Liquid handling: A guide to pipetting success

Boost accuracy and overcome challenges to generate results you can trust

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Introduction

Liquid handling plays a pivotal role within most laboratories, which signifies just how important it is that scientists be equipped with the knowledge they need to select the most suitable liquid handling tool to meet their research goals.

Pipetting can become problematic when inappropriate tools are used, which could lead to difficulty with handling challenging liquids such as those with high viscosity, as well as volume inconsistencies, repetitive strain injuries, and decreased productivity.

This application eBook presents a guide on how to enhance liquid handling procedures and achieve optimum results using state-of-the-art single- and multi-channel pipettors designed with comfort, ease of use, and precision in mind. You will find expert guidance on how to effectively pipette and handle difficult liquids, explore new ways and tools to improve ELISA workflows, and discover tips to streamline your pipetting technique, including insights to help increase precision and attain consistency.

Contents

Optimize your pipettor

Selecting a suitable liquid handling instrument will help save time, decrease sample contamination, and improve accuracy and productivity. Liquid handling equipment has advanced in recent years, leading to many

high-throughput screening processes that allow researchers to rapidly evaluate data. This application note introduces the many factors that must be taken into consideration when selecting a liquid handling instrument, including the common issues associated with manual pipetting processes, and the tools you need to ensure the best possible ergonomics are achieved.

The ideal combination: Accuracy & ease of use

Transferring small liquid volumes can be a daily challenge for most researchers and ultimately can make or break an experiment. Because it is vital to ensure the variation between each volume is as low as possible, accuracy is crucial. Pipetting with precision will help achieve experimental reproducibility and pave the way for attaining optimum results. Discover how the Corning® Lambda™ EliteTouch™ Pipettor has been engineered to deliver the highest level of comfort and precision, and find out how this lightweight tool is equipped with a comfortable contoured handle and a 4-digit counter, allowing you to perform at your best.

How to handle difficult liquids

Pipetting errors are common and often associated with manual pipetting procedures. Scientists that rely on manual pipetting methods may come face-to-face with several challenges, including time-consuming processes, unreliable results, and difficulty handling problematic liquids and injuries. This application note highlights solutions that can be used to overcome everyday pipetting setbacks and instruments that aim to improve your liquid handling experience and results, such as the Corning Step-R™ Repeating Pipettor. The Step-R Repeating Pipettor is designed to handle difficult liquids with ease, with no air-cushion features, for accurate dispensing.

Dispensing collagen solutions: Achieve fast and accurate dispensing

This application note highlights how to effectively perform daily pipetting rituals with the Corning Step-R Repeating Pipettor. The Step-R Repeating Pipettor was created to handle viscous liquids and those performing long dosing series, whilst facilitating rapid dispensing. For those working with Collagen, Corning also provides Collagen I, a solution to help enhance cell attachment and proliferation, or that can alternatively be used as a gel to promote the expression of cell-specific morphology and function with 90% purity.

Cell culturing: Dispensing Corning Matrigel® Matrix solutions

Cell culturing procedures are complex and associated with potential issues around environmental variability, media inefficiency, and contamination. To promote efficient and effective processes, the Corning Matrigel Matrix has been developed. Learn how the Matrigel Matrix, a solubilized basement membrane preparation, enables researchers to easily mimic in vivo environments to help achieve repeatable cell culturing results.

ELISA: Top tips for success

High sensitivity and specificity are essential for attaining diagnostic accuracy. Enzyme-linked immunosorbent assays (ELISAs) are the most common immunological assays used to measure antibodies, antigens, proteins, and glycoproteins within biological samples. Find out how to improve existing ELISA procedures using the Corning Stripwell™ microplates, providing both medium and high-binding surfaces. This application note details the range of high-quality accessories available from Corning, including buffers and pipet tips, and presents an illustrative step-by-step ELISA workflow revealing how you can improve ELISA performance for the better.

Liquid Handling Ergonomics in Every Step

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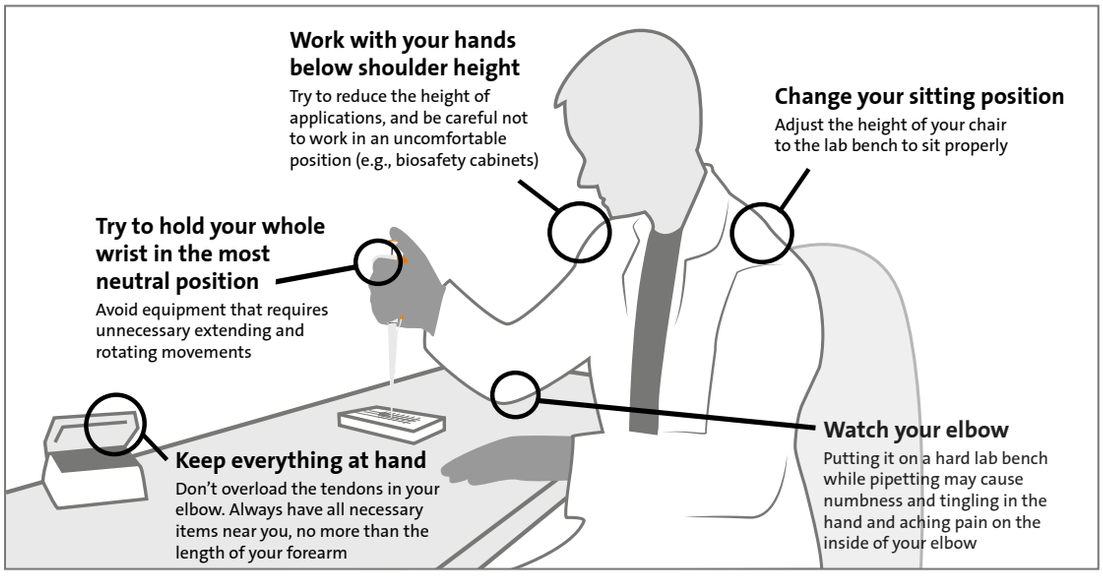
When it comes to selecting a liquid handling instrument, many factors should be taken into consideration.

