

Needles

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Needles

Hamilton needles are manufactured with top quality materials and skilled workmanship ensuring the highest possible performance for reliable analyses. With proper care and handling, Hamilton needles provide unsurpassed performance.

Introduction

Product finder tutorials to simplify finding the right needle. Not familiar with the terminology? Visit the Needle 101 section for definitions and terminology.



Introduction

P. 96

Needles

Needles are grouped based on needle type such as Luer Lock, Removable Needles, Specialty Needles, and Needle Cleaning Accessories.



Needles

P. 102

Needle Technical Reference

This section contains the most frequently requested needle reference information including: needle care and use, sterilization and disinfection, and needle dimensions.



Needle Technical Reference

P. 114



Find Your Product

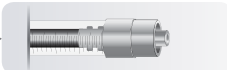
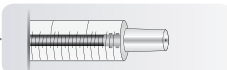
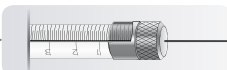
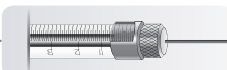
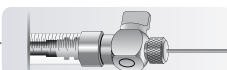
I have a syringe, which needle do I need?

If you already have a syringe and need a Hamilton needle, review the three options below to determine which needle hub is compatible with your syringe. Once the needle hub is identified turn to the corresponding page to browse the available needle gauges, lengths, and point styles.

Option 1

I already know my syringe termination

Below are the syringe terminations that accept replacement needles. Identify your termination below and proceed to the corresponding needle hub page to see the compatible needle part numbers.

Terminations		Needle Hubs	Page
TLL - PTFE / Luer Lock		Kel-F Hub Metal Hub	P. 105 P. 106
LT - Luer Tip		Kel-F Hub	P. 105
RN - Removable Needle 100 µL or Smaller		Small Hub RN	P. 109
RN - Removable Needle 250 µL or Larger		Large Hub RN	P. 108
SL - SampleLock		Large Hub RN	P. 108

Option 2

I know my syringe part number, but not the termination

If you know the syringe part number but do not know what termination it has, you can look up the part number in the index at the back of this guide. You will be directed to the page where the part number is displayed, indicating the syringe termination. Alternatively, you can search for the part number at www.hamiltoncompany.com where the product page will list the termination and the compatible needle hub. Once the termination is determined use Option 1 to find the page where the appropriate needles are listed.

Option 3

I have a plastic syringe and need a compatible needle

Many plastic syringes use an industry standard Luer or Luer Lock connector. For these syringes both the Hamilton Metal Hub (page 106) and the Kel-F Hub (page 105) needles are compatible.

A photograph of two clear plastic syringes. The syringe in the foreground is angled towards the left, showing its plunger and a black Luer Lock connector at the tip. The syringe in the background is angled towards the right, also showing its plunger and a black Luer Lock connector. Both syringes have graduated scales on their barrels.





Needles 101:

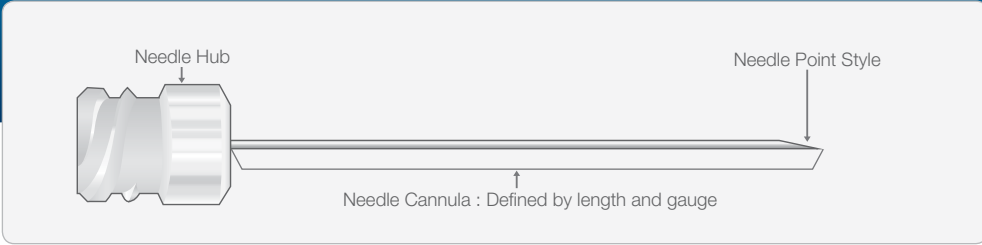
Definitions and Terminology

This section is designed to provide an overview of the different types of needles that Hamilton offers including a discussion of hub

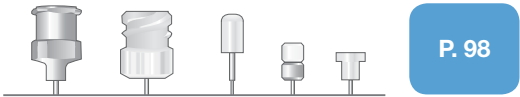
styles, needle point styles with a discussion on calculating the bevel length, needle lengths, and choosing a needle gauge for an application.

Anatomy of a Needle

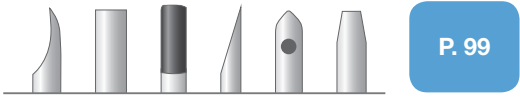
The needle hub is attached to the needle cannula and is used to connect the needle to a syringe, tube, or fitting. The opposite end of the needle is shaped into a needle point style that is appropriate for the application.



Needle Hub Styles



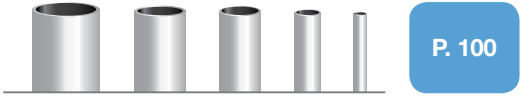
Needle Point Styles



Specifying Needle Length



Choosing the Appropriate Gauge



Needle Hub Styles

The tables below discuss the different hub styles that Hamilton offers.

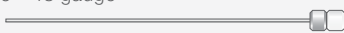
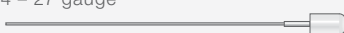
Luer Lock Needle Hubs

Designed to fit any standard Luer or Luer Lock syringe or fitting.

