

CLAIMS

What is claimed is:

1. A needle device (100) comprising:
 - a catheter hub (106) having a body defining an interior cavity (120) and having a proximal opening (130);
 - a catheter tube (108) extending distally of the catheter hub (106) and comprising a distal opening (50);
 - a needle hub (102);
 - a needle (104) extending distally of the needle hub (102), said needle (104) comprising a shaft and a needle tip (110) extending distally of the distal opening (50) of the catheter tube (108) in a ready to use position, and
 - a needle guard (122) comprising a proximal wall (126) and at least one arm (124a, 124b) extending distal the proximal wall (126),characterized in that
 - said the needle (104) comprises a first shaft diameter region (104a), a first transition region 104c that tapers from a large diameter to a smaller diameter in a proximal direction, a reduced diameter region 104b, and a second transition region 104c that tapers from a small diameter to a larger diameter in the proximal direction, and a second shaft diameter region 104a proximal of the second transition region 104c and at least part of the shaft diameter region (104a) and the transition region (104c) are located in a bore of the catheter tube (108), proximal of the distal opening (50); and
 - the at least one arm (124a, 124b) presses against the reduced diameter region (104b) in the ready position and secures the needle tip (110) in a protective position.
2. The needle device (100) of claim 1, wherein the needle guard has two arms (124a, 124b) pressing against the reduced diameter region (104b) in the ready position.
3. The needle device of claim 2, wherein the two arms (124a, 124b) of the needle guard (122) each comprises a distal wall (90a, 90b) and an elbow section (94a, 94b) and at least one of the elbow sections engaging a projection (136) extending from an interior surface of the interior cavity (120) in the ready position, the reduced diameter region (104b) of the needle (104) biasing the two arms (124a, 124b) outwardly.
4. The needle device (100) of claim 3, wherein a curved lip (92a, 92b) extends from each distal wall (90a, 90b) and presses against the reduced diameter region (104b) in the ready position.

5. The needle device (100) according to any one of the preceding claims, wherein the reduced diameter region (104b) extends from the needle hub (102) to the distal end of the catheter hub (106) in the ready position.

6. The needle device according to any one of the preceding claims, wherein the needle (104) further comprises a shaft diameter region (104a) proximal of the reduced diameter region (104b).

7. The needle device (100) according to any one of the preceding claims, wherein the needle (104) further comprises a change in profile (128) adjacent the needle tip (110), wherein the change in profile (128) is larger than a perimeter defining an opening on the proximal wall (126).

8. The needle device (100) according to any one of the preceding claims, wherein the reduced diameter region (104b) extends from the needle hub (102) to adjacent the needle tip (110) in the ready position.

9. The needle device (100) according to any one of the preceding claims, wherein the shaft diameter region (104a) is larger than a perimeter defining an opening on the proximal wall (126).

10. A method for manufacturing a needle device (100), the method comprising:
attaching a catheter tube (108) to a catheter hub (106), said catheter hub (106) comprising a hub body comprising an exterior surface and an interior surface defining an interior cavity (120);

projecting a needle (104) through the catheter tube (108) so that a needle tip (110) of the needle (104) extends distally of a distal end (50) of the catheter tube (108) in a ready to use position, said needle (104) having a proximal end attached to a needle hub (102), the needle (104) comprises a first shaft diameter region (104a), a first transition region 104c that tapers from a large diameter to a smaller diameter in a proximal direction, a reduced diameter region 104b, and a second transition region 104c that tapers from a small diameter to a larger diameter in the proximal direction, and a second shaft diameter region 104a proximal of the second transition region 104c and

providing a needle guard (122) comprising a proximal wall (126) and two arms (124a, 124b) extending distally of the proximal wall (126), the two arms (124a, 124b) pressing against the reduced diameter region (104b) in the ready position; and

wherein at least part of the shaft diameter region (104a) and the transition region (104c) are located in a bore of the catheter tube (108) proximal of the distal end (50) of the catheter tube (108) in the ready to use position.

11. The method of claim 10, further comprising pressing the two arms (124a, 124b) against the reduced diameter region (104b) in the ready position.

12. The method according to any one of claims 10 or 11, further comprising engaging an elbow section (94a, 94b) of at least one of the arms (124a, 124b) against a
5 projection (136) inside the interior cavity (120) of the catheter hub (106) in the ready position and the two arms being biased outwardly by the reduced diameter region (104b) of the needle (104).

13. The method according to any one of claims 10 to 12, wherein a curved lip (92a, 92b) extending from a distal wall (90a, 90b) of each arm (124a, 124b) presses against
10 the reduced diameter region (104b) in the ready position.

14. The method according to any one of claims 10 to 13, wherein the reduced diameter region (104b) extends from the needle hub (102) to the distal end of the catheter hub (106) in the ready position.

15. The method according to any one of claims 10 to 14, wherein the reduced
15 diameter region (104b) is centered about the distal walls (90a, 90b) in the ready position and the transition region (104c) is located on opposite sides of the reduced diameter region (104b).

16. The method according to any one of claims 10 to 15, wherein the needle (104) further comprises a change in profile (128) adjacent the needle tip (110), wherein the change
20 in profile (128) is larger than a perimeter defining an opening on the proximal wall 126.

17. The method according to any one of claims 10 to 16, wherein the reduced diameter region (104b) extends from the needle hub (102) to adjacent the needle tip (110) in the ready position.

18. The method according to any one of claims 10 to 17, wherein the shaft
25 diameter region (104a) is larger than a perimeter defining an opening on the proximal wall (126).