %	Precision within + %
55019-01	5 µL	● Steel Blue	1.40	0.75
55019-03	10 µL	● Purple	0.80	0.40
55019-05	25 µL	● Forest Green	0.80	0.30
55019-07	50 µL	● Sandstone	0.60	0.30
55019-09	100 µL	● Violet	0.50	0.20
55019-11	200 µL	● Mustard	0.40	0.18
55019-13	250 µL	● Burnt Orange	0.40	0.18
55019-15	300 µL	● Brick Red	0.40	0.18
55019-17	500 µL	● Olive Green	0.40	0.18
55019-19	1 mL	● Sky Blue	0.30	0.12

# Accessories

P/N	Product	Description
6600849-01	8-Position Pipette Carousel	Holds eight single channel or four multi-channel pipettes
1987-01	Calibration Labels, 120/pk	Quickly record and view calibration data with labels on your pipettes
34002	Calibration Key	For simple calibration in the field

Calibration Labels



Calibration Key



8-Position Pipette Carousel





# Multi-Channel Pipettes

- Easily Adjusts for Left-Hand Operation
- Completely Autoclavable
- Guaranteed Accuracy and Precision

Hamilton SoftGrip pipettes are available as 8-channel and 12-channel adjustable volume manual pipettes in two volume ranges, covering 5  $\mu\text{L}$  to 50  $\mu\text{L}$  and 30  $\mu\text{L}$  to 300  $\mu\text{L}$ . The pipettes have color-coded plunger buttons and labels for quick volume identification.

The unique, long tip ejector lever and movable lower body can be rotated a full 360° relative to the handle to provide maximum comfort for left- or right-handed use. Additionally, the easily activated tip ejector lever releases all the tips in a single stroke.

Made of the finest materials, the entire SoftGrip multi-channel pipette can be autoclaved without the need for disassembly or recalibration.

Accuracy and precision is guaranteed when used with Hamilton Universal AdvanTip Precision Pipette Tips.

## 8-Channel Pipettes

### 5 $\mu\text{L}$ –300 $\mu\text{L}$

P/N	Volume	Increments ( $\mu\text{L}$ )	Color	At 10% of Pipette Volume		At 100% of Pipette Volume	
				Accuracy within $\pm$ %	Precision within + %	Accuracy within $\pm$ %	Precision within + %
55019-50	5–50 $\mu\text{L}$ x 8	0.02	● Sandstone	2.00	2.00	0.80	0.35
55019-52	30–300 $\mu\text{L}$ x 8	0.2	● Brick Red	1.20	0.70	0.50	0.30





## 12-Channel Pipettes

### 5 $\mu$ L–300 $\mu$ L

P/N	Volume	Increments ( $\mu$ L)	Color	At 10% of Pipette Volume		At 100% of Pipette Volume	
				Accuracy within $\pm$ %	Precision within + %	Accuracy within $\pm$ %	Precision within + %
55019-54	5–50 $\mu$ L x 12	0.02	● Sandstone	5.00	2.00	1.00	0.50
55019-56	30–300 $\mu$ L x 12	0.2	● Brick Red	2.40	1.20	1.00	0.50

## Accessories

P/N	Product	Description
34195	Multi-Channel Pipette Stand	Constructed of heavy, solvent-resistant plastic; holds one multi-channel pipette
1987-01	Calibration Labels, 120/pk	Quickly record and view calibration data with labels on your pipettes
34002	Calibration Key	For simple calibration in the field



Multi-Channel Pipette Stand



## ADVANTIP PIPETTE TIPS



# AdvanTip™ Pipette Tips

- Maximum recovery of valuable samples and reagents
- No secondary chemicals or additives
- Consistent results, no sample leaching
- Highest accuracy and reproducibility
- Certified RNase, DNase, and pyrogen safe

New AdvanTip LT pipette tips virtually eliminate any retention of valuable samples and reagents. Unlike standard polypropylene products, the wall surfaces of AdvanTip LT tips are completely free of occlusions and cavities. This is achieved through a modification to the polypropylene resin combined with the use of ultra smooth, diamond polished molds.

No secondary chemicals such as silicone or other substances are added, eliminating the possibility of sample leaching and performance inconsistencies. Tips are ideal for use in critical applications such as quantitative PCR, where the target DNA is present in very small quantities. The maximum volume of enzymes or DNA can be transferred during testing procedures, reducing expensive reagent cost.