Research has shown that working with a manual pipettor continuously for more than 1.5 hours can significantly increase the risk of hand and shoulder ailments known as RSI (repetitive strain injuries). Almost half of all life science lab technicians spend more than 2 hours continuously pipetting.

Therefore, the ergonomic features of the instrument, as well as the design of the workspace, are critical safety considerations for all labs.



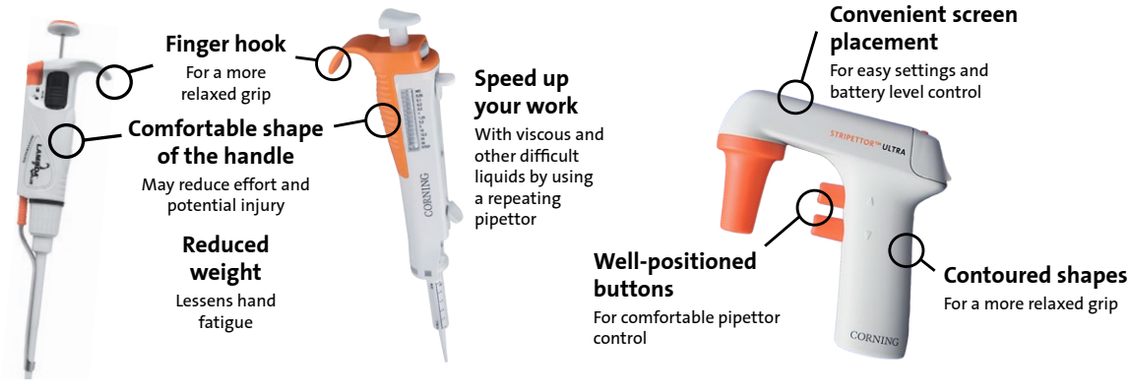
Remember also to:

Switch
Between different types of work to give wrist a break

Change your hand
To avoid unnecessary strain and reduce hand exhaustion

Move and stretch
Take care especially with your wrist and back. Try to get up every 30 minutes.

To ensure the best possible ergonomics, Corning pays close attention to product attributes that are important for comfortable and painless laboratory work:



Ergonomic liquid handling equipment and consumables available from Corning:

- Corning® Step-R™ Repeating Pipettor and Syringe Tips
- Corning Lambda™ Plus Single- and Multi-channel Pipettors
- Corning Deckworks™ Pipet Tips
- Corning Stripettor™ Ultra Pipet Controller
- Stripette™ Serological Pipets

Contact your local Corning Representative for a demonstration of products.

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Corning® Lambda™ EliteTouch™ Pipettors

Effortless pipetting and reliable results

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Corning Lambda EliteTouch pipettors have been engineered to provide the highest levels of comfort, accuracy, and precision. The lightweight construction, contoured handle, and 4-digit counter were designed to ensure comfortable pipetting. All pipettors feature smooth plunger movement and extremely low pipetting forces to reduce wrist strain and fatigue (RSI). Colored pushbuttons (included) can help identify a user or application for sample safety and lower risk of cross-contamination.

- Ergonomic handle design is a perfect fit for both the right and left hand
- Convenient one-hand volume setting with auto-lock system prevents accidental volume change during work
- 4-digit counter provides greater precision and is perfectly positioned for visibility at all times
- Single-channel pipettors are compatible with very narrow tubes
- Fully autoclavable and UV-resistant for sample protection against contaminations
- The multi-channel shafts retract individually for perfect tip loading and easier tip ejection
- Unique ejector lever system enables effortless tip ejection
- Easy in-lab calibration helps you quickly adjust your pipettor to various liquid types
- Individually tested and supplied with a certificate of quality

Starter Kit

Corning Lambda EliteTouch Starter Kit contains 4 variable volume pipettors in the most popular and universal volumes (0.5-10 µL, 2-20 µL, 20-200 µL, and 100-1000 µL), pipet stand for 4 pipettors, 3 racks with tips, and accessories.

Ordering Information

Corning® Lambda™ EliteTouch™ Pipettors

Single-channel

Cat. No.	Volume Range (µL)	Accuracy (%)	Precision (%)	Non-filtered Tip (µL)	Qty/Cs
6050	0.1 - 2	±40.0 to ±1.5	≤12.0 to ≤0.7	10	1
6051	0.5 - 10	±4.0 to ±1.0	≤2.8 to ≤0.4	10	1
6052	2 - 20	±3.5 to ±0.8	≤1.5 to ≤0.3	200	1
6053	5 - 50	±3.5 to ±0.8	≤1.3 to ≤0.3	200	1
6054	10 - 100	±3.0 to ±0.8	≤1.0 to ≤0.2	200	1
6055	20 - 200	±2.0 to ±0.6	≤0.7 to ≤0.2	200	1
6056	100 - 1000	±2.5 to ±0.6	≤0.6 to ≤0.2	1000	1