	Needle Hub Style	Needle Gauge	Compatible with:
Metal Hub Needle		33 – 10 gauge	25 µL to 2 L – PTFE Luer Lock (TLL) Syringes
Kel-F Hub Needle		31 – 10 gauge	25 µL to 2 L – PTFE Luer Lock (TLL) Syringes 10 µL to 10 mL – Luer Tip (LT) Syringes

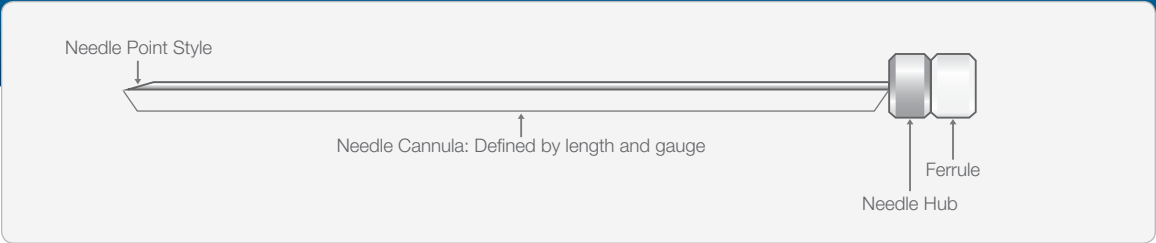
Removable Needle Hubs

Seated at the zero line of the syringe, minimizing dead volume, and enabling complete priming of small volume syringes. The difference between a Small and Large Hub Removable Needle (RN) is the outer diameter of the hub and ferrule. There are two versions of the Small Hub RN because at smaller than 27 gauge the tubing wall is too thin to stake the hub in place.

	Needle Hub Style	Needle Gauge	Compatible with:
Small Hub Removable Needle	26 – 18 gauge 	34 – 18 gauge	2.5 µL to 100 µL – Removable Needle (RN) Syringes
	34 – 27 gauge 		
Large Hub Removable Needle		26s – 20 gauge	250 µL to 10 mL – Removable Needle (RN) Syringes 50 µL to 100 mL – SampleLock (SL) Syringes

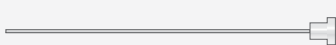
Detachable Ferrules

Some Removable Needles have a detachable ferrule as shown below.



Valve Port Needle Hubs

Used to connect the needle to a tubing port on a Hamilton valve.

	Needle Hub Style	Needle Gauge	Compatible with:
Hat Needle		26 – 14 gauge	Connected directly to a ¼"-28 flat bottom valve port using needle bushing part number 35056



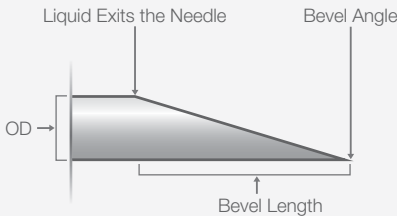
Needle Point Styles

Hamilton offers several different needle point styles depending on the intended application. For most syringes and needles, the standard length is 51 mm. Customization of the needle gauge, length, and point style is possible to suit almost any application.

ID	Point Style	Description	Application	Gauges
2		10 – 12° sharp, beveled, curved non-coring	Gas Chromatography (GC), septum piercing	33 – 10 ga
3		Blunt, electro-polished	High Performance Liquid Chromatography (HPLC) injection, Thin-Layer Chromatography (TLC), general liquid handling, controlled animal injections	34 – 10 ga
3T		Blunt, electro-polished, coated with PTFE 19 mm from the tip	Thin-Layer Chromatography (TLC) applications	26s, 22s, and 22 ga
4		Sharp 10 – 12° beveled needle; other angles available upon request	Life science/animal injections	34 – 10 ga
5		Conical with side port for penetration without coring	Headspace, applications prone to needle clogging, causes minimal septum damage	26 – 10 ga
AS		Conical, non-coring designed to withstand multiple injections	Autosampler injection, pre-pierced septa	26 – 10 ga

Calculating Point Style 4 Bevel Length

Neuroscience injections require precise positioning of the needle in the brain. Liquid exits the needle from the start of the bevel so knowing the bevel length is critical. It is possible to calculate the bevel length by knowing the outer diameter (OD) of the needle tubing and the bevel angle.



$$\text{Bevel Length} = \frac{\text{OD}}{\tan(\text{Bevel Angle})}$$

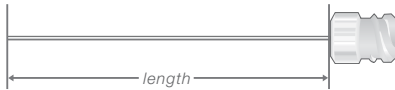
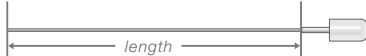
For example: A 27 gauge needle (OD = 0.413) with a point style 4 beveled at 30 degrees:
Bevel length= 0.413 mm / tan30=0.715 mm



Specifying Needle Length

The needle length for most standard Hamilton needles is 51 mm ± 1 mm. If a custom length is desired, it is critical to understand how to specify the desired length. The table below shows the length that is specified when ordering each hub style.

Custom needles are available in lengths from 10 mm to 304 mm. If a longer needle is required, contact your local representative to determine available possibilities.

Hub Style	Length Determination	Image
Metal Hub Needle	Needle length is specified from the needle point to the start of the hub.	
Kel-F Hub Needle	Needle length is specified from the needle point to the start of the hub.	
Standard RN Hub Needle	Needle length is specified from the needle point to the start of the RN nut. The distance from the needle point to the hub is Length + 1.8 mm.	
Small Gauge RN Hub Needle	Needle length is specified from the needle point to the start of the support sleeve.	
Hat Hub Needle	Needle length is specified from the needle point to the end of the hub.	

Choosing the Appropriate Gauge

Needle gauge specifies the outer diameter of the tubing used to make the needle. As the needle gauge increases the outer diameter of the needle decreases, i.e. 10 gauge is larger than 33 gauge. The same gauge tubing is available with different wall thicknesses resulting in different inner diameters. Hamilton designates the thick wall version of the tubing by adding an “s” to the gauge. For example, 26s is the thick walled version of 26 gauge tubing. To see the dimensions of the tubing Hamilton uses for needles, turn to the Gauge Index on page 119.

