

LIQUID AEROSOL DEVICES (Air-free)

► For doses up to 1ml in Rat, Guinea Pig, or Custom MicroSprayer® Aerosolizer - Model IA-1B



MicroSprayer® Aerosolizer - Model IA-1B shown with 1 ml polycarbonate syringe

Description: For fast, precise, targeted, liquid aerosol administration. Made of rigid stainless steel 19-gage tubing with rounded tip. Luer hub. Operates with a 0.5 ml precision glass, gas-tight syringe or 1-ml polycarbonate syringe (provided). Can be used with liquids, solutions or suspensions (liquid) in a wide range of formulations from small molecules to bioactive compounds.

Operates with: Commercial 0.5 ml glass or 1ml polycarbonate syringe

Syringe Capacity: 0.5ml glass or 1ml polycarbonate. (Smallest dose that can be aerosolized may need to be tested by end user.)

Particle size range: Mass Median Diameter of 23-24 µm (microns).

NOTE: Particle size analyzed with water using laser defraction method.

Outer diameter: .042" (1.1 mm) except at tip which is .048" (1.2 mm)

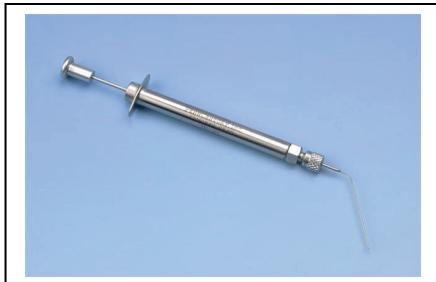
Inner diameter: .032" (.81 mm) except the passage through the patented aerosol components at the very tip, where diameter is approximately 140 microns wide.

Custom lengths: Available straight or with bend. Longer lengths may be inserted directly or via an endotracheal tube in larger species.

Re-usable/Sterilizable: Can be cleaned and sterilized with hot water, organic solvents, autoclave or ultrasound.

ITEM #	DESCRIPTION	PRICE
IA-1B-R-GL500	For Rat (2" tip) w/.5 ml glass syringe	\$775.00
IA-1B-R	For Rat w/ 1ml polycarbonate syringe	\$680.00
IA-1B-GP-GL500	For Guinea Pig (3" tip) w/.5 ml glass syringe	\$790.00
IA-1B-GL	For Guinea Pig w/ 1ml polycarbonate syringe	\$695.00
IA-1B-C	Custom length (straight or w/bend)	Ask for quote
B-SYR-GL	Extra 0.5 ml glass syringe	\$95.00
B-SYR-PL	Extra 1ml polycarbonate syringe	\$3.90

► For doses of 25-µl to 250-µl in Mouse, Rat or Custom MicroSprayer®/Syringe Assembly - MSA-250



Includes: MicroSprayer® Aerosolizer Model IA-1C and FMJ-250 High Pressure Syringe (Re-usable and sterilizable)

Description: For fast, precise, targeted liquid aerosol administration. Can be used with liquids, solutions or suspensions (liquid) in a wide range of formulations from small molecules to bioactive compounds

Syringe Capacity: 250 µl (microliters). A set of volume stops is provided with each syringe. These are attached to the plunger to permit precise doses of 25-µl or 50-µl, or combinations of those amounts. Syringe holds multiple doses.

Operates only with: Penn-Century's patented FMJ-250 Syringe (required)

Particle size range: Mass Median Diameter of 16-17 µm (microns)

NOTE: Particles analyzed with water only using laser defraction method.

ITEM #	DESCRIPTION	PRICE
MSA-250-M	For Mouse (1.25" tip)	\$1,950.00
MSA-250-R	For Rat (2" tip)	\$1,965.00
MSA-250-C	Custom length	Ask for quote

MicroSprayer® Aerosolizer (liquid) - Model IA-1C



Requires FMJ-250 High Pressure Syringe

Description: For fast, precise, targeted liquid aerosol administration.

MicroSprayer® Aerosolizer made of flexible, 23-gauge, stainless steel tubing with rounded tip. Hub: 1/4-28 tpi.

Operates only with: Penn-Century's patented FMJ-250 Syringe (REQUIRED)

Outer diameter: .025" (0.64 mm), except at the very tip which is .028" (0.71mm)

Inner diameter: .017" (.43m), except passage through the patented aerosol components at the very tip where diameter is approximately 60 microns wide.

