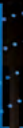


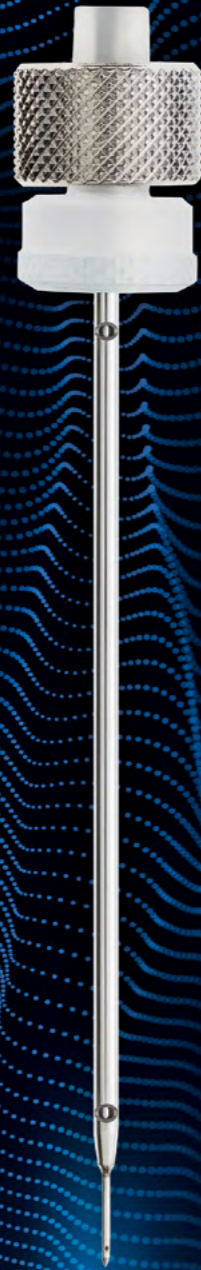
Hamilton Selection Guide

Needles



Quickly Find the Needle You Need

The 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 **Needle Cannula** will be defined by **gauge** and **length**

The opposite end of the needle is shaped into a **Needle Point Style** that is appropriate for the application

1



2



3



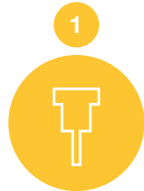
4



5

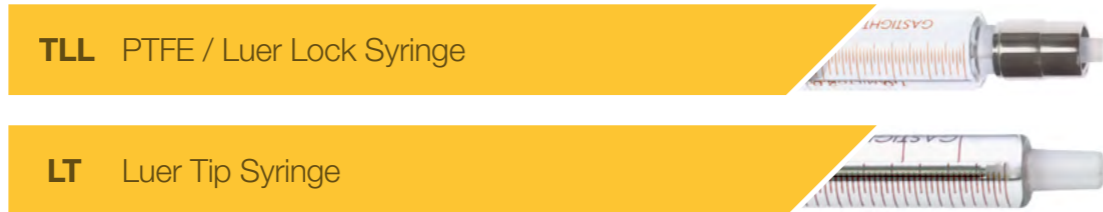


Choosing the Appropriate Hub



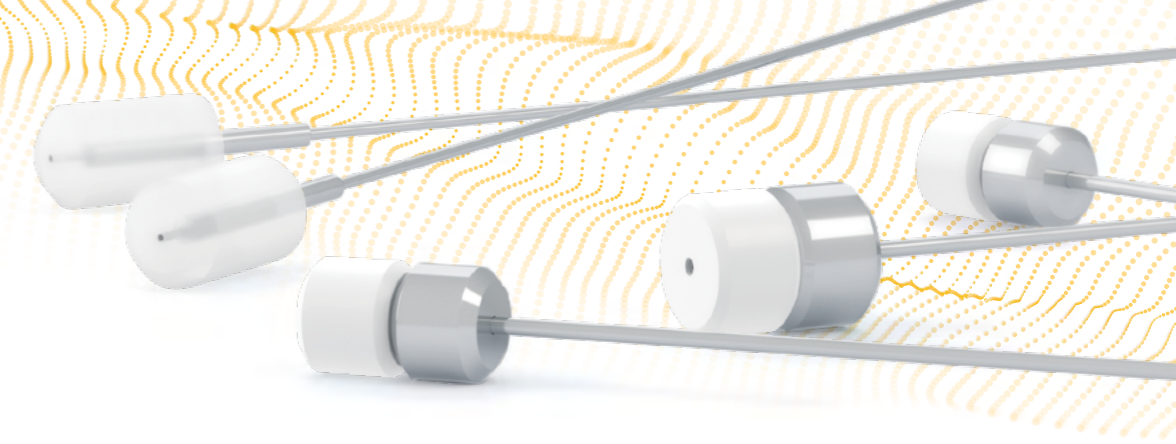
Luer Lock Needle Hubs

Designed to fit any standard Luer, Luer Lock syringe or Luer Lock termination.