Considerations for Syringes 250 µL and Smaller

For syringes 250 µL and smaller it is recommended to use the “s” gauge tubing and a Cemented or Removable Needle. With small volume syringes the needle dead volume becomes critical. If the dead volume is too large it will be difficult to prime the syringe. If a thick walled version of the desired gauge is not available or if a Luer Lock hub is desired, special priming techniques may be required. Ideally the dead volume will not exceed 20% of the syringe’s nominal dispense volume.

What is Dead Volume?

Dead volume is defined as the volume of solution that remains in the needle after an injection. To achieve a precise dispense the dead volume must be completely primed with sample by rapidly filling and dispensing until the air bubbles are flushed from the system. Once primed the dead volume does not contribute to the volume aspirated or dispensed by the syringe.





Choosing the Appropriate Gauge (Cont.)

Calculating Needle Dead Volume

The dead volume and dimensions of the needle tubing are listed in the Gauge Index (page 119). The dead volume can be calculated by the equation $(\text{inner diameter}/2)^2(\pi)(\text{needle length})$. Add this to the dead volume of the needle hub to get the needle's total dead volume. For a Metal or Kel-F Luer Lock Needle connected to a Hamilton syringe add 10 μL , and for a Removable Needle there is no additional dead volume.

Considerations for Syringes 500 μL and Larger

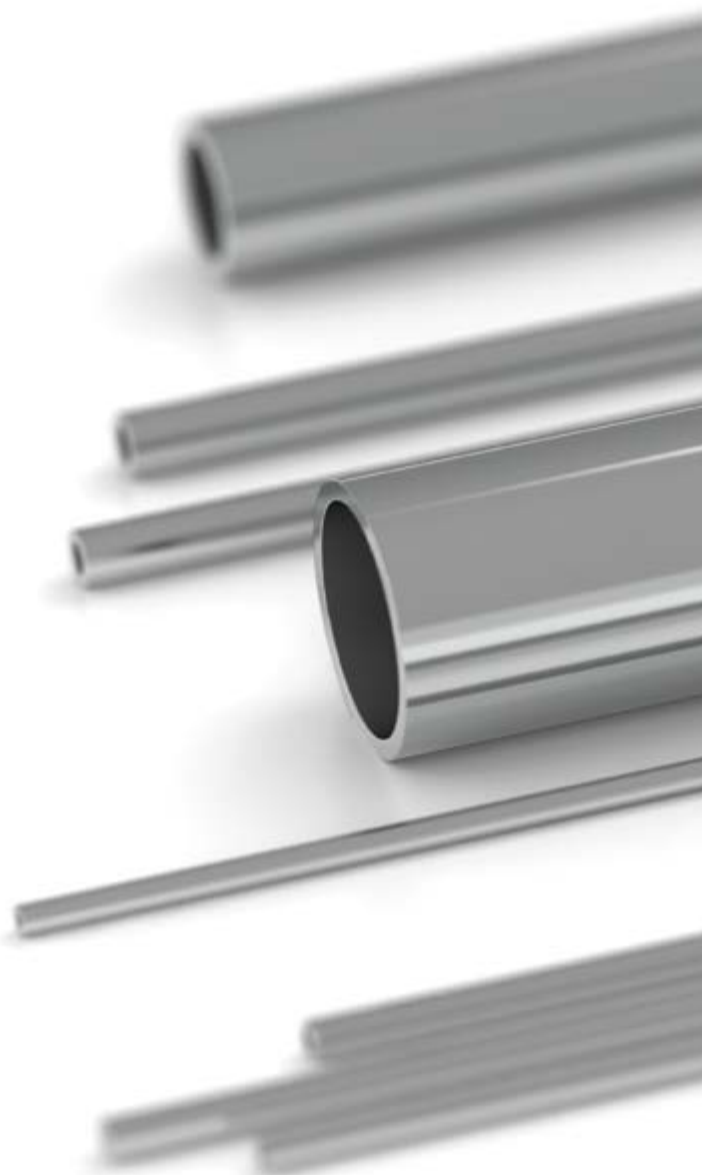
For syringes of this size, flow rate and backpressure are the biggest considerations. It is possible to use a 27 gauge and smaller needle with these syringes. However, the force to press the plunger will increase, and the dispense rate must be slow. When possible, it is always recommended to use the thin-walled tubing in lieu of the "s" gauge tubing.

Small Gauge Needle Bending with Length

As needle diameter decreases, the needle becomes less rigid. For applications that require a small gauge needle but still need rigidity for penetration, it is recommended to order the shortest needle that is still suitable for the application. The Neuros syringe on page 58 may also be an option. It has a protective sleeve to improve the rigidity of a small gauge needle.

Using 34 Gauge Needles

A 34 gauge needle is significantly smaller than a 33 gauge needle. For some applications the smaller size is a real advantage but has inherent complications. 34 gauge tubing requires special cutting tools to ensure the tubing is not crimped shut. Due to this limitation the needles are only available in restricted lengths and point styles. The small inner diameter (ID) results in a needle more prone to clogging, and cleaning wires are not available for this size. The small ID also makes it difficult to aspirate water with a fitted Microliter syringe; therefore, a Gastight syringe must be used with a 34 gauge needle.





NEEDLES

Needles

Hamilton Company offers the widest variety of standard and custom needles in the industry. All needles are built from high quality materials including 304 stainless steel tubing to ensure chemical resistance. Custom needle part numbers are used to deliver all common gauge, length, and point style combinations with quick turnaround. For more complicated custom requests contact a Hamilton representative.