Particle size range: Mass Median Diameter of 16-17 µm (microns)

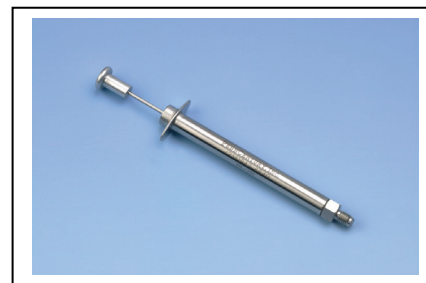
NOTE: Particles analyzed with water only using laser defraction method.

Custom lengths: Available straight or with bend. Longer lengths may be inserted directly or via an endotracheal tube or bronchoscope.

Re-usable/Sterilizable: Can be cleaned and sterilized with hot water, organic solvents, autoclave or ultrasound.

ITEM #	DESCRIPTION	PRICE
IA-1C-M	For Mouse (1.25" tip)	\$715.00
IA-1C-R	For Rat (2" tip)	\$730.00
IA-1C-C	Custom length (straight or w/bend)	Ask for quote
RCA-1C	Reverse Cleaning Adaptor (NEW**)	\$65.00

FMJ-250 High-Pressure Syringe



Required for use with MicroSprayer® Aerosolizer - Model IA-1C

Description: Unique patented design operates at 3000 psi. Constructed of stainless steel and chemically-resistant components with a replaceable plunger with a Teflon® tip. May be used with any length Model IA-1C.

Syringe Capacity: 250 µl (microliters). Two sets of volume spacers are provided with each syringe. These are attached to the plunger, and removed one by one, per instructions provided, to permit precise single doses of either 25-µl or 50-µl, or combinations of those amounts. Syringe holds multiple doses.

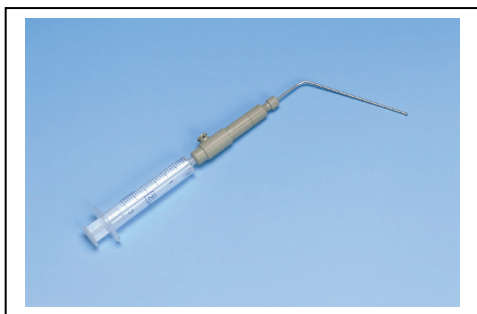
Re-usable/Sterilizable: Can be cleaned and sterilized with hot water, organic solvents, autoclave or ultrasound.

ITEM #	DESCRIPTION	PRICE
FMJ-250	FMJ-250 High-Pressure Syringe	\$1,310.00
PLU-250	Replacement Plunger for FMJ-250	\$135.00

Product / Price List

DRY POWDER DEVICES (Air syringe)

► For doses up to 5 mg in Rat, Guinea Pig or Custom Dry Powder Insufflator™ - Model DP-4



Description: For fast, efficient targeted administration of precise doses of aerosolized dry powder directly to the lungs, or for intranasal or *in vitro* uses. Device made of chemically resistant PEEK™ and silicone valves. Standard delivery tube is detachable and made of rigid, hollow stainless steel 18-gauge tubing with rounded tip.

Operates with: Commercial 3ml plastic air syringe (provided) set for correct volume for intended use per Instructions. (More than one puff of air usually required to clear 100% of dose from the device.)

Single dose range: 1-5mg (To be loaded with ONLY ONE dose at a time)

For larger single doses: 100mg Sample Chamber Extension may be attached for larger doses.

Particle size range: Dry Powder Insufflator™ can be loaded with dry powders in a very wide range of sizes from nanoparticles to large macroparticles. Device does not filter or affect powders traveling through it.

Delivery tube: Stainless steel with rounded tip. Outer diameter .050" (1.1 mm) except at rounded tip which is .058" (1.47mm).

Inner diameter: .038" (Hollow throughout)

Custom delivery tubes: Available in stainless steel - straight or with bend, or in flexible plastic tubing. Longer lengths may be inserted directly, or via an endotracheal tube or bronchoscope in larger species.

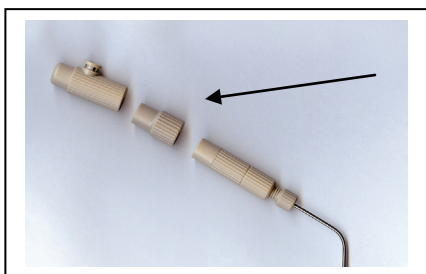
Reusable/Sterilizable: Stainless steel tip detachable and autoclavable.