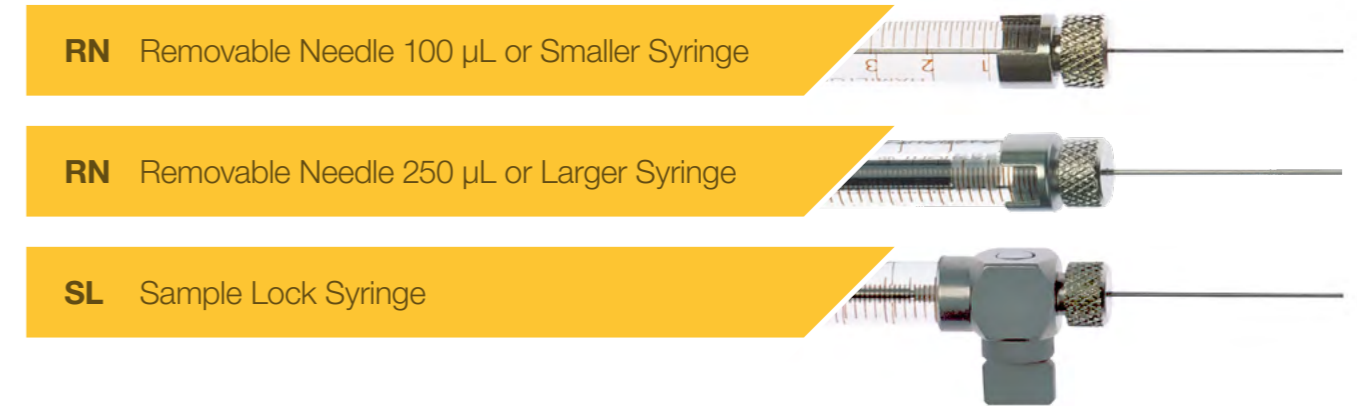
| | NEEDLE HUB STYLE | COMPATIBILITY | NEEDLE GAUGE |
|--------------------------------------|------------------|---|---------------|
| METAL HUB NEEDLE N NEEDLE | | PTFE Luer Lock (TLL) Syringes 25 μ L to 2 L | 33 – 10 gauge |
| KEL-F HUB NEEDLE KF NEEDLE | | PTFE Luer Lock (TLL) Syringes 25 μ L to 2 L Luer Tip (LT) Syringes 10 μ L to 10 mL | 31 – 10 gauge |
| VENTING TLL FEMALE NEEDLE | | PTFE Luer Lock (TLL) Syringes 25 μ L to 2 L | * / ** |
| VENTING TLL MALE NEEDLE | | PTFE Luer Lock (TLL) Syringes 25 μ L to 2 L | * / ** |
| PEEK TLL NEEDLE | | PTFE Luer Lock (TLL) Syringes 25 μ L to 2 L Luer Tip (LT) Syringes 10 μ L to 10 mL | *** |

*For standard needle dimensions, go to page 17
 **For custom needle dimensions, go to page 22
 ***Outer Diameter 1.6 mm, Inner Diameter 0.8 mm



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.



| | NEEDLE HUB STYLES | COMPATIBILITY | NEEDLE GAUGE |
|--|-------------------|---|---------------|
| SMALL HUB REMOVABLE NEEDLE SMALL RN NEEDLE | | Removable Needle (RN) Syringes 2.5 μ L to 100 μ L | 34 – 18 gauge |
| LARGE HUB REMOVABLE NEEDLE LARGE RN NEEDLE | | Removable Needle (RN) Syringes 250 μ L to 10 mL Sample Lock (SL) Syringes 50 μ L to 100 mL | 31 – 10 gauge |
| PEEK LARGE HUB REMOVABLE NEEDLE PEEK LARGE RN NEEDLE | | Removable Needle (RN) Syringes 250 μ L to 10 mL Sample Lock (SL) Syringes 50 μ L to 100 mL | *** |

Remove the original needle and PTFE ferrule from the RN termination before inserting the replacement needle assembly.



ChemSeal Needle Hubs

Designed to fit any standard ChemSeal / C-Termination Syringe or any such 1/4"-28 UNF thread.



| | NEEDLE HUB STYLES | COMPATIBILITY | NEEDLE GAUGE |
|--|-------------------|---|----------------|
| C-F METAL HUB NEEDLE C FEMALE NEEDLE | | ChemSeal Syringes 10 µL to 10 mL | 26s – 10 gauge |
| C-M COLORED PEEK NUT FOR RN NEEDLE C MALE NEEDLE | | Can be connected with any Female 1/4"-28 UNF thread | - |
| VENTING C-FEMALE NEEDLE | | ChemSeal Syringes 10 µL to 10 mL Septum piercing applications | * / ** |
| VENTING C-MALE NEEDLE | | PEEK Syringes 10 µl to 50 mL | * / ** |

*For standard needle dimensions, go to page 21
**For custom needle dimensions, go to page 22

- i** Complete priming of the syringe and needle is critical to achieving the stated accuracy and precision. Excessive dead volume can make it impossible to completely prime syringes smaller than 100 µL.
- i** All colored Nuts are sold in three-packs, separately from the needles. The color will need to be specified on order.