## 10 µL Pipette Tips

**Volume Range: 0.2–10 µL • Recommended for 2, 5, and 10 µL pipettes**

Description	Low Retention P/N	Total Tips	Standard Retention P/N	Total Tips
10 µL, Bulk, 1000 tips/bag	68007-20	1000		
10 µL, Bulk, Extended Length, 1000 tips/bag	23005-14	1000	11005-14	1000
10 µL, Racked, 96 tips/rack	68007-21	1152	68007-11	1152
10 µL, Racked, Extended Length, 96 tips/rack	68007-24	960		
10 µL, Racked, Pre-Sterilized, 96 tips/rack	23003-01	960	68007-12	1152
10 µL, Racked, Filter, Pre-Sterilized, 96 tips/rack	68007-23	1152	68007-13	1152
10 µL, Racked, Extended Length, Filter, Pre-Sterilized, 96 tips/rack	68007-26	960	11003-26	960
10 µL, Stacked Rack, 96 tips/rack, 5 racks/stack			11003-11	480





## 200 $\mu$ L Pipette Tips

**Volume Range: 2–200  $\mu$ L • Recommended for 20, 25, 50, 100, and 200  $\mu$ L pipettes**

Description	Low Retention P/N	Total Tips	Standard Retention P/N	Total Tips
200 $\mu$ L, Bulk, 1000 tips/bag	68008-20	1000		
200 $\mu$ L, Racked, 96 tips/rack	68008-21	960	68008-11	960
200 $\mu$ L, Racked, Pre-Sterilized, 96 tips/rack	68008-22	960	68008-12	960
200 $\mu$ L, Racked, Filter, Pre-Sterilized, 96 tips/rack	68008-23	960	68008-13	960

*Also, can be used with 300  $\mu$ L pipettes when pipetting volumes of 200  $\mu$ L or less.*



## 300 $\mu$ L Pipette Tips

**Volume Range: 2–300  $\mu$ L • Recommended for 250 and 300  $\mu$ L pipettes**

Description	Low Retention P/N	Total Tips	Standard Retention P/N	Total Tips
300 $\mu$ L, Bulk, 1000 tips/bag	68009-20	1000		
300 $\mu$ L, Racked, 96 tips/rack	68009-21	960	68009-11	960
300 $\mu$ L, Racked, Pre-Sterilized, 96 tips/rack	68009-22	960	68009-12	960
300 $\mu$ L, Racked, Filter, Pre-Sterilized, 96 tips/rack	68009-23	960	68009-13	960



## 1 mL Pipette Tips

**Volume Range: 100–1000  $\mu$ L • Recommended for 500 and 1000  $\mu$ L pipettes**

Description	Low Retention P/N	Total Tips	Standard Retention P/N	Total Tips
1000 $\mu$ L, Bulk, 1000 tips/bag	68010-20	1000		
1000 $\mu$ L, Racked, 96 tips/rack	68010-21	576		
1000 $\mu$ L, Racked, Pre-Sterilized, 96 tips/rack	68010-22	576	68010-12	576
1000 $\mu$ L, Racked, Filter, Pre-Sterilized, 96 tips/rack	68010-23	576	68010-13	576