Luer Lock Needles

Metal and plastic hub needles designed to connect with industry standard Luer syringes and fittings.



Luer Lock Needles

P. 104

Removable Needles

For use with Hamilton Removable Needle Syringes to create a tight, low dead volume connection.



Removable Needles

P. 107

Specialty Needles

Application specific needle connections such as: cut tubing, glass micro pipettes, Thin-Layer Chromatography, Gel-Loading, PEEK, and Valve Port needles.



Specialty Needles

P. 110

Needle Cleaning Accessories

This section includes products for caring for the needles such as: a Needle Cleaning Kit, Cleaning Wires, and Cleaning Solution Concentrate.



Needle Cleaning Accessories

P. 113





NEEDLES | LUER LOCK NEEDLES



Luer Lock Needles

Hamilton Luer Lock Needles are designed to fit any standard Luer or Luer Lock syringe or fitting. They are specifically designed to minimize dead volume when connected with a Hamilton PTFE Luer Lock (TLL) or Luer Tip (LT) syringe.

Excessive dead volume can make it impossible to completely prime syringes smaller than 100 μL . Complete priming of the syringe and needle is critical to achieving the stated accuracy and precision.

Kel-F Hub Needles



P. 105

Metal Hub Needles



P. 106





Kel-F Hub Needles

The Kel-F hub is made from CTFE plastic. Needles are available from 31 to 10 gauge. This hub is recommended when connecting to a rigid male Luer like a Luer Tip (LT) syringe because the plastic is more pliable and creates the best seal. All needles are sold in six-packs and the standard needles are 51 mm long. For all custom needles, the length and point style will need to be specified prior to placing an order.



Standard Kel-F Hub Needles

Length	Gauge	Point 2	Point 3	Point 5
51 mm	31 ga	90131	90531	
	30 ga	90130	90530	
	29 ga	90129	90529	
	28 ga	90128	90528	
	27 ga	90127	90532	
	26s ga	90139	90539	7746-12
	26 ga	90126	90533	7746-10
	25 ga	90125	90525	7746-09
	24 ga	90124	90524	7746-08
	23 ga	90123	90523	7746-07
	22s ga	90138	90534	7746-11
	22 ga	90122	90134	7746-06
	21 ga	90121	90521	7746-05
	20 ga	90120	90520	7746-04
	19 ga	90119	90519	7746-13
	18 ga	90118	90535	7746-03
	17 ga	90117	90517	7746-02
	16 ga	90116	90516	7746-01
	15 ga	90115	90515	7746-14
	14 ga	90114	90514	7746-15
	13 ga	90113	90513	
	12 ga	90112	90512	
	11 ga	90111	90511	
	10 ga	90110	90536	7746-16

Custom Kel-F Hub Needles

Length	Gauge	Point 2, 3, or 4	Point 5 or AS
10 – 304 mm	31 ga	7750-22	
	30 ga	7750-21	
	29 ga	7750-20	
	28 ga	7750-19	
	27 ga	7750-18	
	26s ga	7750-24	7752-19
	26 ga	7750-17	7752-17
	25s ga	7750-26	7752-21
	25 ga	7750-16	7752-16
	24 ga	7750-15	7752-15
	23s ga	7750-25	7752-20
	23 ga	7750-14	7752-14
	22s ga	7750-23	7752-18
	22 ga	7750-13	7752-13
	21 ga	7750-12	7752-12
	20 ga	7750-11	7752-11
	19 ga	7750-10	7752-10
	18 ga	7750-09	7752-09
	17 ga	7750-08	7752-08
	16 ga	7750-07	7752-07
	15 ga	7750-06	7752-06
	14 ga	7750-05	7752-05
	13 ga	7750-04	7752-04
	12 ga	7750-03	7752-03
	11 ga	7750-02	7752-02
	10 ga	7750-01	7752-01





Metal Hub Needles

The Metal hub is made from nickel plated brass. Needles are available from 33 to 10 gauge. This hub makes the most rigid connection to the needle making it perfect for repetitive septum piercing. Metal hub needles are compatible with PTFE Luer Lock (TLL) syringes. All needles are sold in six-packs and the standard needles are 51 mm long. For all custom needles, the length and point style will need to be specified prior to placing an order.



Standard Metal Hub Needles

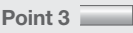
Length	Gauge	Point 2	Point 3	Point 5
51 mm	33 ga	90033	91033	
	32 ga	90032	91032	
	31 ga	90031	91031	
	30 ga	90030	91030	
	29 ga	90029	91029	
	28 ga	90028	91028	
	27 ga	90027	91027	
	26s ga	90039	91039	7729-01
	26 ga	90026	91026	7729-03
	25s ga	90052		
	25 ga	90025	91025	7729-04
	24 ga	90024	91024	7729-05
	23 ga	90023	91023	7729-06
	22s ga	90038	91038	7729-02
	22 ga	90022	91022	7729-07
	21 ga	90021	91021	7729-08
	20 ga	90020	91020	7729-09
	19 ga	90019	91019	7729-14
	18 ga	90018	91018	7729-10
	17 ga	90017	91017	7729-11
	16 ga	90016	91016	7729-12
	15 ga	90015	91015	7729-13
	14 ga	90014	91014	7730-01
	13 ga	90013	91013	7730-02
	12 ga	90012	91012	7730-03
	11 ga	90011	91011	7730-04
	10 ga	90010	91010	7730-05