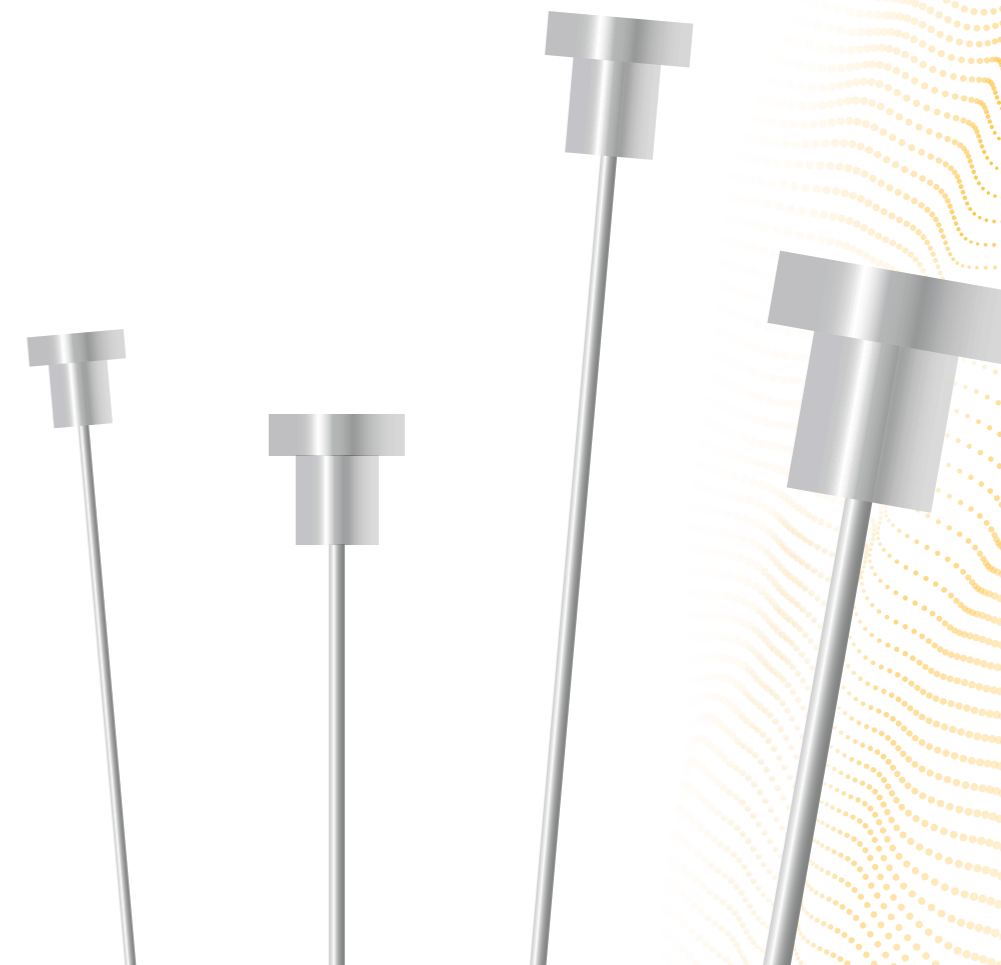


Valve Port Needle Hubs

Designed to be connected to a tubing port on a Hamilton valve.

| | NEEDLE HUB STYLES | COMPATIBILITY | NEEDLE GAUGE |
|-------------------|-------------------|---|---------------|
| HAT NEEDLE | | Use the needle bushing part number 35056 to connect the needle directly to any 1/4"-28 UNF thread | 14 - 26 gauge |

Hat needles are sold in three-packs



Picking the Suitable Gauge

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.

If the application requires septum penetrations, it would be recommended to choose a gauge smaller than 26 gauge or there will be an increased risk of bending the needle. Also avoid needles larger than 22 gauge to avoid coring the septum resulting in a clogged needle.

When choosing a needle gauge to connect to a small syringe, it is critical to take into account the needle's dead volume which is listed in $\mu\text{L}/\text{mm}$ in the gauge index.

When the sample to be dispensed is viscous, a small gauge needle (27 – 34) can make it difficult to aspirate sample into the syringe. If a small gauge needle is required, it may be necessary to backfill the syringe.

| 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 $\mu\text{L}/\text{cm}$ |