8-channel

6057	0.5 - 10	±10.0 to ±2.0	≤8.0 to ≤1.2	10	1
6058	5 - 50	±4.0 to ±1.6	≤2.5 to ≤0.6	200	1
6059	10 - 200	±5.0 to ±1.0	≤3.0 to ≤0.6	200/300	1
6060	30 - 300	±3.0 to ±1.0	≤1.5 to ≤0.6	300	1

12-channel

6061	0.5 - 10	±10.0 to ±2.0	≤8.0 to ≤1.2	10	1
6062	5 - 50	±4.0 to ±1.6	≤2.5 to ≤0.6	200	1
6063	10 - 200	±5.0 to ±1.0	≤3.0 to ≤0.6	200/300	1
6064	30 - 300	±3.0 to ±1.0	≤1.5 to ≤0.6	300	1

Corning Lambda EliteTouch Starter Kit

Cat. No.	Description	Qty/Cs
6065	Corning Lambda EliteTouch Starter Kit Includes: 4 single-channel pipettors: 0.5 to 10 µL (Cat. No. 6051), 2 to 20 µL (Cat. No. 6052), 20 to 200 µL (Cat. No. 6055), 100 to 1000 µL (Cat. No. 6056); universal linear stand for four single-channel pipettors (Cat. No. 6066); Corning DeckWorks pipet tips: 10 µL (Cat. No. 4115), 200 µL (Cat. No. 4116), 1000 µL (Cat. No. 4119); 3 colored pushbuttons (4 sets)	1

Accessories

4088	Pipettor stand for one single-channel, 8-channel, or 12-channel pipettor	1
6066	Universal linear stand for four pipettors, orange (four single-channel, maximum of two 8-channel or 12-channel pipettors)	1
6067	Universal linear stand for four pipettors, transparent (four single-channel, maximum of two 8-channel or 12-channel pipettors)	1
6068	Universal linear stand for six pipettors, transparent (six single-channel, maximum of three 8-channel or 12-channel pipettors)	1

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Guide to Pipetting Challenging Liquids

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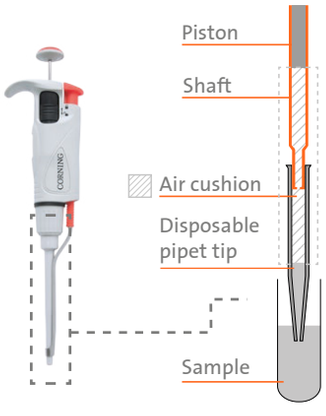
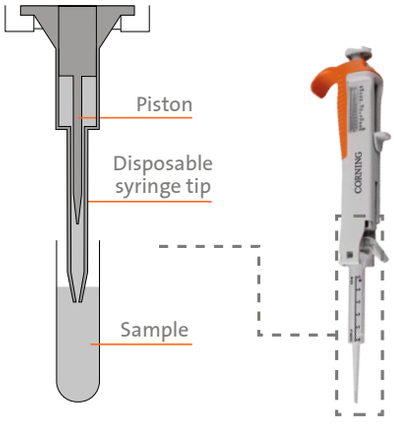
Most commonly used pipettors (e.g., Corning® Lambda™ Plus Pipettor) work based on an air-cushion principle and are perfect for most pipetting applications. However, the precision and accuracy of the pipetting results can be affected when working with liquids of different temperatures or with a different viscosity, volatility, or density than water.

In these cases, positive-displacement pipettors (e.g., Corning Step-R™ Repeating Pipettor) can improve the pipetting process and subsequent results because there is no air-cushion and no variation of the volume aspirated in response to the physical properties of samples.

Air-displacement System
Corning Lambda Plus Pipettor



Positive-displacement System
Corning Step-R Repeating Pipettor



DENSITY

Problem: Pipetted volume is smaller than expected

Example: Chloroform

Cause: Higher density liquids have greater mass per unit volume, and impose an increased gravitational force on the air space between the liquid and the piston. The increased air space results in a smaller volume of liquid being aspirated into the tip. The liquid's density influences the size of the air cushion.

Solution:
- Pipettor recalibration when air-displacement system is used
- Positive-displacement system

VISCOSITY

Problem: Inaccurate dispenses; reduced liquid volume

Example: Glycerol, Corning Matrigel® Matrix

Cause: If pipetting is too fast during aspiration, air bubbles are often formed within the aspirated liquid. Viscous liquids tend to stick to the surface of the tip, and some portion of the pipetted liquid may remain in the pipet tip. The larger the air cushion (e.g., 100 µL dispensed using a 1000 µL tip), the greater the error. The greater the dispenser tip, the lower the dispensable viscosity.

Solution:
- Reverse pipetting when an air-displacement pipettor is used
- Pipetting slowly when an air-displacement pipettor is used
- Using wide bore orifice tips
- Positive-displacement system

HIGH VAPOR PRESSURE

Problem: Droplet hanging from the tip; the pipettor drips

Examples: Acetone, acetonitrile

Cause: Vapor pressure is a property that describes how fast liquid evaporates into the atmosphere until it reaches equilibrium. All liquids exist in equilibrium between their liquid and gas states. In finding this balance, a liquid will continue to evaporate until a certain concentration is present in its surrounding atmosphere. As soon as the liquid is aspirated into a pipettor tip, evaporation begins. The resulting pressure inside the pipettor begins to build and eventually forces some of the liquid back through the tip orifice. Liquids evaporate so quickly that they increase the internal pressure of the air-displacement tips, leading to leaks of the sample. Pre-wetting the tip will help the air space in the tip to reach a concentration closer to the equilibrium point.