Custom Metal Hub Needles

Length	Gauge	Point 2, 3, or 4	Point 5 or AS
10 - 304 mm	33 ga	7747-01	
	32 ga	7747-02	
	31 ga	7748-17	
	30 ga	7748-16	
	29 ga	7748-15	
	28 ga	7748-14	
	27 ga	7748-13	
	26s ga	7748-19	7751-19
	26 ga	7748-12	7751-17
	25s ga	7748-21	7751-21
	25 ga	7748-11	7751-16
	24 ga	7748-10	7751-15
	23s ga	7748-20	7751-20
	23 ga	7748-09	7751-14
	22s ga	7748-18	7751-18
	22 ga	7748-08	7751-13
	21 ga	7748-07	7751-12
	20 ga	7748-06	7751-11
	19 ga	7748-05	7751-10
	18 ga	7748-04	7751-09
	17 ga	7748-03	7751-08
	16 ga	7748-02	7751-07
	15 ga	7748-01	7751-06
	14 ga	7749-05	7751-05
	13 ga	7749-04	7751-04
	12 ga	7749-03	7751-03
	11 ga	7749-02	7751-02
	10 ga	7749-01	7751-01



Point Styles





Removable Needles

Hamilton Removable Needles provide the benefits of a replaceable needle with the smallest dead volume necessary for complete priming of the syringe. The unique connection installs the needle precisely at the zero line and the compression seal between the glass barrel and the PTFE or CTFE seal is chemically inert.

Large Hub Removable Needles



P. 108

Small Hub Removable Needles



P. 109

Large Hub Removable Needles

The Large Hub Removable Needle (RN) is compatible with RN syringes from 250 µL to 10 mL and all SampleLock syringes. Needles are available from 26s to 20 gauge. All needles are sold in six-packs and the standard needles are 51 mm long. For all custom needles, the length and point style will need to be specified prior to placing an order.



Standard Large Hub RN Needles

Length	Gauge	Point 2	Point 3	Point 5
51 mm	26s ga	7779-02	7780-01	7784-03
	26 ga	7779-04	7780-02	7784-04
	22s ga	7779-03	7780-03	7784-01
	22 ga	7779-01	7780-04	7784-02

Custom Large Hub RN Needles

Length	Gauge	Point 2, 3, or 4	Point 5 or AS
10 - 304 mm	26s ga	7806-04	7732-04
	26 ga	7806-03	7732-03
	25s ga	7806-09	7732-09
	25 ga	7806-07	7732-05
	24 ga	7806-06	7732-07
	23s ga	7806-08	7732-08
	23 ga	7806-05	7732-06
	22s ga	7806-02	7732-02
	22 ga	7806-01	7732-01
	21 ga	7806-11	7732-11
	20 ga	7806-10	7732-10

Point Styles

Point 2

Point 3

Point 4

Point 5

Point AS



Small Hub Removable Needles

The Small Hub Removable Needle (RN) is compatible with RN syringes from 2.5 µL to 100 µL. Needles are available from 34 to 18 gauge. All needles are sold in six-packs and the standard needles are 51 mm long. For all custom needles, the length and point style will need to be specified prior to placing an order.



Standard Small Hub RN Needles

Length	Gauge	Point 2	Point 3	Point 5
38 mm	33 ga		7762-06	
	32 ga		7762-05	
	31 ga		7762-04	
	30 ga		7762-03	
	28 ga		7762-02	
51 mm	27 ga		7762-01	
	26s ga	7758-02	7768-01	7784-07
	26 ga	7758-04	7768-02	7784-08
	22s ga	7758-03	7770-01	7784-05
	22 ga	7758-01	7770-02	7784-06

Custom Small Hub RN Needles

Length	Gauge	Point 2, 3, or 4	Point 5 or AS
10, 13, 25, or 38 mm	34 ga	207434*	
	33 ga	7803-05	
	32 ga	7803-04	
	31 ga	7803-03	
	30 ga	7803-07	
	29 ga	7803-06	
	28 ga	7803-02	
	27 ga	7803-01	
	26s ga	7804-04	7731-02
	26 ga	7804-03	7731-01
10 – 304 mm	25s ga	7804-10	7731-06
	25 ga	7804-05	7731-05
	24 ga	7804-08	7731-09
	23s ga	7804-09	7731-08
	23 ga	7804-07	7731-07
	22s ga	7804-02	7731-04
	22 ga	7804-01	7731-03
	21 ga	7804-12	7731-11
	20 ga	7804-11	7731-10
	19 ga	207419	7731-13
	18 ga	7804-06	7731-12

* Only available as a point style 3 or 4



Specialty Needles

Stainless Steel Tubing



P. 110

Glass Micro Pipettes



P. 111

Thin-Layer Chromatography Needles



P. 111

Gel-Loading Needles



P. 112

PEEK Needles



P. 112

Valve Port Needles



P. 112





Stainless Steel Tubing (Cont.)

Stainless Steel Tubing (Cont.)