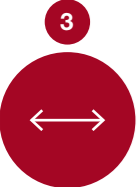
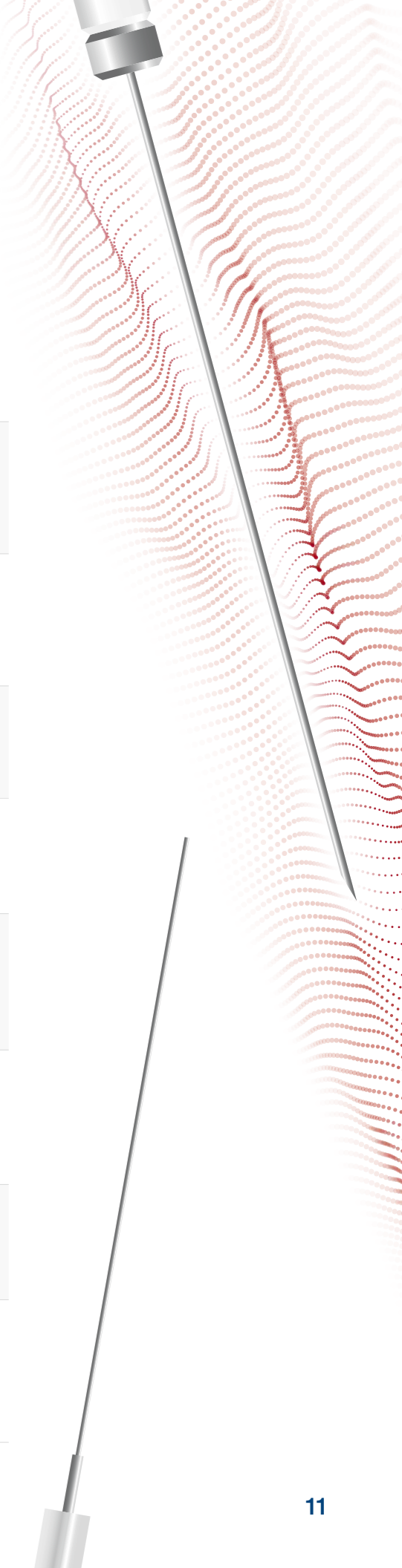
Determining the Needle Length

HUB STYLE







DIMENSION IMAGE

DESCRIPTION

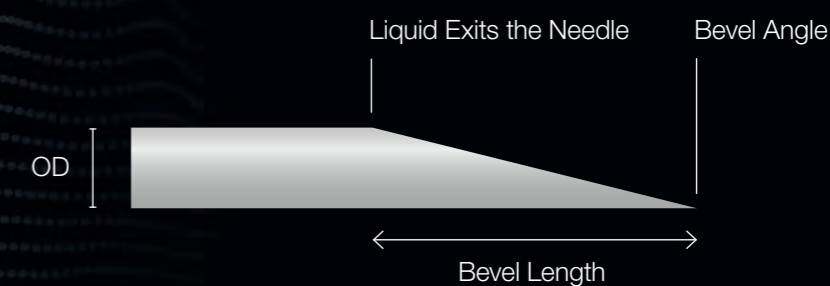
| | | |
|--|--|--|
| <p>METAL HUB NEEDLE N NEEDLES</p> |  | <p>Needle length is specified from the needle point to the start of the hub</p> |
| <p>KEL-F HUB NEEDLE KF NEEDLES</p> |  | <p>Needle length is specified from the needle point to the start of the hub</p> |
| <p>SMALL GAUGE RN HUB NEEDLE</p> |  | <p>Needle length is specified from the needle point to the start of the support sleeve</p> |
| <p>STANDARD RN HUB NEEDLE</p> |  | <p>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</p> |
| <p>C-F METAL HUB NEEDLE C FEMALE NEEDLES</p> |  | <p>Needle length is specified from the needle point to the start of the hub</p> |
| <p>C-M COLORED PEEK NUT FOR RN NEEDLE C MALE NEEDLE</p> |  | <p>The needles compatible with this nut are: RN Large and RN Small The distance from the needle point to the nut is RN needle length – 11 mm Example: Standard RN Length, 51 mm – 11 mm = 40 mm – tip to nut</p> |
| <p>HAT HUB NEEDLE</p> |  | <p>Needle length is specified from the needle point to the start of installation hardware The distance from the needle point to the back end of the hub is length + 14.22 mm</p> |
| <p>VENTING HUB NEEDLE</p> |  | <p>The needle length is determined by using this specifications: A = Needle length from the needle point to the start of the hub B = Needle length from the needle point to the sleeve C = Needle length from the needle point to the first venting hole</p> |



Selecting the Correct Point Style

| 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



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

For example: A 27 gauge needle (OD = 0.413) with a point style 4 beveled at 30 degrees:

$$\text{Bevel length} = 0.413 \text{ mm} / \tan 30 = 0.715 \text{ mm}$$

i **ATTENTION!** When choosing a custom hubed needle with a sharp Point Style 4, short needle length and large outer diameter! It may be impossible to manufacture (example: KF Needle, at the length of 10mm, needle gauge 10 with Point Style 4 at 10-12°, the bevel length is between 19 to 16 mm). To avoid this situation the above formula can be used.