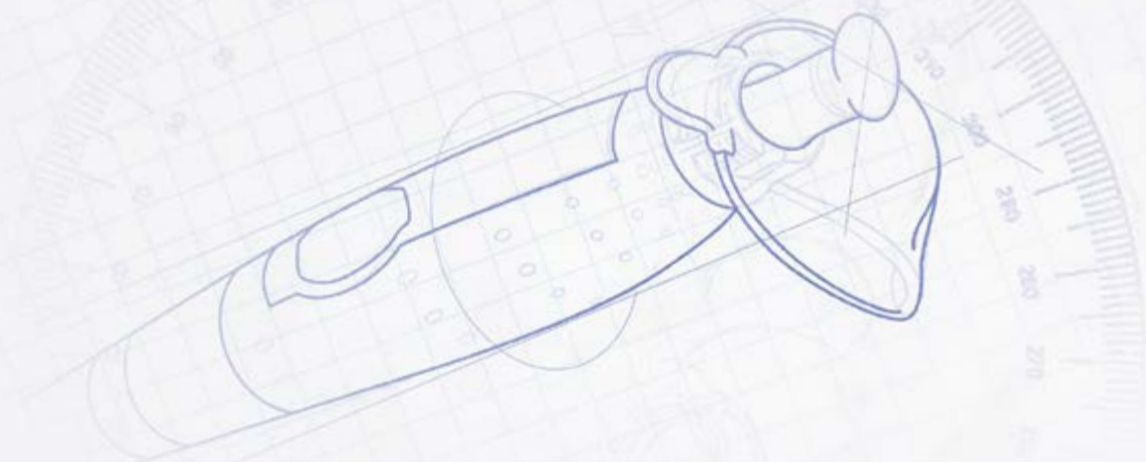




# Pipette Technical Reference

This section includes information on the care and use of Hamilton pipettes, frequently asked questions, certification, and repair services. For more information on a specific part number or application, visit our website at [hamiltoncompany.com](http://hamiltoncompany.com) or contact a local Hamilton representative.

<b>Optimize Your Pipette Performance</b>	Optimize Your Pipette Performance	P. 21
<b>Frequently Asked Questions</b>		P. 22
<b>Accuracy and Precision</b>	Performance Specifications	P. 24
<b>Pipette Calibration</b>	Calibration Procedure, Easy In-Lab Calibration for SoftGrip Pipettes, Certification, Calibration, and Repair Services	P. 26 P. 27 P. 27
<b>Sterilization and Disinfection</b>	Cleaning and Autoclaving	P. 28
<b>Replacement Parts</b>	Single Channel Pipette (2 $\mu$ L), Single Channel Pipette (5–300 $\mu$ L), Single Channel Pipette (500–1000 $\mu$ L), 50 $\mu$ L and 300 $\mu$ L Multi-Channel Pipettes	P. 29, P. 30, P. 30, P. 31







# Optimize Your Pipette Performance

Topic	Action
Consistent Technique	Pipette with a consistent rhythm, pressure, and speed.
Tip Selection	Use Hamilton pipette tips for guaranteed accuracy.
Tip Size & Fit	Use proper size tip, firmly placed on pipette shaft.
Pre-Rinse Tips	Pre-rinse pipette tips for improved precision.
Sample Aspiration	Keep the disposable tip immersed in fluid during aspiration. Do not let the plunger snap back to starting position.
Immersion Depth	Maintain an immersion depth of 2 to 4 mm.
Immersion Angle	Maintain an angle of $< 20^\circ$ from vertical.
Viscous Samples	Aspirate slowly. If bubbles are observed, resample. Volume errors may still occur. Refer to the Calibration section.
Acid Samples	Pipetting strong acids and corrosive solutions is not recommended. These liquids may damage the piston and seal. To protect the pipette, use filter barrier pipette tips and inspect piston frequently. For more information, visit <a href="http://www.hamiltoncompany.com/products/laboratory-products/pipettes-and-pipettors">www.hamiltoncompany.com/products/laboratory-products/pipettes-and-pipettors</a> .
High Vapor Pressure Samples	Pipetting solutions with high vapor pressure are not recommended. These liquids may damage the piston and seal.
Sample Temperature	Fluids at a temperature other than that for which the pipette and pipette tips have been calibrated may result in volume measurement errors.
Storage	Store upright in stand. Do not lay the pipette on its side with fluid in the tip. Fluid reaching the piston causes contamination and possible corrosion.
Cleaning Position	Wipe piston with alcohol and a soft, lint-free cloth. Dry and lightly lubricate the piston (Lubricant, P/N 5763-01).
Seal Replacement	Replace the PTFE seals every 3–6 months depending on use and the samples aspirated.
Performance Checks	Check the accuracy and precision of your pipette every 3–6 months depending on use and the samples aspirated.





# Frequently Asked Questions

Below is a list of commonly asked questions. Find your question and then turn to the page to see the answer. If your question is not listed please contact your Hamilton representative.

## Pipette Questions

- |   |  |       |   |   |       |
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| 2 | What kind of pipettes are the Hamilton SoftGrip pipettes?  | P. 23 | 6 | Where do I send my pipette for warranty repairs (USA only)?                       | P. 23 |
| 3 | Do I need to use both hands when I want to change the volume setting on my Hamilton single channel adjustable volume or the multi-channel pipette? | P. 23 | 7 | Where do I send my Hamilton SoftGrip pipettes for service repairs (USA only)?     | P. 23 |
| 4 | Is it easy to read the volume on all Hamilton SoftGrip pipettes?   | P. 23 | 8 | Why should I buy the Hamilton SoftGrip pipette instead of the other major brands? | P. 23 |



## Pipette Questions

1

### What is the warranty for the Hamilton SoftGrip pipettes?

The Hamilton Company offers a one-year warranty from date of purchase for all parts and labor on all their pipettes for manufacturer's defects.

