What is claimed is:

1. A luer connection device comprising:

a housing including a side wall having an inside surface defining a lumen with a central axis, a proximal end, and a distal end, the lumen extending from the proximal end through to the distal end, the lumen including a male luer tip within the lumen having a passageway therethrough providing fluid communication between the proximal end and the distal end;

a central flow diverter is disposed inside the lumen including a plurality of vanes having a tapered leading edge and a tapered tailing edge extending outwardly from the central axis to direct a fluid to a circumferential dead space distal to the male luer tip.

2. The luer connection device of claim 1 further comprising at least one flow expansion channel within the lumen for increasing flow and mixing of the fluid through the circumferential dead space distal to the male luer tip, the flow expansion channel projecting outward from the side wall of the housing toward the central axis to reduce the cross-section width of the lumen.

3. The luer connection device of claim 2 wherein the flow expansion channel is configured to extend in a straight taper outwardly from the central axis of the lumen.

4. The luer connection device of claim 2 wherein the flow expansion channel is configured to extend in a rotational taper outwardly from the central axis of the lumen.

5. The luer connection device of claim 2 wherein the flow expansion channel is located upstream from the flow diverter.

6. A vascular access device incorporating the luer connection device of claim 1.

7. The vascular access device of claim 6 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing, or needleless connector.

8. The luer connection device of claim 1 wherein the proximal end is removably connected to a vascular access device.

9. The luer connection device of claim 8 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing or needleless connector.

10. The luer connection device of claim 1 wherein the central flow diverter is configured in a cross, rectangle, star, triangle, oval, spiral, twisting or helical formation.

11. The luer connection device of claim 1 wherein the tapered leading edge is configured to create a smooth entrance of fluid and the tapered tailing edge is configured to create a sharp exit for producing turbulent fluid flow upon exiting the central flow diverter.

12. The luer connection device of claim 1 wherein the plurality of vanes are configured to extend straight outwardly from the central axis of the lumen to the side wall.

13. The luer connection device of claim 1 wherein the plurality of vanes extend outwardly from the central axis of the lumen in a curved configuration.

14. The luer connection device of claim 1 wherein at least one edge of the plurality of vanes has a ramped angled surface to create a greater angle of incidence.

15. A luer connection device comprising:

a housing including a side wall having an inside surface defining a central lumen with a central axis, a proximal end, and a distal end including a male luer tip having a passageway therethrough providing fluid communication between the proximal end and the distal end; and

a flow expansion channel disposed in the interior of the central lumen tapering outward from the wall of the housing and partially extending along a longitudinal axis from the distal end toward the proximal end for increasing mixing and flow through a circumferential dead space in a fluid path distal to the male luer tip.

16. A vascular access device incorporating the luer connection device of claim 15.

17. The vascular access device of claim 16 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing, or needleless access device.

18. The luer connection device of claim 15 wherein the proximal end is removably connected to a vascular access device.

19. The luer connection device of claim 18 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing, or needleless connector.

20. The luer connection device of claim 17 wherein the syringe is a pre-filled flush syringe.

21. The luer connection device of claim 15 wherein the flow expansion channel is configured to extend in a rotational taper outwardly from the central axis of the lumen.

22. The luer connection device of claim 15 wherein the flow expansion channel is configured to scallop outwardly from the central axis of the lumen.

23. The luer connection device of claim 15 wherein the flow expansion channel is located at the distal end and projects axially in a proximal direction towards the proximal end.

24. The luer connection device of claim 15 further comprising a flow diverter disposed in the lumen at or near the distal end of the male luer tip to direct the fluid flow to the periphery of a connecting female luer space upon application of force in the distal direction.

25. The luer connection device of claim 24 wherein the flow diverter is connected to the flow expansion channel.

26. The luer connection device of claim 24 wherein the flow expansion channel is located upstream from the flow diverter.

27. The luer connection device of claim 24 wherein the flow diverter directs fluid flow into the flow expansion channel.

28. The luer connection device of claim 24 wherein the flow expansion channel directs fluid flow into the flow diverter.

29. The luer connection device of claim 24 wherein the flow expansion channel is configured to extend in a rotational taper towards the central axis of the lumen and flow diverter is configured to extend in a straight taper towards the central axis of the lumen.