Solution:
- Pre-wetting at least 5 times when an air-displacement pipettor is used
- Positive-displacement system

TEMPERATURE

Problem: Pipetted volume is smaller or larger than expected

Examples: Reagents and buffers at 37°C; nucleic acid-based reagents at 4°C or lower

Cause: When a tip is inserted into a warm liquid, the air in the tip is at ambient temperature. During aspiration, the tip heats up which causes the air to expand and push liquid out of the tip. This results in less liquid being delivered than expected. With cold liquids, it has the opposite effect.

Solution:
- Pre-wetting at least 5 times when an air-displacement pipettor is used.
- Use pipettors at, or close to, the nominal volume settings (this results in better accuracy compared to using the pipettors at, or close to, the minimum specified volume setting)

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Dispensing Collagen Solutions with a Corning® Step-R™ Repeating Pipettor

Guidelines for Use

CORNING

Corning® Step-R Repeating Pipettor

The Corning Step-R repeating pipettor (Corning Cat. No. 4217) is suitable for dispensing viscous liquids, and for all applications where long dosing series are required. The fast and precise multiple dispensing enabled by the Corning Step-R repeating pipettor is particularly useful in Corning Collagen self-coating protocols for cell culture in multiwell plates or microplates. Sterile syringe tips are available in a range of sizes to dispense doses from 1 µL up to 5 mL.

Corning Collagen Solutions

Collagen I (Corning Cat. No. 354236) ships cold and should be stored at 2°C to 8°C until use. All work should be conducted in a biosafety cabinet using aseptic technique with sterile consumables and reagents.

1. In a centrifuge tube or reagent reservoir, dilute the stock Collagen with 0.02 N acetic acid to a specific working concentration. Prepare extra volume of working solution to accommodate discarding the first and last dispense step.
2. Insert the syringe tip into Step-R pipettor and click the lever to lock in place. If using the 25 or 50 mL syringe tip, attach the adapter to the syringe tip before insertion into the Step-R pipettor.

   Note: Use a syringe tip of enough volume (with the correct step size for the dispense volume) to minimize the amount times the syringe tip requires refilling.
3. Set the dial to the correct volume for dispensing.
4. Slowly draw up the Collagen solution, keeping the syringe tip in the solution as long as the solution is filling the syringe tip.
5. Dispense the first step (see Step 1) into the source container to prime the syringe tip, then slowly dispense each step to the bottom of each well.
6. If necessary, repeat Steps 4 and 5 to fill all wells.

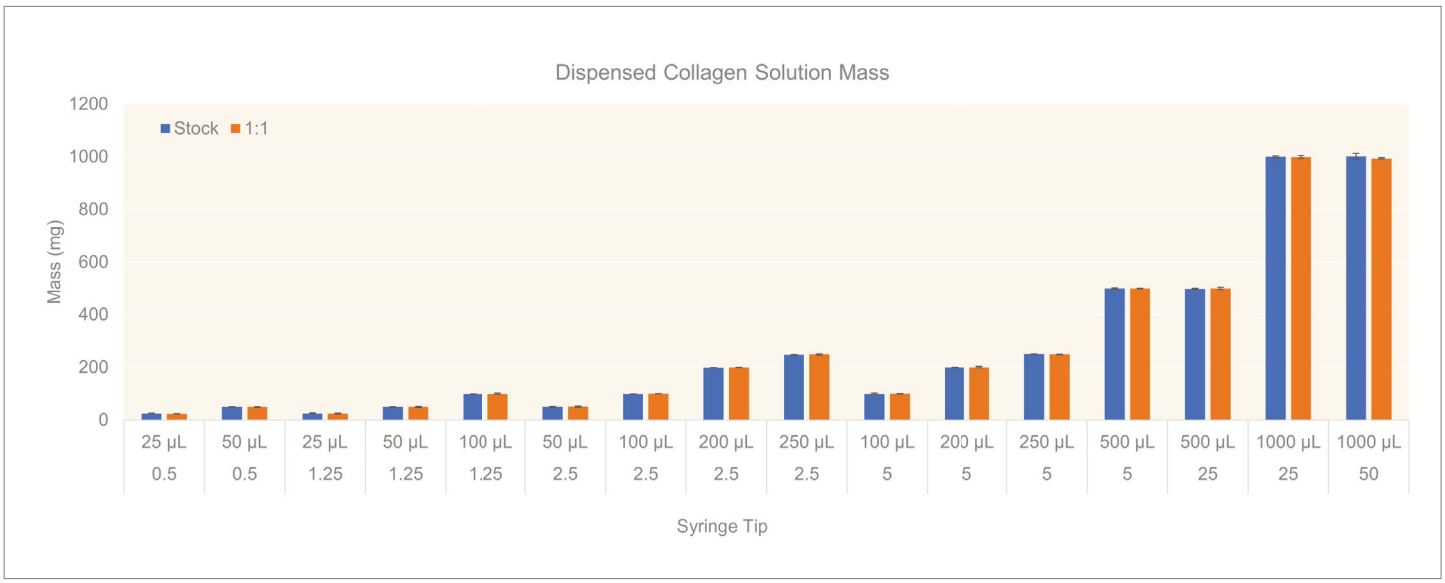

Figure 1. Mean dispensed Collagen solution mass. Stock rat tail Collagen I (approx. 3 to 4 mg/mL; Corning Cat. No. 354236) and Collagen diluted 1:1 with 0.02 N acetic acid were dispensed via multiple syringe tips into a reservoir for a total of 5 dispenses per volume. The mass of the dispensed volume was measured after each dispense. Bars = mean ± SD.