2

### What kind of pipettes are the Hamilton SoftGrip pipettes?

The Hamilton SoftGrip pipettes include single channel adjustable volume, single channel fixed volume, and the multi-channel pipettes, and all are volume air displacement pipettes.

3

### Do I need to use both hands when I want to change the volume setting on my Hamilton single channel adjustable volume or the multi-channel pipette?

Yes. The Hamilton Company isolated the volume adjustment ring to avoid accidental volume changes and it has been design to eliminate glove snags while changing volume.

4

### Is it easy to read the volume on all Hamilton SoftGrip pipettes?

Yes. Each Hamilton SoftGrip pipette has a magnified precision micrometer and is color-coded for quick volume identification.

5

### How precise and accurate are the Hamilton SoftGrip pipettes?

The Hamilton SoftGrip pipettes have an accuracy to  $\pm 0.3\%$  of selected volume and a precision within  $+0.12\%$  of selected volume. Please see the Performance Specifications chart on page 25 for more information.

6

### Where do I send my pipette for warranty repairs (USA only)?

The Hamilton SoftGrip pipette should be sent back to Hamilton Company with prior authorization and paper work done. Hamilton Company will evaluate the pipette, and depending on the findings, will return the pipette to you when ready at no cost to you.

7

### Where do I send my Hamilton SoftGrip pipettes for service repairs (USA only)?

The Hamilton SoftGrip pipette should be sent back to Hamilton Company with prior authorization and paper work done. An estimation will be made for parts and labor. Upon customer approval of the repair estimate, the Hamilton Company will proceed with the repairs and will send the pipette back to the customer once ready and will charge the customer for servicing fees for labor, parts, and shipping.

8

### Why should I buy the Hamilton SoftGrip pipette tips instead of other leading brands for my Hamilton SoftGrip pipette?

As you already know, the quality of tips affects the pipette performance. The Hamilton company offers the Hamilton SoftGrip pipette tips which offer clean hydroscopic surfaces, absence of flash, and have consistent geometry and dimension from one lot to another. Each lot of pipette tips is tested very thoroughly according to the Hamilton Company's very strict QC rules before being released on the market.





# Accuracy and Precision

Guaranteed accuracy and precision are a function of both pipette and tip performance. Based on published specifications, the Hamilton SoftGrip pipette delivers the best overall accuracy and precision versus any other pipette brand. The SoftGrip pipette and Hamilton AdvanTip

Precision Pipette Tips create a liquid handling system designed for optimal performance. Ensure you are getting the Hamilton accuracy and precision advantage by using only Hamilton AdvanTip Precision Pipette Tips.



## High Quality Tips for High Performance

There are several key pipette tip features that are critical to accuracy and precision. Hamilton AdvanTip Precision Pipette Tips are manufactured to the exacting standards required to meet accuracy and precision specifications.



## The Difference is in the Quality

There can be tremendous differences in various pipette tips on the market that can affect the quality of precise fluid measurement. Using Hamilton AdvanTip Precision Pipette Tips guarantees maximum accuracy and precision performance.

## Clean Hydroscopic Surfaces

Hamilton tips are made from chemically resistant, virgin polypropylene to ensure excellent clarity and smooth surfaces for exceptional fluid handling and sample delivery.



## Absence of Flash (Plastic Burrs)

The presence of flash can severely diminish accuracy and precision, particularly at the tip orifice. Hamilton prevents flash with stringent specifications and tolerances for our precision tooling.

## Consistent Geometry and Dimension

Uniform orifice geometry gives consistent drop size and less liquid retention. The tip cone geometry and dimensions are designed for a perfect fit.