NOTE: **Dry methods of cleaning only recommended for main PEEK™ device

ITEM #	DESCRIPTION	PRICE
DP-4-R	For Rat (2" tip)	\$780.00
DP-4-GP	For Guinea Pig (3" tip)	\$795.00
DP-4-C	Custom length stainless steel or flexible plastic delivery tubes	Ask for quote

Extra delivery tubes only for Model DP-4

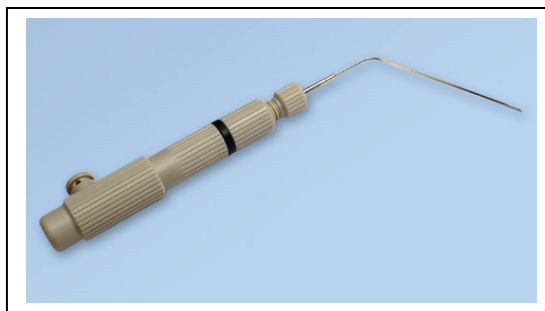
DP-EXT-R	For Rat (2" tip)	\$255.00
DP-EXT-GP	For Guinea Pig (3" tip)	\$270.00
DP-EXT-C	Custom length stainless steel or flexible plastic delivery tubes	Ask for quote



Model SC-X
100 mg Sample Chamber Extension

\$98.00
Extends sample chamber capacity for larger single doses with Model DP-4

► For doses up to 2 mg in Mouse Dry Powder Insufflator™ - Model DP-4M for Mouse



Description: For fast, efficient targeted administration of precise doses of aerosolized dry powder directly to the lungs in mice, or for intranasal or *in vitro* uses. Device made of chemically resistant PEEK™ and silicone valves. Standard delivery tube made of rigid, hollow stainless steel 18-gauge tubing with rounded tip.

Operates with: Until recently, the Dry Powder Insufflator™ for Mouse – Model DP-4M was offered with our own Air Pump – Model AP-1 for precise, rapid administration of puffs of air of no more than 200 µl. This Air Pump is no longer available due to changes in essential parts by our suppliers. It is possible to operate the Model DP-4M with a 3 ml air syringe. The use of the Model DP-4M mouse with an air syringe, however, will require additional practice and care to avoid excessive hand motion during repeated administrations of air, as well as other considerations. (Contact us directly for additional information.)

Single dose range: 1-2mg (To be loaded with ONLY ONE dose at a time)

Particle size range: The Dry Powder Insufflator™ can be loaded with dry powders in a very wide range of sizes from nanoparticles to large bioactive macroparticles. Device does not filter or affect powders traveling through it.

Delivery tube: Stainless steel with rounded tip. Outer diameter is .025" (.63 mm) except at rounded tip which is .028"

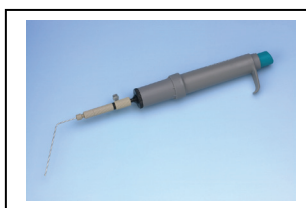
Inner diameter: .020" (Hollow throughout)

Reusable/Sterilizable: Stainless steel tip detachable and autoclavable.

NOTE: Dry methods of cleaning preferred for main PEEK™ device.

ITEM #	DESCRIPTION	PRICE
DPM-APA	Dry Powder Insufflator™/Air Pump Assembly	N/A**
DP-4M	Dry Powder Insufflator™ for Mouse	\$890.00
DPM-EXT	Extra delivery tube only for DP-4M	\$340.00

**Air Pump - Model AP-1



For rapid application of air pulses to Model DP-4 or Model DP-4M

**NOTE: The Air Pump – Model AP1 is no longer available for purchase due to discontinuation of essential parts by our supplier. We are developing a new, hand-held Air Pump Model AP-2 for rapid applications of precise volumes of air for use with our Dry Powder Insufflator™ Model DP-4 or Mode DP-4M.

- Both the Dry Powder Insufflator™ Model DP-4 or Mode DP-4M remain available for purchase.
- The Model DP-4 has been widely used with the 3 ml air syringe.
- The Model DP-4M may be operated with a 3 ml air syringe for applying 200 microliter puffs of air, but intratracheal use requires considerable practice and skill.