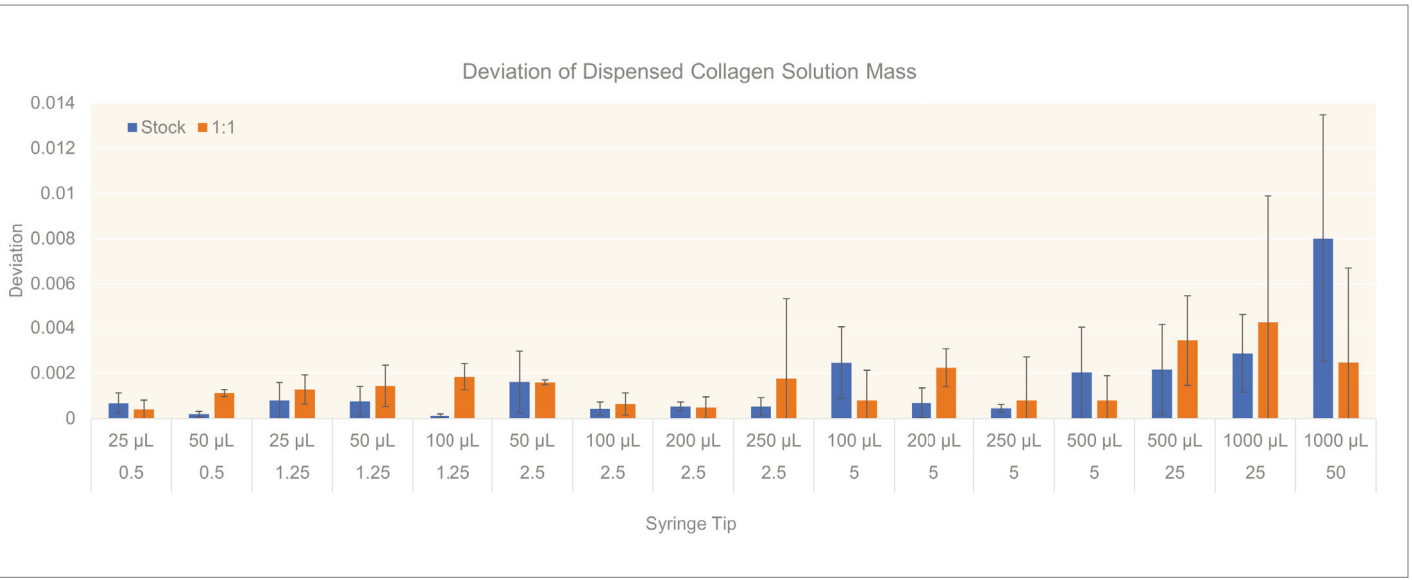

Figure 2. Mean absolute deviation of dispensed Collagen solution mass. Deviation was calculated as: |Average dispense mass – single dispense mass. Bars = mean ± SD|.

Conclusion

- The Corning® Step-R repeating pipettor supports accurate dispensing of Corning Collagen of different viscosities with a large range of dispense volumes.

References

1. Corning Step-R Repeating Pipettor (Corning Lit. Code CLS-AN-511).
2. Guide to Pipetting Challenging Liquids (Corning Lit. Code CLS-EQ-134).
3. Corning Collagen Products Frequently Asked Questions (Corning Lit. Code CLS-DL-AC-004).

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Dispensing Corning® Matrigel® Matrix Solutions with a Corning Step-R™ Repeating Pipettor

Guidelines for Use

CORNING

Corning Step-R Repeating Pipettor

The Corning Step-R repeating pipettor (Corning Cat. No. 4217) is suitable for dispensing viscous liquids, and for all applications where long dosing series are required. The fast and precise multiple dispensing enabled by the Corning Step-R repeating pipettor is particularly useful in Corning Matrigel matrix self-coating protocols for cell culture in multiwell plates or microplates. Sterile syringe tips are available in a range of sizes to dispense doses from 1 µL up to 5 mL.

Corning Matrigel Matrix

Matrigel matrix (Corning Cat. No. 354230) ships frozen and should be stored at -20°C until ready to use. Thaw Matrigel matrix overnight at 4°C on ice until ready to use. Pre-chill syringe tips, plates, and other consumables that will come in contact with Matrigel matrix at 4°C before beginning work. Remember to keep Matrigel matrix stock and dilute solutions cold until ready to polymerize. All work should be conducted in a biosafety cabinet using aseptic technique with sterile consumables and reagents.

1. In a centrifuge tube or reagent reservoir, dilute the stock Matrigel matrix with cold cell culture medium to a specific working concentration. Prepare extra volume of working solution to accommodate discarding the first and last dispense step.
2. Insert the syringe tip into the Step-R pipettor unit and click the lever to lock it in place. If using the 25 or 50 mL syringe tip, attach the proper adapter to the syringe tip before insertion into the Step-R pipettor.

   NOTE: Use a syringe tip of enough volume (with the correct step size for the dispense volume) to minimize the amount of times the syringe tip requires refilling.
3. Set the dial to the correct volume for dispensing.
4. Slowly draw up the Matrigel matrix solution, keeping the syringe tip in the solution as long as the solution is filling the syringe tip.
5. Dispense the first step (see Step 1) into the source container to prime the syringe tip, then slowly dispense each step to the bottom of each well.
6. If necessary, repeat Steps 4 and 5 to fill all wells.