Gauge	Cut Tubing	Point 2, 3, or 4	Point 5 or AS
29 ga	21029A	22029-01	
28 ga	21028A	22028-01	
27 ga	21027A	22027-01	
26s ga	21039A	22039-01	22039-02
26 ga	21026A	22026-01	22026-02
25s ga	21058A	22058-01	22058-02
25 ga	21025A	22025-01	22025-02
24 ga	21024A	22024-01	22024-02
23s ga	21041A	22041-01	22041-02
23 ga	21023A	22023-01	22023-02
22s ga	21038A	22038-01	22038-02
22 ga	21022A	22022-01	22022-02

Gauge	Cut Tubing	Point 2, 3, or 4	Point 5 or AS
21 ga	21021A	22021-01	22021-02
20 ga	21020A	22020-01	22020-02
19 ga	21019A	22019-01	22019-02
18 ga	21018A	22018-01	22018-02
17 ga	21017A	22017-01	22017-02
16 ga	21016A	22016-01	22016-02
15 ga	21015A	22015-01	22015-02
14 ga	21014A	22014-01	22014-02
13 ga	21013A	22013-01	22013-02
12 ga	21012A	22012-01	22012-02
11 ga	21011A	22011-01	22011-02
10 ga	21010A	22010-01	22010-02

Glass Micro Pipettes

Glass micro pipettes are widely used in Neuroscience because the point can be pulled to an incredibly small diameter and maintain the rigidity to penetrate tissue. Additionally, the dispense orifice exits from the very tip of the needle so the wound track can be minimized. The 1 mm RN compression fitting allows for quick connection to standard 1 mm capillary glass. Pull your own needle and attach it to an RN syringe without wax or glue.

1 mm Compression Fitting



P/N	Description
55750-01	RN Compression Fitting 1 mm

Hamilton does not offer 1 mm glass capillary tubing.



Gel-Loading Needles

These are replacement needles for a Fixed or Adjustable Gel-Loading syringes. The needles are available in a variety of outer diameters for compatibility with different sized loading wells. For more information on Gel-Loading Syringes turn to page 64.

Replacement Gel-Loading Needles



Syringe Type	Needle OD	Quantity	Part Number
Fixed Gel-Loading Syringe	0.2 mm	6 pk	8651-01
	0.3 mm	6 pk	8651-02
	0.4 mm	6 pk	8651-03
Adjustable Gel-Loading Syringe	0.2 mm	4 pk	78633
	0.3 mm	4 pk	78631

PEEK Needles

Some applications call for a non-metallic needle. These plastic needles are made from PEEK HPLC tubing that is both chemically and physical robust. PEEK needles are sold in six-packs.

PEEK Needles



P/N	Hub	Length	Outer Diameter	Inner Diameter
8649-01	Kel-F	51 mm	1.6 mm	0.8 mm
8650-01	Large RN	51 mm	1.6 mm	0.8 mm

Valve Port Needles

Hat type needles are designed to be connected directly to a flat bottom valve port. Use the needle bushing part number 35056 to connect the needle directly to any 1/4"-28 Hamilton valve. Hat needles are sold in three-packs.

Hat Needles



Length	Gauge	Point 2, 3, or 4
10 - 304 mm	26 gauge	90826
	25 gauge	90825
	24 gauge	90824
	23 gauge	90823
	22 gauge	90822
	21 gauge	90821
	20 gauge	90820
	19 gauge	90819
	18 gauge	90818
	17 gauge	90817
	16 gauge	90816
	15 gauge	90815
	14 gauge	90814





Needle Cleaning Accessories

To extend the life of a needle it is critical to thoroughly clean before storage. It is much easier to flush out contaminants before they dry and harden. Be sure to flush the needle with a solvent known to solubilize the sample. One common mistake is to flush salts, protein, or DNA with organic solvents. This tends to precipitate the contaminants, resulting in clogs instead of preventing them.

Hamilton's Needle Cleaning Kit includes a biodegradable, non-phosphate Cleaning Solution Concentrate that is suitable for many common sample types and various sized tungsten cleaning wires that can be threaded through the needle to clear a blockage.

Needle Cleaning Kit

P/N	Volume
76620A	Kit includes 10 of each wire and 70 mL of concentrate

Cleaning Solution Concentrate

P/N	Volume
18311	500 mL
18310	70 mL

Tungsten Cleaning Wires

P/N	For Gauges	Wire OD	Package
18304	22, 23 ga, and larger	0.306 mm	10 pk
18303	24 – 26 ga	0.207 mm	10 pk
18302	27 ga	0.167 mm	10 pk
18301	22s, 25s, and 28 – 30 ga	0.126 mm	10 pk
18300	26s and 31 – 33 ga	0.089 mm	10 pk
18306	23s ga	0.076 mm	10 pk





Needle Technical Reference

The Needle Technical Reference section includes information on the operation, maintenance, and dimensions of the needles. The information is intended as a general guideline.

For specific details on a part number or application search the part on our website or contact a local Hamilton representative.

Needle Care and Use

P. 115

Sterilization and Disinfection

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Gauge Index

P. 119





Needle Care and Use

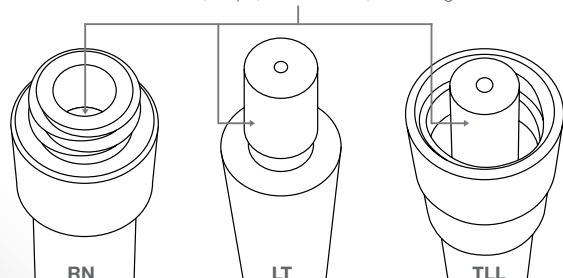
Step 1

Inspection

Inspect the sealing surfaces

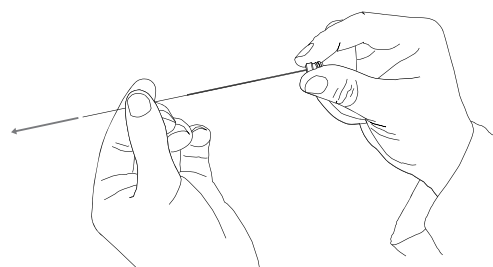
Inspect the connection between the needle hub and the syringe termination. Confirm that the sealing surfaces are free of major damage, scratches, or chips that could hinder sealing.

