

Device Characteristic Recommendations



FITTER Forward experts evaluated device characteristics that impact injection experience.

1 Length

- Needle length should be long enough to traverse the skin but short enough to avoid intramuscular injection

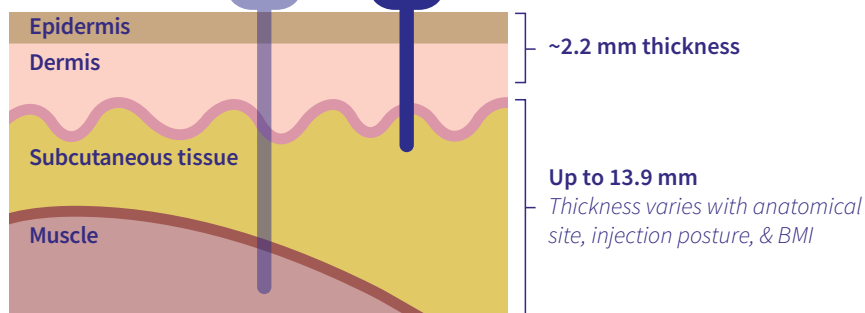


6 mm is the recommended length for insulin syringe needles



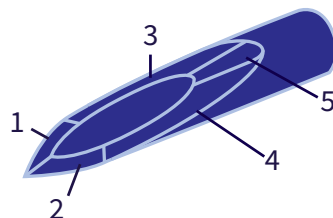
4 mm pen needles are recommended for all people (adults and children)

8 mm needle ✗
4 mm needle ✓



2 Sharpness (Geometry)

- Needles sharpness should minimize skin penetration force
- 5 bevels, the angles that create the needle tip, are preferred to 3 bevels



3 Width & Wall Thickness

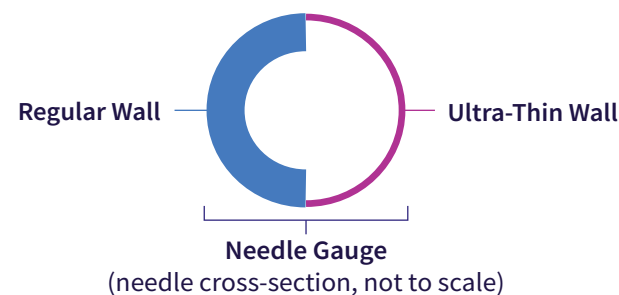
- Needle width (gauge) should be thin to reduce injection pain – higher gauge number indicates a thinner needle
- Current evidence suggests 32G reduces pain without being too fragile, as higher gauge needles may pose an increased risk of bending or breaking
- Needle wall thickness should be thin to create larger lumen to enable higher flow rate



31G is the recommended width for syringe needles

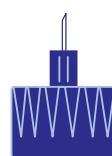


32G is the recommended width for pen needles



4 Pen Needle Base

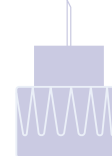
- Needle base design influences the way pressure is concentrated at the injection site
- A non-posted, contoured base is recommended as it first concentrates pressure at the insertion site but then distributes forces across the skin surface



Posted



Contoured



Flat*

*A flat base pen needle is also available; however, there is currently no evidence demonstrating the impact of flat bases on injection pressure

Access the full manuscript here:



FITTER Forward is sponsored by embecta.

Klonoff DC et al. Mayo Clin Proc. 2025;100(4):682-699.
doi:10.1016/j.mayocp.2025.01.004