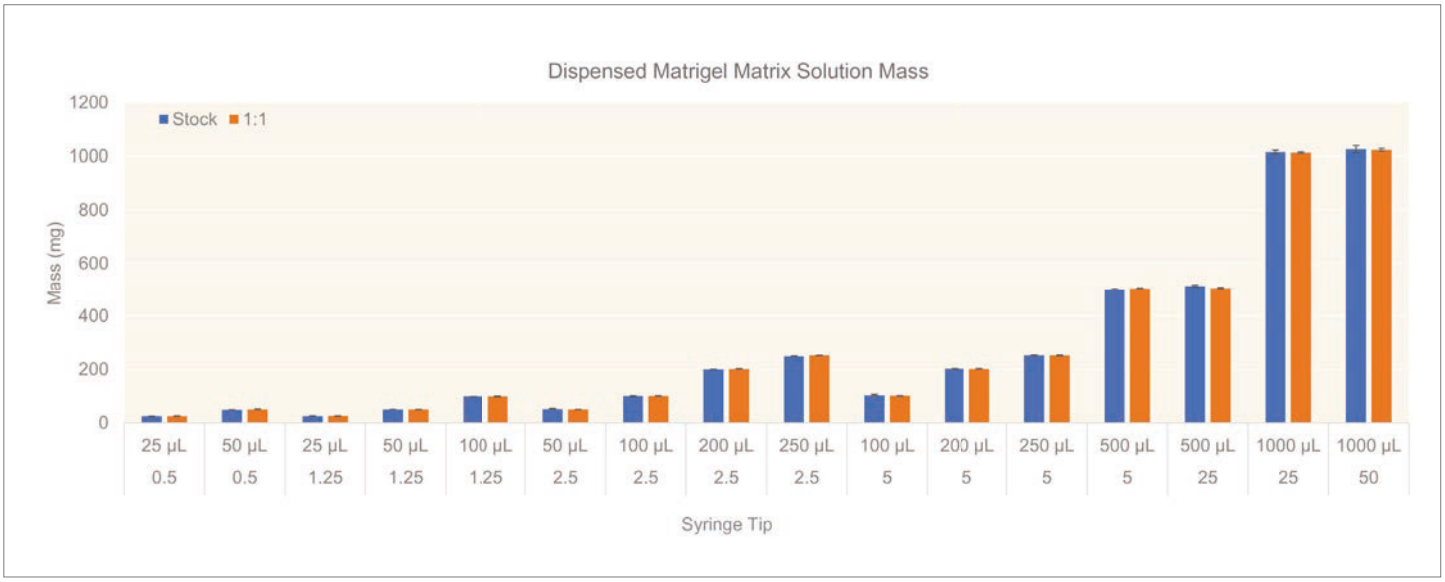

Figure 1. Mean dispensed Matrigel matrix solution mass. Stock Corning Matrigel matrix I (approx. 8 to 10 mg/mL) and Matrigel matrix diluted 1:1 with Dulbecco's Modified Eagle's Medium (DMEM) were dispensed via multiple syringe tips into a reservoir for a total of 5 dispenses per volume. The mass of the dispensed volume was measured after each dispense. Bars = mean ± SD.

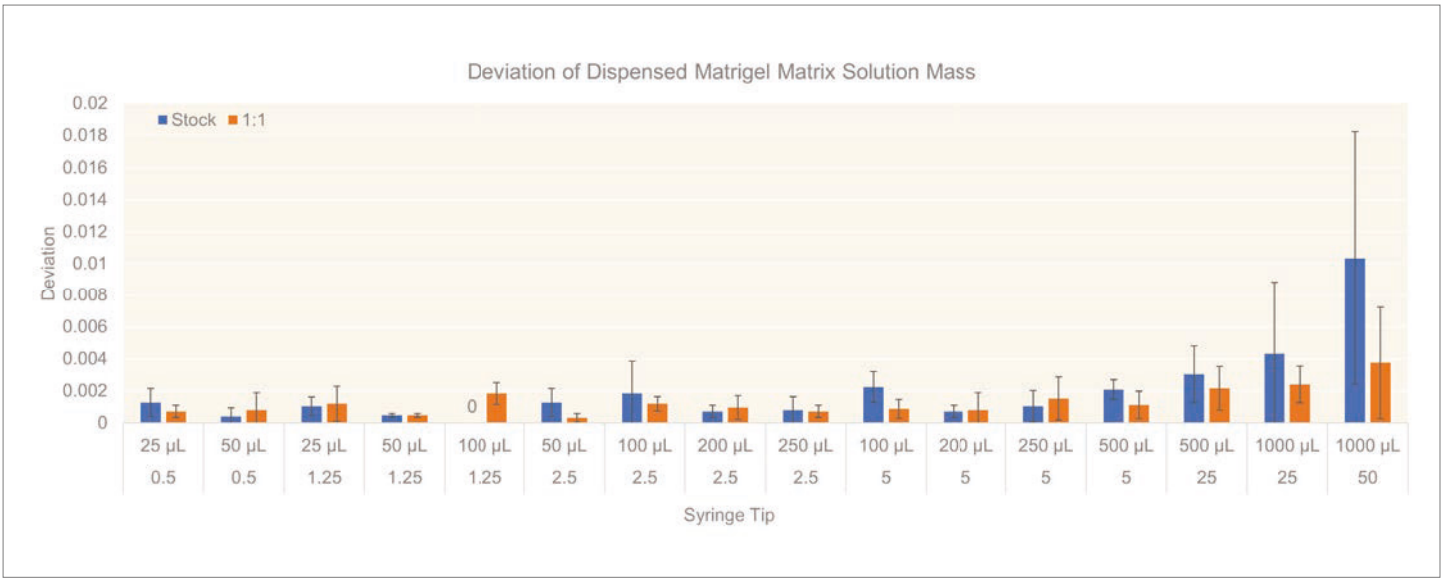

Figure 2. Mean absolute deviation of dispensed Matrigel matrix solution mass. Deviation was calculated as: |Average dispense mass – single dispense mass|. Bars = mean ± SD.