A new Air Pump will be available after development and testing to assure it meets our quality standards. To obtain more detailed information on use of the Dry Powder Insufflator®, technical support information and updates, contact us at: info@penncentury.com

New!! Combination Kit



Save on everything you need for a liquid intratracheal aerosol study in mice

MicroSprayer® Aerosolizer Pulmonary Aerosol Kit for Mouse (Liquid)

- MicroSprayer® Aerosolizer - Model IA-1C-M
- FMJ-250 High-Pressure Syringe -250-µl capacity
- Small Animal Laryngoscope for Mouse
- Mouse Intubation Platform

ITEM #	PRICE
PAK-MSA	\$3,825.00

ACCESSORIES

For easier intratracheal dosing



For easier liquid or dry powder intratracheal aerosol administration

Small Animal Laryngoscope - Model LS-2

Description: Designed to clearly illuminate the trachea and epiglottis for easier, faster intubation and insertion of a Penn-Century MicroSprayer® or Dry Powder Insufflator™. Now with a fiberoptic LED light source for clear, bright illumination. Each device comes with a removable, custom-made small, tapered stainless steel blade for moving aside the animal's tongue. (Specify which animal when ordering). Easy-grip handle with curved ergonomic shape fits securely in the palm of the hand. Coated with non-slip Santoprene™ rubber. Operates with one 3-volt lithium battery (included). Sterilizable. Autoclavable.

ITEM #	DESCRIPTION	PRICE
LS-2-M	LED Handle and Blade Assembly for Mouse	\$1,235.00
LS-2-R	LED Handle and Blade Assembly for Rat	\$1,240.00
LS-2-GP	LED Handle and Blade Assembly for Guinea Pig	\$1,245.00
Combo Kit (NEW**):		
LS-2-M/R	LED Handle with Blades for Mouse and Rat	\$1,870.00
LS-2-C	For larger species	Ask for quote

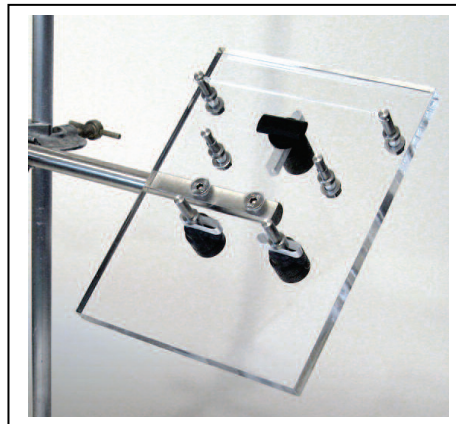
Laryngoscope Blade Assembly Only - Model LS-BA

Order additional blade assemblies for other size animals. Can be attached to any LS-2 Handle. The Blade Assembly is comprised of:

- A green plastic and metal fitting which securely attaches the Blade Assembly to the laryngoscope handle
- A stainless steel light pipe that holds a fiber-optic bundle (The LED light source is housed in the LS-2 Handle.)
- A stainless steel blade tip used to gently push aside the animal's tongue to better visualize the trachea and epiglottis

ITEM #	DESCRIPTION	PRICE
LS-BA-M	Blade Assembly with tip for Mouse	\$650.00
LS-BA-R	Blade Assembly with tip for Rat	\$655.00
LS-BA-GP	Blade Assembly with tip for Guinea Pig	\$660.00
LS-BA-C	For larger species	Ask for quote

Mouse Intubation Platform - Model MIP



Attaches to any lab clamp stand (not included)

Description: Specially designed to assist researchers working with Penn-Century intratracheal aerosol devices or intubation procedures in mice. The Mouse Intubation Platform provides a simple, durable, lightweight, easy-to-use system for supporting the anesthetized mouse during intubation and/or insertion of our aerosol delivery devices.

Features: Adjustable to the preferred height, angle or work surface of the user. Solid Plexiglass®/Perspex® base and stainless steel support rod, easily attached to any standard lab clamp stand (not included).

- Special tilt and swivel neck support permits user to straighten the neck position and optimize ease of insertion and visualization of the trachea.
- Stainless steel posts with plastic "wire" maintain the anesthetized animal in the correct position for intubation, suspended from the front incisors.
- Two side posts to secure the mouse on its back with a rubber band.
- Additional, adjustable stainless steel side posts prevent lateral movement of the mouse during intubation

Specifications:

Platform dimensions: 4.5" x 6 1/8 x 3/8" (15 x 23 x 6 cm)

Stainless steel support rod: 8" (20 cm)

Weight: 15.6 oz with support rod - (450 gr)

ITEM #	DESCRIPTION	PRICE
MIP	Mouse Intubation Platform	\$690.00

NOTE: Platform can be attached to any lab clamp stand (NOT INCLUDED)

Penn-Century, Inc.