# Performance Specifications

## Single Channel Fixed Volume Pipettes

P/N	Volume Range	Color Coding	At 100% of Pipette Volume	
			Accuracy within ± %	Precision within + %
55019-01	5 µL	● Steel Blue	1.40	0.75
55019-03	10 µL	● Purple	0.80	0.40
55019-05	25 µL	● Forest Green	0.80	0.30
55019-07	50 µL	● Sandstone	0.60	0.30
55019-09	100 µL	● Violet	0.50	0.20
55019-11	200 µL	● Mustard	0.40	0.18
55019-13	250 µL	● Burnt Orange	0.40	0.18
55019-15	300 µL	● Brick Red	0.40	0.18
55019-17	500 µL	● Olive Green	0.40	0.18
55019-19	1 mL	● Sky Blue	0.30	0.12

## Single Channel Adjustable Volume Pipettes

P/N	Volume Range	Color Coding	At 10% of Pipette Volume		At 100% of Pipette Volume	
			Accuracy within ± %	Precision within + %	Accuracy within ± %	Precision within + %
55019-30	0.2–2 µL	● Aqua	1.40	0.75	1.40	0.75
55019-32	1–10 µL	● Purple	0.80	0.40	0.80	0.40
55019-34	2.5–25 µL	● Forest Green	0.80	0.30	0.80	0.30
55019-36	10–100 µL	● Violet	0.60	0.30	0.60	0.30
55019-38	30–300 µL	● Brick Red	0.50	0.20	0.50	0.20
55019-40	0.100–1 mL	● Sky Blue	0.40	0.18	0.40	0.18

## Multi-Channel Adjustable Volume Pipettes

P/N	Volume Range	Color Coding	At 10% of Pipette Volume		At 100% of Pipette Volume	
			Accuracy within ± %	Precision within + %	Accuracy within ± %	Precision within + %
55019-50	5–50 µL x 8	● Sandstone	2.00	2.00	0.80	0.35
55019-52	30–300 µL x 8	● Brick Red	1.20	0.70	0.50	0.30
55019-54	5–50 µL x 12	● Sandstone	5.00	2.00	1.00	0.50
55019-56	30–300 µL x 12	● Brick Red	2.40	0.70	1.00	0.50





# Pipette Calibration

Hamilton SoftGrip pipettes can be gravimetrically calibrated by the user. A universal calibration key is available so that the pipette can be adjusted to accommodate specific fluid viscosities and environmental factors such as temperature, humidity, altitude, etc.

## Calibration Procedure

Use a 5- or 6-place balance depending on the volume being measured. A 5-place balance should be accurate to within  $\pm 0.01$  mg and a 6-place balance should be accurate to within  $\pm 0.001$  mg. All items used to perform the calibration must be allowed to equilibrate to room temperature (20–25°C, constant to  $\pm 0.5^\circ\text{C}$ ).

1. Attach a disposable tip and pre-rinse the tip.
2. Set the desired or lowest volume at which the pipette will be used.
3. Make 10 measurements of distilled water per tip, recording the weights. Adjust for environmental factors, e.g., temperature, humidity, and altitude.
4. Calculate the mean and standard deviation.
5. If necessary, adjust the volume. However, adjust the volume only after confirming the error is not due to other causes. Refer to the sections on Optimizing Performance and Troubleshooting.
  - a. Remove the calibration label and locate the calibration reference mark.
  - b. Remove the plunger cap by pulling the plunger button off the pipette.
  - c. Insert the calibration key, turning the calibration key clockwise to increase volume and counter-clockwise to decrease volume. Each vertical line on the calibration key is approximately 0.2% of the pipette volume.
  - d. Remove the calibration key and replace the plunger cap. Repeat the gravimetric procedure until results are satisfactory.
6. Initial and date a new calibration label, placing the label on the pipette hilt.

The pipette can be recalibrated for liquids with a density other than water. Follow the calibration procedure above with the pipette set at the required volume. Use the liquid to be sampled. With this type of calibration adjustment, the pipette is calibrated only for the liquid used and the volume tested. The pipette should be labeled as such, and should not be used for other sampling applications unless it is recalibrated.





## Easy In-Lab Calibration for SoftGrip Pipettes

Calibration of SoftGrip pipettes is a simple procedure that requires only a single calibration key.

For complete details visit our website at [www.hamiltoncompany.com/pipettes/calibration](http://www.hamiltoncompany.com/pipettes/calibration).

### Step 1

Remove the calibration label. Initial and date a new calibration label and place on the pipette.



### Step 2

Locate the calibration reference mark and remove the plunger cap.



### Step 3

Insert the calibration key. Each vertical line on the calibration key is approximately 0.2% of the pipette's total volume.



### Step 4

Turn the calibration key clockwise to increase volume, counter-clockwise to decrease volume.



## Certification, Calibration, and Repair Services

Hamilton Company offers a program to recertify the accuracy and precision of your Hamilton pipette. Testing is performed at a Hamilton facility under stringent conditions on state-of-the-art equipment. The calibration process is performed with an unbroken chain of calibrations traceable to N.I.S.T. Your pipette will be returned to you with a new Certificate of Performance. If a pipette must be repaired to bring it into conformance, you will be contacted with a cost estimate.