Conclusions

- The Corning Step-R repeating pipettor supports accurate dispensing of Matrigel matrix of different viscosities with a large range of dispense volumes.

References

1. Corning Step-R Repeating Pipettor (Corning Lit. Code CLS-AN-511).
2. Guide to Pipetting Challenging Liquids (Corning Lit. Code CLS-EQ-134).
3. Corning Matrigel Matrix Frequently Asked Questions (Corning Lit. Code CLS-DL-CC-026).

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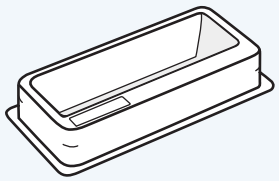
ELISA Workflow Guide

OVERVIEW

Enzyme Linked Immunosorbent Assay (ELISA) is accurate, highly sensitive, and specific for identifying protein species. ELISA microplates enable a common laboratory procedure to be carried out on multiple samples simultaneously. Popular formats include 96-well microplates, 384-well microplates, and 8-well strips.

This guide provides an overview of the tools you'll need at each stage of the ELISA workflow, as well as a few tips for choosing the optimal microplate for your particular assay. Corning is a leading manufacturer of high quality, high performance ELISA microplates and 1 x 8 Corning® Stripwell™ microplates for a wide range of laboratory assays. Corning also carries an extensive variety of accessories that can be used as part of the ELISA workflow, including a full line of buffers, pipettors, pipet tips, and tubes to meet unique assay needs.

Reservoirs



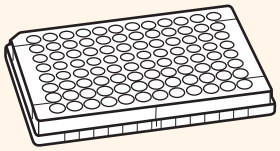
Costar® Reagent Reservoirs

- Use with multi-channel pipettors to transfer samples, buffers, or reagents into ELISA microplates

Axygen® Multi-channel Reservoirs

- Single and multiple well formats for manual and automated platforms
- Multi-channel reservoirs allow for separation of reagents during ELISA preparation

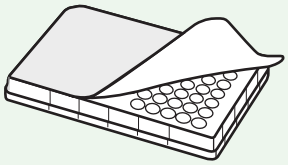
Microplates



Corning Microplates

- Available in clear, black, or white polystyrene to suit various detection methods: absorbance, fluorescence, or luminescence
- Medium or High Binding surfaces most commonly used for biochemical assays based on size of target molecule
- Additional surfaces are available to support other assay types

Microplate Seals

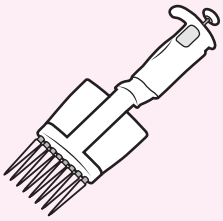


Axygen ELISA Microplate Sealing Films

- Used during repetitive incubation steps during ELISAs to reduce reagent evaporation, which can cause an "edge effect"

Corning Aluminum Microplate Sealing Tape

- Utilize during incubation steps to protect light-sensitive samples or reagents for direct and sandwich ELISA



Axygen Multi-channel pipettors

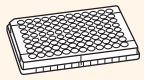
- Fully autoclavable and UV-resistant for sample protection against contaminations
- Retracking shafts for perfect tip loading and easier tip ejection
- Universal fit with all common brands of pipet tips
- Volume setting protected with a locking system

BASIC WORKFLOW

Process Step	Products Used

Select the Correct Microplate and Surface for the Application

- Well format (96-well, 384-well, 8-well strips)
- Surface chemistry (medium bind, high bind, or other surface type)
- Microplate color (clear, black, white)



Coat

- Coat the microplate surface with solution of either antigen or antibody of interest
- Incubate
- Wash to remove unbound material

Block (if required)

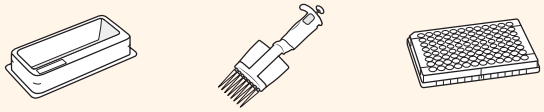
- Add protein-based solution to block unbound sites on microplate surface (BSA, Casein)
- Incubate
- Wash to remove excess blocking solution (if required)

Add Detection Substrate Solution

- Enzyme, fluorophore-conjugated Ab or direct binding
- Aluminum sealing tape (ideal for fluorescent reactions)
- Incubate at the appropriate temperature for the detection method used

Read Signal

- Add stop solution (if required)
- Measure produced signal via absorbance, fluorescence, or luminescence



PRODUCTS

For a full list of all microplates, reservoirs, multi-channel pipettors, and microplate seals, visit **www.corning.com/lifesciences.**

Microplates

Color

Clear – Best suited for absorbance detection.

Black – Low background fluorescence and low fluorescent cross-talk. The black colorant reduces background, as well as light scattering, resulting in higher signal-to-noise ratios.

White – Enhances luminescence signal-to-noise ratio by reflecting light back into the range of the detector.