You have built the perfect needle to perform your applications

Now, you just have to order it

- Metal Hub Needles 15
- Kel-F Hub Needles 16
- Venting TLL Female Needles 17
- Venting TLL Male Needles 17
- PEEK Needles 17
- Small Hub Removable Needles 18
- Large Hub Removable Needles 19
- Metal C Female Needles 20
- PEEK C Male Colored Needles 21
- Venting C-Female Needles 21
- Venting C-Male Needles 21
- Venting Needles 22
- Hat Hub Needles 23
- Stainless Steel Tubing 23

Metal Hub Needles



| GAUGE | STANDARD | | | CUSTOM | |
|--------|---------------|---------|---------|---------------------|---------------|
| | LENGTH: 51 MM | | | LENGTH: 10 - 304 MM | |
| | POINT 2 | POINT 3 | POINT 5 | POINT 2, 3 OR 4 | POINT 5 OR AS |
| 33 ga | 90033 | 91033 | - | 7747-01 | |
| 32 ga | 90032 | 91032 | - | 7747-02 | |
| 31 ga | 90031 | 91031 | - | 7748-17 | |
| 30 ga | 90030 | 91030 | - | 7748-16 | |
| 29 ga | 90029 | 91029 | - | 7748-15 | |
| 28 ga | 90028 | 91028 | - | 7748-14 | |
| 27 ga | 90027 | 91027 | - | 7748-13 | |
| 26s ga | 90039 | 91039 | 7729-01 | 7748-19 | 7751-19 |
| 26 ga | 90026 | 91026 | 7729-03 | 7748-12 | 7751-17 |
| 25s ga | 90052 | - | - | 7748-21 | 7751-21 |
| 25 ga | 90025 | 91025 | 7729-04 | 7748-11 | 7751-16 |
| 24 ga | 90024 | 91024 | 7729-05 | 7748-10 | 7751-15 |
| 23s ga | - | - | - | 7748-20 | 7751-20 |
| 23 ga | 90023 | 91023 | 7729-06 | 7748-09 | 7751-14 |
| 22s ga | 90038 | 91038 | 7729-02 | 7748-18 | 7751-18 |
| 22 ga | 90022 | 91022 | 7729-07 | 7748-08 | 7751-13 |
| 21 ga | 90021 | 91021 | 7729-08 | 7748-07 | 7751-12 |
| 20 ga | 90020 | 91020 | 7729-09 | 7748-06 | 7751-11 |
| 19 ga | 90019 | 91019 | 7729-14 | 7748-05 | 7751-10 |
| 18 ga | 90018 | 91018 | 7729-10 | 7748-04 | 7751-09 |
| 17 ga | 90017 | 91017 | 7729-11 | 7748-03 | 7751-08 |
| 16 ga | 90016 | 91016 | 7729-12 | 7748-02 | 7751-07 |
| 15 ga | 90015 | 91015 | 7729-13 | 7748-01 | 7751-06 |
| 14 ga | 90014 | 91014 | 7730-01 | 7749-05 | 7751-05 |
| 13 ga | 90013 | 91013 | 7730-02 | 7749-04 | 7751-04 |
| 12 ga | 90012 | 91012 | 7730-03 | 7749-03 | 7751-03 |
| 11 ga | 90011 | 91011 | 7730-04 | 7749-02 | 7751-02 |
| 10 ga | 90010 | 91010 | 7730-05 | 7749-01 | 7751-01 |

Hamilton needles are sold in six-packs and the standard needles are 51 mm long



Kel-F Hub Needles



| GAUGE | STANDARD | | | CUSTOM | |
|--------|---------------|---------|---------|---------------------|---------------|
| | LENGTH: 51 MM | | | LENGTH: 10 - 304 MM | |
| | POINT 2 | POINT 3 | POINT 5 | POINT 2, 3 OR 4 | POINT 5 OR AS |
| 31 ga | 90131 | 90531 | - | 7750-22 | - |
| 30 ga | 90130 | 90530 | - | 7750-21 | - |
| 29 ga | 90129 | 90529 | - | 7750-20 | - |
| 28 ga | 90128 | 90528 | - | 7750-19 | - |
| 27 ga | 90127 | 90532 | - | 7750-18 | - |
| 26s ga | 90139 | 90539 | 7746-12 | 7750-24 | 7752-19 |
| 26 ga | 90126 | 90533 | 7746-10 | 7750-17 | 7752-17 |
| 25s ga | - | - | - | 7750-26 | 7752-21 |
| 25 ga | 90125 | 90525 | 7746-09 | 7750-16 | 7752-16 |
| 24 ga | 90124 | 90524 | 7746-08 | 7750-15 | 7752-15 |
| 23s ga | - | - | - | 7750-25 | 7752-20 |
| 23 ga | 90123 | 90523 | 7746-07 | 7750-14 | 7752-14 |
| 22s ga | 90138 | 90534 | 7746-11 | 7750-23 | 7752-18 |
| 22 ga | 90122 | 90134 | 7746-06 | 7750-13 | 7752-13 |
| 21 ga | 90121 | 90521 | 7746-05 | 7750-12 | 7752-12 |
| 20 ga | 90120 | 90520 | 7746-04 | 7750-11 | 7752-11 |
| 19 ga | 90119 | 90519 | 7746-13 | 7750-10 | 7752-10 |
| 18 ga | 90118 | 90535 | 7746-03 | 7750-09 | 7752-09 |
| 17 ga | 90117 | 90517 | 7746-02 | 7750-08 | 7752-08 |
| 16 ga | 90116 | 90516 | 7746-01 | 7750-07 | 7752-07 |
| 15 ga | 90115 | 90515 | 7746-14 | 7750-06 | 7752-06 |
| 14 ga | 90114 | 90514 | 7746-15 | 7750-05 | 7752-05 |
| 13 ga | 90113 | 90513 | - | 7750-04 | 7752-04 |
| 12 ga | 90112 | 90512 | - | 7750-03 | 7752-03 |
| 11 ga | 90111 | 90511 | - | 7750-02 | 7752-02 |
| 10 ga | 90110 | 90536 | 7746-16 | 7750-01 | 7752-01 |