To send in a pipette for re-calibration or service in the U.S.A., visit the Hamilton website or call 1-888-525-2123. For authorized service outside of the U.S.A., contact your local Hamilton Company office or representative.

#### Factory calibration includes:

- Testing under stringent conditions on state-of-the-art equipment
- Calibrations pursuant to ANSI/NCSL Z-540-1-1994, with unbroken chain of calibrations traceable to N.I.S.T.
- New Certificate of Calibration documenting test conditions, data, and results





# Sterilization and Disinfection

## Cleaning

Wipe the outer surface of the pipette daily with a mild soap and water. In case of accidental contamination of the pipette shaft, immediately remove the ejector sleeve and lower body assembly (refer to Pipette Parts Diagrams beginning on page 29). Rinse the ejector sleeve and lower body assembly with a mild soap and water followed by distilled water. Dry all components completely. Lightly lubricate the piston (Lubricant, P/N 5763-01). Hold the plunger button down to engage the piston into the seal. After reattaching the lower body assembly, attach the injector sleeve over the lower body C-ring.

## Autoclaving

The entire pipette is autoclavable at 121°C for 15 minutes at 15 psi (103.5 kPa or 1.02 atm) pressure without the need for any disassembly. However, make sure to loosen the lower body assembly by:

1. Sliding the ejector sleeve off the pipette to access the lower body assembly (refer to Pipette Parts Diagrams beginning on page 29).
2. Loosen the lower body assembly near the adjustment ring. Do not completely remove the assembly (refer to Pipette Parts Diagrams beginning on page 29).
3. Slide the ejector sleeve back over the assembly but do not reconnect it. It should be loose enough that it slides off if the pipette is turned tip-side down.

Once autoclaved, re-tighten the lower body assembly. Although autoclaving should not affect pipette accuracy, practice good laboratory procedures by checking your pipette and recalibrate as needed.



# Pipette Replacement Parts

SoftGrip pipettes can be easily serviced and calibrated in the lab. If you prefer to service your own pipette, replacement parts are readily available to ensure long pipette life. Service and calibration are also available through Hamilton; see page 27 for information on Hamilton's complete pipette service.

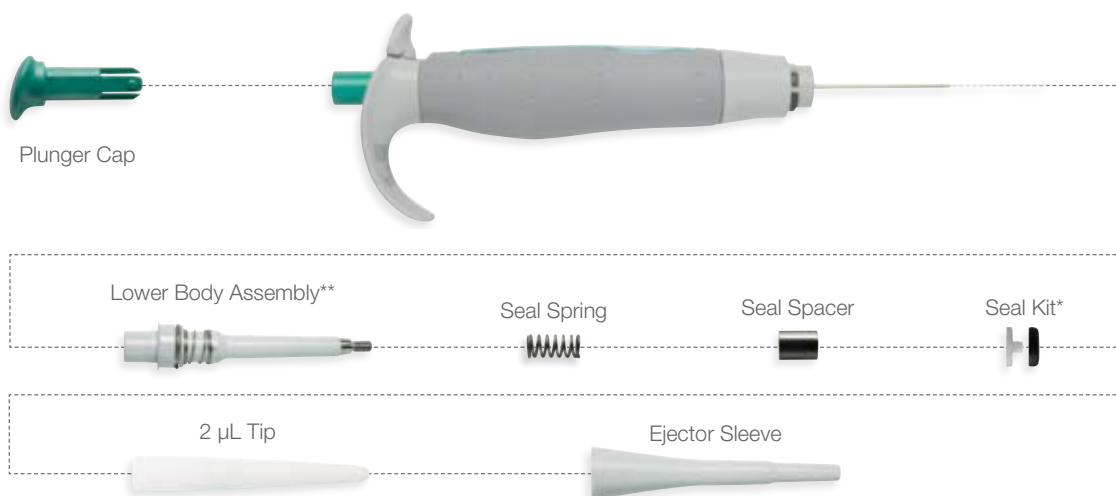
## SoftGrip™ Single Channel Pipettes

### 2 µL

Description	2 µL P/N
Plunger Cap	54190-02
Lower Body Assembly**	4118-07
Seal Spring	1288-12
Seal Spacer	4029-01
Seal Kit*	1708-79
2 µL Tip	4028-01
Ejector Sleeve	54758-01

\* Seal Kit contains 5 PTFE seals with O-rings, and 1 tube of lubricant.