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Wyndmoor, PA 19038-8031 USA

215-753-6540 Tel

215-220-3040 Fax

www.penncentury.com

NOTE: All prices in US Dollars.

Contact us for a quote at info@penncentury.com or 215-753-6540



Custom device questionnaire

All Penn-Century aerosol drug delivery devices are available in custom length for intratracheal or other uses in larger species, in other locations of the body, or in *in-vitro*, *ex-vivo*, or other experimental laboratory set-ups. Examples of custom devices include longer devices for: rabbits, ferrets, dogs, cats, chickens, pigs, sheep, monkeys, horses, etc.

For optimal aerosol deposition in the lung, the device must be measured so the tip reaches to the carina (first bifurcation). In larger animals it may also be possible to insert the device in one lung, if desired.

To assure that we have sufficient information to provide you with a device that will best suit your needs, we will need the following information. **Please consider this information carefully, and ask questions if you need guidance, as these devices are manufactured for you specifically. Once production begins, orders cannot be changed, and custom length devices cannot be returned or exchanged.** To obtain a quote for a custom length MicroSprayer® Aerosolizer or Dry Powder Insufflator™, please complete the following form and send it to Penn-Century by fax at 215-220-3040. Or scan and send it to us as an email attachment to: info@penncentury.com.

1. What animal do you plan to use for your study? _____ OR Do you plan an *in vitro* set-up? (No animal used) _____
2. If using an animal, will the animal grow bigger, mature, or change in size during the course of your study? _____
3. What type of material do you plan to administer? ___ liquid ___ liquid solution/particle suspension ___ dry powder
4. Approximately what dose volume are you planning to administer per animal? _____
5. Where do you plan to insert the device? (check one)
 - ___ directly in the trachea by itself?
 - ___ into the trachea through an endotracheal tube or catheter?
 - ___ into the trachea through a bronchoscope/endoscope?
 - ___ into another location of the body (i.e. intranasal, sinuses, colon, stomach, vagina, cervix, etc.)? Specify: _____
 - _____
 - ___ *in vitro* or other lab set-up? Describe: _____
 - _____
6. Have you ever used a Penn-Century intratracheal device before? _____
7. If so, which Penn-Century device did you use? _____ In which animal? _____
8. Have you ever intubated an animal? _____ If so, what animal? _____
9. Does the size or anatomy of the animal, or your lab equipment require the intratracheal portion of the device to be:
 - ___ flexible ___ rigid ___ Not important
10. Does the size or anatomy of the animal or your lab application require the intratracheal portion of the device to be:
 - ___ straight ___ with a standard 120-degree bend ___ Not important
11. Do you plan to insert the device: ___ up to the carina/first bifurcation only ___ past the carina into one lung?
12. Approximate measurement (in inches or centimeters) from the front incisor of the animal to the carina? ___ in ___ cm
13. What disease are you studying? _____
14. What is the general goal of your study? _____

15. If you are able, please tell us what material you plan to administer. _____
16. If you are not able to name the formulation, please describe the characteristics of your formula:
- a. IF A LIQUID? Is your formula viscous/thick? If your formula is a suspension or solution, please describe size of particles and other attributes. (NOTE: When using Penn-Century MicroSprayer® Aerosolizers, the drug or formula passes through patented aerosolizing components in the tip that may clog or block the tip after repeated use, or effect your particular formulation in some way. You may not be able to determine this in advance without buying the device and doing a feasibility study.) _____
 - b. IF A DRY POWDER? Approximate particle size? Stickiness? Does it rapidly absorb moisture?

 - c. Pharmaceutical (small molecule) vs Biological/bioactive? _____
 - d. Nanoparticle/microparticle? _____

Please print your contact information clearly:

Name _____ Position/Responsibility _____

Organization _____ Address _____

Dept or Lab _____ Email _____

Phone _____

To obtain a quote for a custom length MicroSprayer® Aerosolizer or Dry Powder Insufflator™, please complete the following form and send it to Penn-Century by fax at 215-220-3040. Or scan and send it to us as an email attachment to info@penncentury.com.