Venting TLL Female Needles



| STANDARD | | | | | | | | | |
|-------------|----------------------------|---------|---------|---------|------|-----|------------|------|------|
| PART NUMBER | DESCRIPTION | O.D. MM | I.D. MM | C.D. MM | A MM | PST | HUB | B MM | C MM |
| 210540 | NDL VENT (0.5/51/5) TLL-F | 0.50 | 0.25 | 1.40 | 51 | 5 | TTL Female | 17 | 20 |
| 210541 | NDL VENT (1.0/76/5) TLL-F | 1.00 | 0.70 | 1.80 | 76 | 5 | TTL Female | 30 | 33 |
| 210542 | NDL VENT (1.6/102/5) TLL-F | 1.60 | 1.20 | 2.50 | 102 | 5 | TTL Female | 60 | 63 |
| 210543 | NDL VENT (2.0/102/5) TLL-F | 2.00 | 1.60 | 3.00 | 102 | 5 | TTL Female | 60 | 63 |

Venting TLL Male Needles



| STANDARD | | | | | | | | | |
|-------------|----------------------------|---------|---------|---------|------|-----|----------|------|------|
| PART NUMBER | DESCRIPTION | O.D. MM | I.D. MM | C.D. MM | A MM | PST | HUB | B MM | C MM |
| 210544 | NDL VENT (0.5/51/5) TLL-M | 0.50 | 0.25 | 1.40 | 51 | 5 | TTL Male | 17 | 20 |
| 210545 | NDL VENT (1.0/76/5) TLL-M | 1.00 | 0.70 | 1.80 | 76 | 5 | TTL Male | 30 | 33 |
| 210546 | NDL VENT (1.6/102/5) TLL-M | 1.60 | 1.20 | 2.50 | 102 | 5 | TTL Male | 60 | 63 |
| 210547 | NDL VENT (2.0/102/5) TLL-M | 2.00 | 1.60 | 3.00 | 102 | 5 | TTL Male | 60 | 63 |

Venting Needles are sold individually

PEEK Needles



| STANDARD | | | | |
|-------------|--------------|--------|---------|---------|
| PART NUMBER | DESCRIPTION | LENGTH | O.D. MM | I.D. MM |
| 8649-01 | Hub Kel-F | 51 | 1.6 | 0.8 |
| 8650-01 | Hub Large RN | 51 | 1.6 | 0.8 |

Small Hub Removable Needles

| STANDARD | | | | |
|----------|--------|---------|----------|---------|
| LENGTH | GAUGE | POINT 2 | POINT 3 | POINT 5 |
| 51 mm | 33 ga | - | 7762-06* | - |
| | 32 ga | - | 7762-05 | - |
| | 31 ga | - | 7762-04 | - |
| | 30 ga | - | 7762-03 | - |
| | 29 ga | - | 7762-02 | - |
| | 28 ga | - | 7762-01 | - |
| | 27 ga | 7758-02 | 7768-01 | 7784-07 |
| | 26s ga | 7758-04 | 7768-02 | 7784-08 |
| | 22s ga | 7758-03 | 7770-01 | 7784-05 |
| | 22 ga | 7758-01 | 7770-02 | 7784-06 |

| CUSTOM | | | |
|-------------------------|---------|-----------------|---------------|
| 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 | - |
| 10 – 304 mm | 26s ga | 7804-04 | 7731-02 |
| | 26 ga | 7804-03 | 7731-01 |
| | 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 | |

*38 mm / **only available as point style 3 or 4

Large Hub Removable Needles

| STANDARD | | | | |
|----------|--------|---------|---------|---------|
| 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 | | | |
|-------------|--------|-----------------|---------------|
| 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 |

