

# Codes and Explanations

Several different needle point styles are offered on HAMILTON syringe and needle products depending upon the application. The standard needles are manufactured from stainless steel and optimized according to use and syringe capacity. They have a standard length of 51 mm and point style 2 or 3.

Standard diameters available are:

Gauge 26s for 5  $\mu$ l and 10  $\mu$ l syringes

Gauge 22s for 25  $\mu$ l to 250  $\mu$ l syringes

Gauge 22 for syringes 500  $\mu$ l and above.



Syringes and needles manufactured by HAMILTON are intended for scientific research and laboratory use only and are not intended for human in vivo use.

## Point styles (pst)



### pst 2

This is the standard point style suitable for septum penetration for all chromatographic applications. 10-12° bevelled, non-coring needle point, recommended for septum penetration. (Only needle gauges from 22 to 26s are ideal for septum penetration.)



### pst 3

This needle has a 90° bevel and is mainly used in HPLC injection valves. It is recommended for sample pipetting and where precision dosing is required (e.g. thin layer chromatography).



### pst 4

This needle is cut at an angle of 10-12° and has a sharp point for animal injections.



### pst 5

Conical needle with closed end and a side hole. The closed end prevents the needle from being plugged when septa are penetrated (coring). Pst 5 needles are available from gauges 10 to 26s. Ideal for penetration of septa, thin-gauged vinyls and plastic without coring.



### pst AS

The needles have an 8° cone. They have been designed to penetrate GC Autosampler septa. AS standard needles are available in gauges 26, 26s, 23, 23s, 22, 22s. Other dimensions on request.

The needles are electro-polished and electro-tapered.

This is a manufacturing process that electrochemically removes the needle material and eliminates burrs. This process is used for pst 2 and pst 3 needles and minimizes damage to septa during penetration.

Needles can be electro-tapered from gauges 10 to 26s.

**SN needles are only tapered on request.**

## Custom Needle Gauge and Length

When selecting a needle gauge it is important to keep in mind the volume of the syringe and the dead volume of the needle. For example, it will be very difficult to prime a 10 µL syringe if the dead volume in the needle is greater than 10 µL. Refer to the gauge index to choose a needle gauge with an appropriate µL/inch before selecting a needle. Select the minimum length that allows you to carry out your application comfortably.

**Note:** The 's' on a 22s needle represents a smaller I.D. (inner diameter) for the needle and a thicker needle wall for better durability. For example, a 26 gauge needle has an O.D. (outer diameter) of 0.46 mm and an I.D. of 0.26 mm while the 26s gauge needle has an O.D. of 0.47 mm and an I.D. of 0.13 mm. The 26s has half the I.D. of the 26 gauge needle. Also, the difference in the wall thickness nearly doubles with 26s gauge having a thickness of 0.18 mm while the 26 gauge is only 0.10 mm.

### Gauge Index Table

Gauge	Nominal O.D.		Nominal I.D.		Wall Thickness		Volume µL/inch
	inch	mm*	inch	mm*	inch	mm*	
33	.0080-.0085	0.21	.0035-.0050	0.11	0.002	0.05	0.20
32	.0090-.0095	0.24	.0035-.0050	0.11	0.002	0.05	0.20
31	.0100-.0105	0.26	.0045-.0060	0.13	0.0025	0.06	0.34
30	.0120-.0125	0.31	.0055-.0070	0.16	0.003	0.08	0.45
28	.0140-.0145	0.36	.0065-.0080	0.18	0.0035	0.09	0.63
27	.0160-.0165	0.41	.0075-.0090	0.21	0.004	0.10	0.80
26s	.0184-.0189	0.47	.0045-.0055	0.13	0.007	0.18	0.26
26	.0180-.0185	0.46	.0095-.0110	0.26	0.004	0.10	1.25
25	.0200-.0205	0.51	.0095-.0110	0.26	0.005	0.13	1.25
24	.0220-.0225	0.57	.0115-.0130	0.31	0.005	0.13	1.80
23	.0250-.0225	0.64	.0125-.0140	0.34	0.006	0.15	2.17
22s	.0280-.0285	0.72	.0055-.0065	0.15	0.011	0.28	0.45
22	.0280-.0285	0.72	.0155-.0170	0.41	0.006	0.15	3.35
21	.0320-.0325	0.82	.0195-.0210	0.51	0.006	0.15	5.19
20	.0355-.0360	0.91	.0230-.0245	0.60	0.006	0.15	6.71
18	.0495-.0505	1.27	.0315-.0345	0.84	0.0085	0.22	14.08
17	.0575-.0580	1.47	.0405-.0435	1.07	0.008	0.20	22.84
16	.0645-.0655	1.65	.0455-.0485	1.19	0.009	0.23	28.25
14	.0820-.0840	2.11	.0610-.0600	1.60	0.010	0.25	51.07
13	.0940-.0960	2.41	.0690-.0730	1.80	0.012	0.31	64.63
12	.1080-.1100	2.77	.0830-.0870	2.16	0.012	0.31	93.07
11	.1190-.1210	3.05	.0920-.0960	2.39	0.013	0.33	113.00
10	.1330-.1350	3.40	.1040-.1080	2.69	0.014	0.36	143.28

\*mm are nominal