This is the sealing surface. Make sure there are no cracks, chips, obstructions, or damage.



Remove cleaning wire

Hamilton 27 – 33 gauge needles ship with cleaning wires installed in the needle tubing. Be sure to remove this wire prior to installing the needle. In one hand grab the needle by the hub and in the other hand grab the cleaning wire. Gently pull the cleaning wire until it is completely removed from the needle tubing. Discard the used cleaning wire.



Step 2

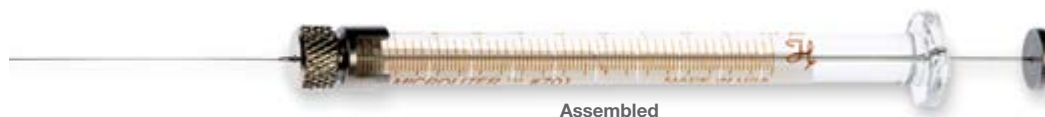
Installation

Removable Needle Syringes

Remove the nut of the syringe, then insert the needle into the syringe hub. Thread the nut over the needle, and tighten onto the syringe. Make sure this connection is finger-tight to make a leak-free seal.



After placing the needle and ferrule into the RN hub, thread the RN nut over them and tighten onto the syringe.

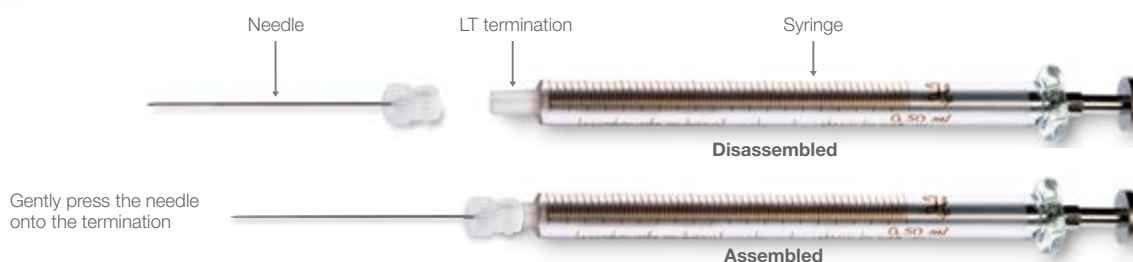


Needle Care and Use (Cont.)

Installation (Cont.)

Luer Tip Syringes

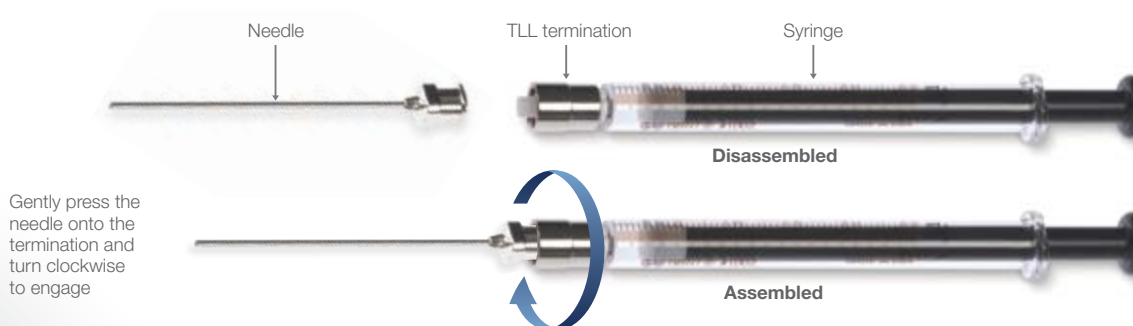
Press the Kel-F needle hub onto the ground glass Luer Tip (LT) termination, and rotate slightly to ensure a tight seal.



PTFE Luer Lock Syringes

Press the Metal or Kel-F needle hub onto the PTFE Luer Lock (TLL) termination until the threads engage.

Rotate the hub clockwise. The threads will pull the hub onto the termination resulting in a tight seal.

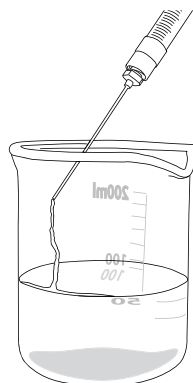


Step 3

Priming

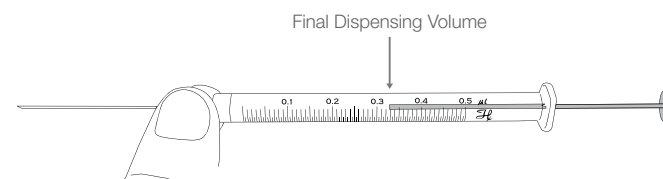
If dead volume is less than 20% of the syringe volume

When priming, the needle should be immersed in the sample. Rapidly draw and dispense sample into the syringe until bubbles are no longer visible in the syringe barrel. For larger syringes it is possible to remove air bubbles by turning the barrel upright and allowing the air bubbles to rise to the needle exit. Then dispense the air bubbles from the needle.



If dead volume is greater than 20% of the syringe volume

With such a large dead volume it may not be possible to prime the syringe with the above method. In this case backfilling the system may be the best option. For this method the plunger is removed from the syringe and a second syringe is used to load sample from the back of the syringe. Once the system is completely primed, the plunger is reinserted and ready for use. For these instances Hamilton offers a Priming Kit which is shown on page 63.



Needle Care and Use (Cont.)