Metal C Female Needles



| STANDARD | | | | |
|----------|--------|---------|---------|---------|
| LENGTH | GAUGE | POINT 2 | POINT 3 | POINT 5 |
| 51 mm | 26s ga | 210467 | 210468 | - |
| | 26 ga | 210465 | 210466 | - |
| | 25 ga | 210463 | 210464 | - |
| | 22s ga | 210461 | 210462 | - |
| | 22 ga | 210458 | 210459 | 210460 |
| | 21 ga | 210456 | 210457 | - |
| | 20 ga | 210454 | 210455 | - |

| CUSTOM | | | |
|-------------|--------|-----------------|---------------|
| LENGTH | GAUGE | POINT 2, 3 OR 4 | POINT 5 OR AS |
| 10 – 304 mm | 26s ga | 211011 | 211012 |
| | 26 ga | 211009 | 211010 |
| | 25s ga | 211007 | 211008 |
| | 25 ga | 211005 | 211006 |
| | 24 ga | 210499 | 211004 |
| | 23s ga | 210497 | 210498 |
| | 23 ga | 210495 | 210496 |
| | 22s ga | 210493 | 210494 |
| | 22 ga | 210491 | 210492 |
| | 21 ga | 210489 | 210490 |
| | 20 ga | 210487 | 210488 |
| | 19 ga | 210485 | 210486 |
| | 18 ga | 210483 | 210484 |
| | 17 ga | 210481 | 210482 |
| | 16 ga | 210479 | 210480 |
| | 15 ga | 210477 | 210478 |
| | 14 ga | 210475 | 210476 |
| 13 ga | 210473 | 210474 | |
| 12 ga | 210471 | 210472 | |
| 11 ga | 210469 | 210470 | |

PEEK C Male Colored Needles



| NUT COMPATIBILITY | ITEM NUMBER | GAUGE RANGE | COLORS |
|------------------------------|-------------|-------------|--------|
| Large Hub Removable Needles* | 10118952 | 20 - 26s ga | |
| Small Hub Removable Needles* | 10118953 | 18 - 34 ga | |

*Needle not included – please see the pages 18 and 19

Venting C-Female Needles



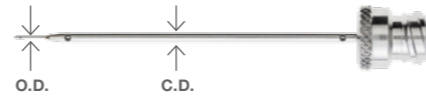
| STANDARD | | | | | | | | | |
|-------------|--------------------------|---------|---------|---------|------|-----|----------|------|------|
| PART NUMBER | DESCRIPTION | O.D. MM | I.D. MM | C.D. MM | A MM | PST | HUB | B MM | C MM |
| 210548 | NDL VENT (0.5/51/5) C-F | 0.50 | 0.25 | 1.40 | 51 | 5 | C-Female | 17 | 20 |
| 210549 | NDL VENT (1.0/76/5) C-F | 1.00 | 0.70 | 1.80 | 76 | 5 | C-Female | 30 | 33 |
| 210550 | NDL VENT (1.6/102/5) C-F | 1.60 | 1.20 | 2.50 | 102 | 5 | C-Female | 60 | 63 |
| 210551 | NDL VENT (2.0/102/5) C-F | 2.00 | 1.60 | 3.00 | 102 | 5 | C-Female | 60 | 63 |

Venting C-Male Needles



| STANDARD | | | | | | | | | |
|-------------|--------------------------|---------|---------|---------|------|-----|--------|------|------|
| PART NUMBER | DESCRIPTION | O.D. MM | I.D. MM | C.D. MM | A MM | PST | HUB | B MM | C MM |
| 210552 | NDL VENT (0.5/51/5) C-M | 0.50 | 0.25 | 1.40 | 51 | 5 | C-Male | 17 | 20 |
| 210553 | NDL VENT (1.0/76/5) C-M | 1.00 | 0.70 | 1.80 | 76 | 5 | C-Male | 30 | 33 |
| 210554 | NDL VENT (1.6/102/5) C-M | 1.60 | 1.20 | 2.50 | 102 | 5 | C-Male | 60 | 63 |
| 210555 | NDL VENT (2.0/102/5) C-M | 2.00 | 1.60 | 3.00 | 102 | 5 | C-Male | 60 | 63 |