\*\* Lower body assembly comes with one seal kit.





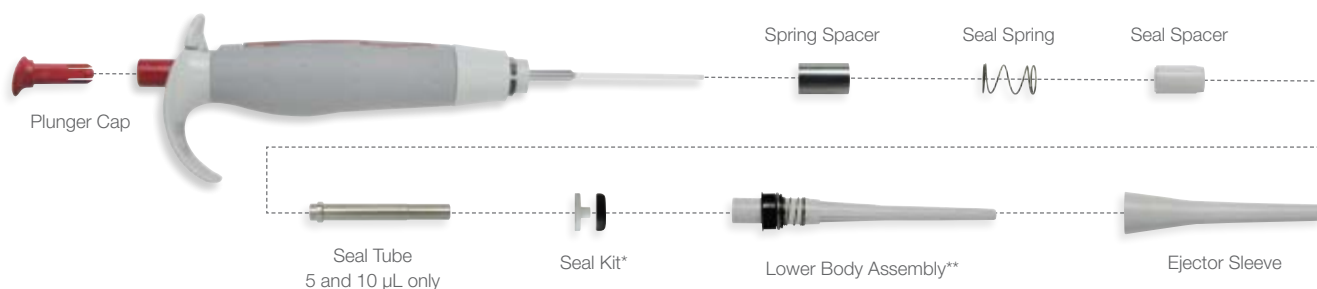
## SoftGrip Single Channel Pipettes (Cont.)

### 5–300 µL

Description	P/N							
	5 µL	10 µL	25 µL	50 µL	100 µL	200 µL	250 µL	300 µL
Plunger Cap	54190-13	54190-11	54190-03	54190-06	54190-12	54190-07	54190-08	54190-10
Lower Body Assembly**	4118-08	4118-09	4118-10	4118-11	4118-11	4118-13	4118-14	4118-15
Spring Spacer	34189 for 5–300 µL pipettes							
Seal Spring	1390-01A for 5–300 µL pipettes							
Seal Tube	34064	34064						
Seal Kit*	1708-70	1708-70	1708-71	1708-72	1708-73	1708-74	1708-75	1708-76
Seal Spacer	34106	34106	34136	34062	34062	34012	34012	34012
Ejector Sleeve	54758-01	54758-01	54757-01	54757-01	54757-01	54757-01	54757-01	54757-01

\* Seal Kit contains 5 PTFE seals with O-rings, and 1 tube of lubricant.

\*\* Lower body assembly comes with one seal kit.

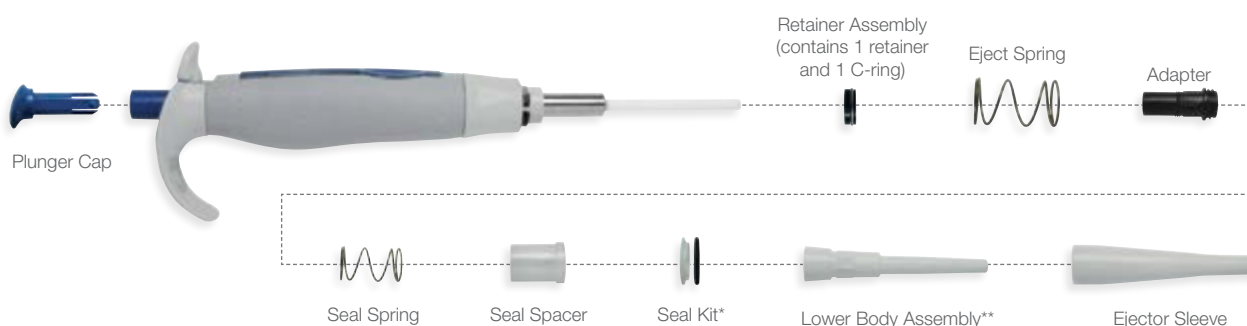


### 500–1000 µL

Description	P/N	
	500 µL	1000 µL
Plunger Cap	54190-04	54190-01
Retainer Assembly	34196	34196
Eject Spring	1288-06	1288-06
Adapter	34154	34154
Seal Spring	1288-13A	1288-13A
Seal Spacer	34132	34133
Seal Kit*	1708-77	1708-78
Lower Body Assembly**	4118-16	4118-17
Ejector Sleeve	54756-01	54756-01

\* Seal Kit contains 5 PTFE seals with O-rings, and 1 tube of lubricant.