Surface Chemistry

Medium Binding Surface

- Hydrophobic
- Ideal for large, hydrophobic biomolecules (>20 kD)
- Binding capacity: ~200 ng IgG/cm^2

High Binding Surface

- Hydrophobic and ionic (negatively charged)
- Ideal for positively charged biomolecules (>10 kD)
- Binding capacity: ~500 ng IgG/cm^2

Corning® ELISA Microplates

Cat. No.	Type	Color	Surface	Qty/Pk	Qty/Cs
9017	96-well, flat-bottom	Clear	Medium binding	25	100
9018	96-well, flat-bottom	Clear	High binding	25	100
3912	96-well, flat-bottom	White	Medium binding	25	100
3922	96-well, flat-bottom	White	High binding	25	100
3915	96-well, flat-bottom	Black	Medium binding	25	100
3925	96-well, flat-bottom	Black	High binding	25	100
2593	Stripwell™ 96-well, flat-bottom	Clear	Medium binding	25	100
2592	Stripwell 96-well, flat-bottom	Clear	High binding	25	100
3923	Stripwell 96-well, flat-bottom	White	High binding	25	100
3924	Stripwell 96-well, flat-bottom	Black	High binding	25	100
3700	384-well, flat-bottom	Clear	High binding	25	100
3702	384-well, flat-bottom	Clear	Not treated	25	100
3576	384-well, flat-bottom	White	High binding	10	50
3572	384-well, flat-bottom	White	Not treated	10	50
3577	384-well, flat-bottom	Black	High binding	10	50
3573	384-well, flat-bottom	Black	Not treated	10	50

Reagent Reservoirs

- Costar® reagent reservoirs are manufactured from modified polystyrene, are sterile, and disposable.
- Axygen® single- and multi-channel reservoirs are automation compatible. The multi-channel versions allow for separation of reagents, and are available with up to 12-channels.

Cat. No.	Brand	Channel	Volume	Color
4870	Costar	Single	50 mL	White
4872	Costar	Single	100 mL	White
RES-SW96-HP	Axygen	Single	240 mL	Clear
RES-MW4-HP	Axygen	Four	280 mL (70 mL/channel)	Clear

Sealing Film/Tape

- Axygen® sealing film is polyester-based with uniformly applied acrylic adhesive to reduce edge effect for sensitive ELISAs, and is suitable for short-term storage/incubation of samples and reagents.
- Corning® aluminum sealing tape is ideal for use with light-sensitive samples and reagents.

Cat. No.	Brand	Description	Dimension (mm)	Working Temp.	Qty/Pk	Qty/Cs
PCR-SP	Axygen	Polyester, 80 µm sealing film	146 x 79.6	104°C	100	500
6570	Corning	Aluminum sealing tape (96-well)	117.5 x 79.4	-80°C to 150°C	100	100
6569	Corning	Aluminum sealing tape (384-well)	137.2 x 82.5	-80°C to 150°C	100	100

Multi-channel Pipettors and Tips

- Axygen Axypet® Pro multi-channel pipettors come in a variety of configurations, are fully autoclavable, and UV resistant.
- Color-coded pipetting push buttons enable easy size identification.
- Axygen MultiRack pipet tips are free of detectable RNase, DNase, DNA, and pyrogens. Maxymum Recovery® surface ensures minimum liquid loss and aerosol filters reduce cross-contamination.

Cat. No.	Brand	Description	Pipettor Volume Range	Recommended Pipet Tip Cat. No.	Maximum Tip Volume	Tip Description
AP-8-10-P	Axygen	8-channel	0.5-10 µL	MRF-10XT-L-R-S	10 µL	Extended length, filtered, Maxymum Recovery surface, racked, sterile
AP-8-200-P	Axygen	8-channel	20-200 µL	MRF-200NX-L-R-S	200 µL	Extended length, filtered, Maxymum Recovery surface, racked, sterile

ELISA Technical Documents

Five ELISA Application Notes are available at **www.corning.com/lifesciences**.

- Immobilization Principles – Selecting the Surface for ELISA Assays (Corning Lit. Code CLS-DD-AN-454)
- Optimizing the Immobilization of Protein and Other Biomolecules for ELISA Assays (Corning Lit. Code CLS-DD-AN-455)
- Effective Blocking Procedures in ELISA Assays (Corning Lit. Code CLS-DD-AN-456)
- Optimizing the Separation Step on 96-well Microplates for ELISA Assays (Corning Lit. Code CLS-DD-AN-457)
- Selecting the Detection System – Colorimetric, Fluorescent, Luminescent Methods for ELISA Assays (Corning Lit. Code CLS-DD-AN-458)

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Featured Products

Corning Lambda EliteTouch Pipettors

Ease of use: ★★★★★ **After-sales service:** ★★★★★
Value for money: ★★★★★

Rating: ★★★★★

"We tested these Corning multichannels against others and found them the most comfortable to use."

Thomas Murante, University of Rochester

Corning Matrigel Matrix for Organoids

Ease of use: ★★★★★ **After-sales service:** ★★★★★
Value for money: ★★★★☆

Rating: ★★★★★

"High quality product and fantastic customer service."

Antonio Barbachano, CIBERONC-IIB

Corning Collagen I, High Concentration, Rat Tail, 100 mg

Ease of use: ★★★★★ **After-sales service:** ★★★☆☆
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Rating: ★★★★☆

"Perfect for 3D printing applications."

Richard Cheng, University of Toronto