Venting Needles



| CUSTOM | | | | |
|--------------------------|------------------------|---|--------------------------|---------------------------|
| 210600 (BASIC NUMBER) | | | | |
| Code | O.D. Outer Diameter | I.D. Inner Diameter | C.D. Coaxial Diameter | Approximate Gauge of I.D. |
| 01 | 0.50 mm | 0.15 mm | 1.40 mm | 30 |
| 02 | 0.50 mm | 0.25 mm | 1.40 mm | 25 |
| 03 | 1.00 mm | 0.20 mm | 1.80 mm | 27 |
| 04 | 1.00 mm | 0.30 mm | 1.80 mm | 24 |
| 05 | 1.00 mm | 0.40 mm | 1.80 mm | 22 |
| 06 | 1.00 mm | 0.50 mm | 1.80 mm | 21 |
| 07 | 1.00 mm | 0.70 mm | 1.80 mm | 19 |
| 08 | 1.60 mm | 0.51 mm | 2.50 mm | 21 |
| 09 | 1.60 mm | 0.71 mm | 2.50 mm | 19 |
| 10 | 1.60 mm | 0.79 mm | 2.50 mm | near to 18 |
| 11 | 1.60 mm | 1.06 mm | 2.50 mm | 17 |
| 12 | 1.60 mm | 1.20 mm | 2.50 mm | 16 |
| 13 | 2.00 mm | 0.50 mm | 3.00 mm | 21 |
| 14 | 2.00 mm | 0.61 mm | 3.00 mm | 20 |
| 15 | 2.00 mm | 1.00 mm | 3.00 mm | near to 17 |
| 16 | 2.00 mm | 1.20 mm | 3.00 mm | 16 |
| 17 | 2.00 mm | 1.60 mm | 3.00 mm | 14 |
| ↓ | Code A | | | |
| | X X X | O.D. > Ø 0.50 = 20-180 mm / Ø 1.00 = 25-180 mm / Ø 1.60 = 25-180 mm / Ø 2.0 = 30-180 mm | | |
| | ↓ | Code | | Point Style |
| | | 0 | | Point Style AS |
| | | 4 | | Point Style 4 |
| | 5 | | Point Style 5 | |
| | ↓ | Code | | Hub |
| | | 1 | | TLL-Female |
| | | 2 | | TLL-Male |
| | | 3 | | C-Female (1/4"-28 UNF) |
| 4 | | C-Male (1/4"-28 UNF) | | |
| ↓ | Code B | | | |
| | X X | O.D. Ø 0.50 = 05 - 17 mm | | |
| | | O.D. Ø 1.00 = 10 - 30 mm | | |
| | | O.D. Ø 1.60 = 10 - 60 mm | | |
| O.D. Ø 2.00 = 15 - 60 mm | | | | |
| ↓ | Code C | | | |
| | X X X | Min. dimension = B + 3 mm Max. dimension = A - 12 mm | | |
| 210600 | | | | ← REFERENCE NUMBER |

Example: 210600-03-100-5-2-20-030

This example part number results in a venting needle with O.D. = 1.0 mm, I.D. = 0.2 mm, A = 100 mm, point style 5, TLL-Male hub, B = 20 mm, C = 30 mm

Venting Needles are sold individually

Hat Hub Needles



| CUSTOM | | |
|-------------|-------|-----------------|
| LENGTH | GAUGE | POINT 2, 3 OR 4 |
| 10 - 304 mm | 26 ga | 90826 |
| | 25 ga | 90825 |
| | 24 ga | 90824 |
| | 23 ga | 90823 |
| | 22 ga | 90822 |
| | 21 ga | 90821 |
| | 20 ga | 90820 |
| | 19 ga | 90819 |
| | 18 ga | 90818 |
| | 17 ga | 90817 |
| | 16 ga | 90816 |
| | 15 ga | 90815 |
| 14 ga | 90814 | |

Hat needles are sold in three-packs

Stainless Steel Tubing



| CUSTOM | | | |
|--------|--------------|--------------------|------------------|
| GAUGE | CUT TUBING * | POINT 2, 3 OR 4 ** | POINT 5 OR AS ** |
| 33 ga | 21033 | 22033-01 | - |
| 32 ga | 21032 | 22032-01 | - |
| 31 ga | 21031 | 22031-01 | - |
| 30 ga | 21030 | 22030-01 | - |
| 29 ga | 21029 | 22029-01 | - |
| 28 ga | 21028 | 22028-01 | - |
| 27 ga | 21027 | 22027-01 | - |
| 26s ga | 21039 | 22039-01 | 22039-02 |
| 26 ga | 21026 | 22026-01 | 22026-02 |
| 25s ga | 21058 | 22058-01 | 22058-02 |
| 25 ga | 21025 | 22025-01 | 22025-02 |
| 24 ga | 21024 | 22024-01 | 22024-02 |
| 23s ga | 21041 | 22041-01 | 22041-02 |
| 23 ga | 21023 | 22013-01 | 22023-02 |
| 22s ga | 21038 | 22038-01 | 22038-02 |
| 22 ga | 21022 | 22022-01 | 22022-02 |
| 21 ga | 21021 | 22021-01 | 22021-02 |
| 20 ga | 21020 | 22020-01 | 22020-02 |
| 19 ga | 21019 | 22019-01 | 22019-02 |
| 18 ga | 21018 | 22018-01 | 22018-02 |
| 17 ga | 21017 | 22017-01 | 22017-02 |
| 16 ga | 21016 | 22016-01 | 22016-02 |
| 15 ga | 21015 | 22015-01 | 22015-02 |
| 14 ga | 21014 | 22014-01 | 22014-02 |
| 13 ga | 21013 | 22013-01 | 22013-02 |
| 12 ga | 21012 | 22012-01 | 22012-02 |
| 11 ga | 21011 | 22011-01 | 22011-02 |
| 10 ga | 21010 | 22010-01 | 22010-02 |

*Cut cannulas are sold in single-packs

**Needle cannulas are sold in six-packs that are processed and cleaned the same as a standard needle assembly



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