\*\* Lower body assembly comes with one seal kit.

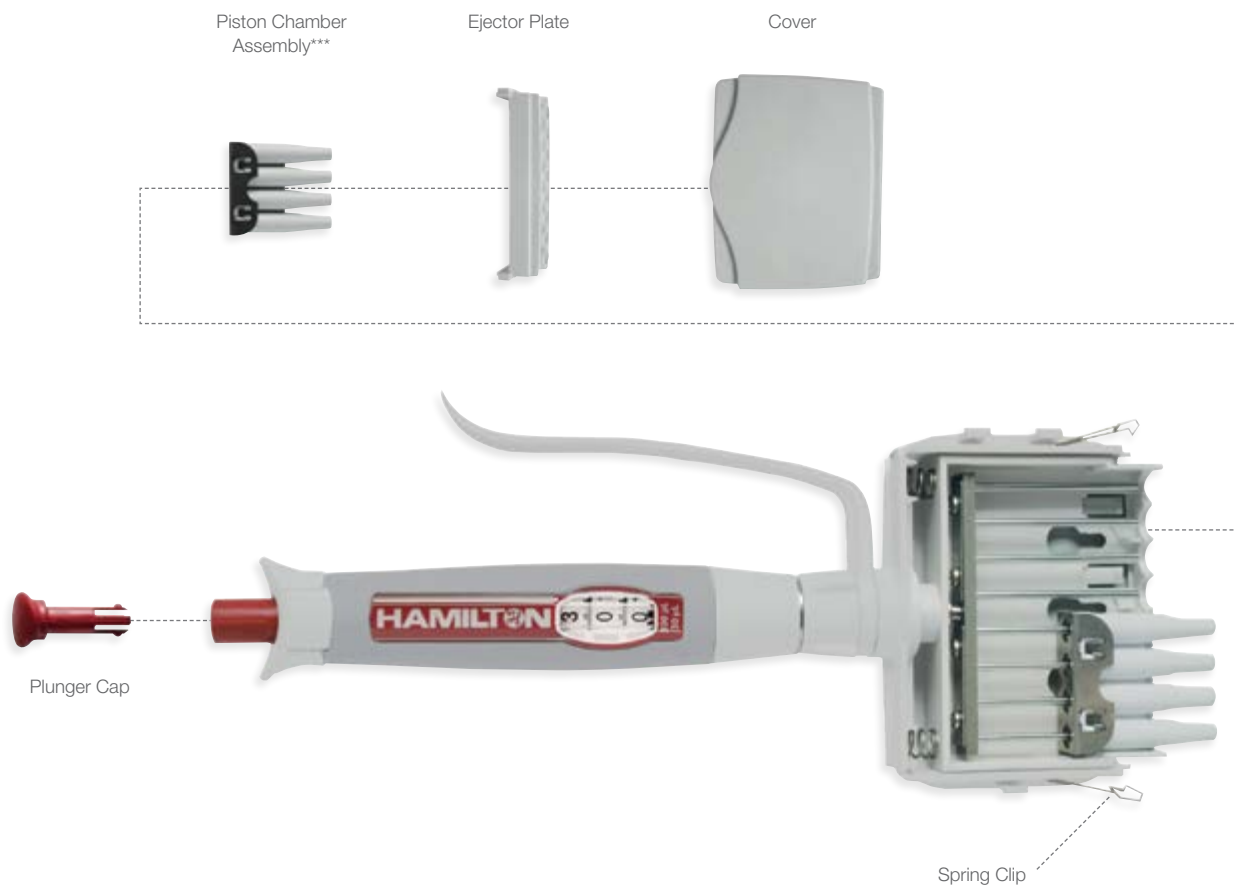


# SoftGrip™ Multi-Channel Pipettes

## 50 µL and 300 µL

Description	P/N			
	8 x 50 µL	12 x 50 µL	8 x 300 µL	12 x 300 µL
Plunger Cap	54190-06	54190-06	54190-10	54190-10
Spring Clip	34354	34354	34354	34354
Piston Chamber Assembly***	6385-01	6385-01	6385-02	6385-02
Ejector Plate	4923-01	4922-01	4923-01	4922-01
Cover	4917-01	4916-01	4917-01 </td <td>4916-01</td>	4916-01

\*\*\* Comes pre-assembled with seals installed by the factory.





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