Step 4

Cleaning

Immediately after use

After each use it is critical to flush the sample from the needle. If the sample contained dissolved particles it is critical to use a solvent known to dissolve the particles. For example, if the sample contains proteins, DNA, or salts then flushing with an organic solvent could precipitate these particles resulting in a clog. In this case it is better to flush with a detergent like Hamilton Cleaning Solution Concentrate (page 113), then with deionized water, and finally with acetone to ensure the needle dries quickly.

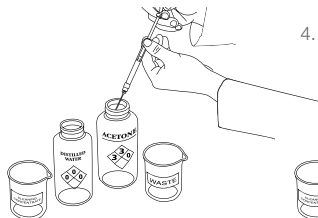
1.



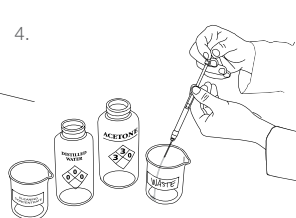
2.



3.

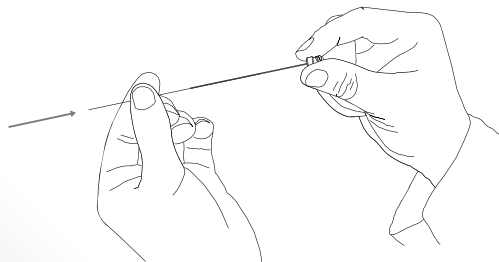


4.



After a needle has become clogged

If the needle is clogged and it is not possible to flush with cleaning solution it is time to use the cleaning wires. Start with the smallest cleaning wire that can be pushed through the needle inner diameter. Slowly increase the cleaning wire up to the size specified for the needle gauge. Once the clog has been removed, rinse the needle as described above.



Step 5

Storage

After the needle is cleaned according to Step 4, store the needle with the syringe in the syringe packaging or in the original needle packaging to keep it protected and clean for future applications.



Sterilization and Disinfection

The table below shows the autoclavability of our needles as well as the recommended chemicals for disinfection. As an alternative to the autoclave, all needle types may be sterilized using ethylene oxide.

Sterilization and Disinfection Table

Product	Autoclave Sterilization	Chemical Disinfection ¹
Removable Needles	Yes	Yes
Metal Hub Needles	Yes	Yes
Kel-F Hub Needles	Yes	Yes
PTFE Tubing	Yes	Yes
Kel-F Fittings	Yes	Yes

¹Recommended disinfecting chemicals are Microcide SQ® (P/N 3995-01), 10% bleach, acetone, or ethanol.



Gauge Index

The Gauge Index contains the nominal inner and outer dimensions of the tubing used in Hamilton needles. If the needle dead volume exceeds 20% of the nominal syringe volume then special priming steps may be required. The index lists the dead volume in $\mu\text{L}/\text{cm}$ so it is easier to determine if the gauge is suitable for the desired syringe volume.

Gauge Index

Gauge	Nominal OD	Nominal ID	Volume
34	0.159 mm	0.051 mm	0.02 $\mu\text{L}/\text{cm}$
33	0.210 mm	0.108 mm	0.09 $\mu\text{L}/\text{cm}$
32	0.235 mm	0.108 mm	0.09 $\mu\text{L}/\text{cm}$
31	0.261 mm	0.133 mm	0.14 $\mu\text{L}/\text{cm}$
30	0.312 mm	0.159 mm	0.20 $\mu\text{L}/\text{cm}$
29	0.337 mm	0.184 mm	0.27 $\mu\text{L}/\text{cm}$
28	0.362 mm	0.184 mm	0.27 $\mu\text{L}/\text{cm}$
27	0.413 mm	0.210 mm	0.35 $\mu\text{L}/\text{cm}$
26s	0.474 mm	0.127 mm	0.13 $\mu\text{L}/\text{cm}$
26	0.464 mm	0.26 mm	0.53 $\mu\text{L}/\text{cm}$
25s	0.515 mm	0.153 mm	0.18 $\mu\text{L}/\text{cm}$
25	0.515 mm	0.260 mm	0.53 $\mu\text{L}/\text{cm}$
24	0.566 mm	0.311 mm	0.76 $\mu\text{L}/\text{cm}$
23s	0.642 mm	0.116 mm	0.11 $\mu\text{L}/\text{cm}$
23	0.642 mm	0.337 mm	0.89 $\mu\text{L}/\text{cm}$
22s	0.718 mm	0.152 mm	0.18 $\mu\text{L}/\text{cm}$
22	0.718 mm	0.413 mm	1.34 $\mu\text{L}/\text{cm}$
21	0.819 mm	0.514 mm	2.07 $\mu\text{L}/\text{cm}$
20	0.908 mm	0.603 mm	2.86 $\mu\text{L}/\text{cm}$
19	1.07 mm	0.686 mm	3.70 $\mu\text{L}/\text{cm}$
18	1.27 mm	0.838 mm	5.52 $\mu\text{L}/\text{cm}$
17	1.47 mm	1.07 mm	8.94 $\mu\text{L}/\text{cm}$
16	1.65 mm	1.19 mm	11.2 $\mu\text{L}/\text{cm}$
15	1.83 mm	1.37 mm	14.8 $\mu\text{L}/\text{cm}$
14	2.11 mm	1.80 mm	25.6 $\mu\text{L}/\text{cm}$
13	2.41 mm	1.80 mm	25.6 $\mu\text{L}/\text{cm}$
12	2.77 mm	2.16 mm	36.6 $\mu\text{L}/\text{cm}$
11	3.05 mm	2.39 mm	44.8 $\mu\text{L}/\text{cm}$
10	3.40 mm	2.69 mm	57.0 $\mu\text{L}/\text{cm}$