What is claimed is:

1. A luer connection device comprising:

a housing including a side wall having an inside surface defining a lumen with a central axis, a proximal end, and a distal end, the lumen extending from the proximal end through to the distal end, the lumen including a male luer tip within the lumen having a passageway therethrough providing fluid communication between the proximal end and the distal end;

a central flow diverter is disposed inside the lumen including a plurality of vanes having a tapered leading edge and a tapered tailing edge extending outwardly from the central axis to direct a fluid to a circumferential dead space distal to the male luer tip.

2. The luer connection device of claim 1 further comprising at least one flow expansion channel within the lumen for increasing flow and mixing of the fluid through the circumferential dead space distal to the male luer tip, the flow expansion channel projecting outward from the side wall of the housing toward the central axis to reduce the cross-section width of the lumen.

3. The luer connection device of claim 2 wherein the flow expansion channel is configured to extend in a straight taper outwardly from the central axis of the lumen.

4. The luer connection device of claim 2 wherein the flow expansion channel is configured to extend in a rotational taper outwardly from the central axis of the lumen.

5. The luer connection device of claim 2 wherein the flow expansion channel is located upstream from the flow diverter.

6. A vascular access device incorporating the luer connection device of claim 1.

7. The vascular access device of claim 6 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing, or needleless connector.

8. The luer connection device of claim 1 wherein the proximal end is removably connected to a vascular access device.

9. The luer connection device of claim 8 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing or needleless connector.

10. The luer connection device of claim 1 wherein the central flow diverter is configured in a cross, rectangle, star, triangle, oval, spiral, twisting or helical formation.

11. The luer connection device of claim 1 wherein the tapered leading edge is configured to create a smooth entrance of fluid and the tapered tailing edge is configured to create a sharp exit for producing turbulent fluid flow upon exiting the central flow diverter.

12. The luer connection device of claim 1 wherein the plurality of vanes are configured to extend straight outwardly from the central axis of the lumen to the side wall.

13. The luer connection device of claim 1 wherein the plurality of vanes extend outwardly from the central axis of the lumen in a curved configuration.

14. The luer connection device of claim 1 wherein at least one edge of the plurality of vanes has a ramped angled surface to create a greater angle of incidence.

15. A luer connection device comprising:

a housing including a side wall having an inside surface defining a central lumen with a central axis, a proximal end, and a distal end, the lumen extending from the proximal end through to the distal end, the lumen including a male luer tip having a passageway therethrough providing fluid communication between the proximal end and the distal end; and

a flow expansion channel disposed in the interior of the central lumen tapering outward from the wall of the housing and partially extending along a longitudinal axis from the distal end toward the proximal end for increasing mixing and flow through a circumferential dead space in a fluid path distal to the male luer tip.

16. A vascular access device incorporating the luer connection device of claim 15.

17. The vascular access device of claim 16 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing, or needleless access device.

18. The luer connection device of claim 15 wherein the proximal end is removably connected to a vascular access device.

19. The luer connection device of claim 18 wherein the vascular access device is a syringe, extension set, intravenous set, stop cock, tubing, high pressure extension tubing, or needleless connector .

20. The luer connection device of claim 17 wherein the syringe is a pre-filled flush syringe.

21. The luer connection device of claim 15 wherein the flow expansion channel is configured to extend in a rotational taper outwardly from the central axis of the lumen.

22. The luer connection device of claim 15 wherein the flow expansion channel is configured to scallop outwardly from the central axis of the lumen.

23. The luer connection device of claim 15 wherein the flow expansion channel is located at the distal end and projects axially in a proximal direction towards the proximal end.

24. The luer connection device of claim 15 further comprising a flow diverter disposed in the lumen at or near the distal end of the male luer tip, the flow diverter including a plurality of vanes having a tapered leading edge and a tapered tailing edge extending outwardly from the central axis to direct the fluid flow to the periphery of a connecting female luer space upon application of force in the distal direction.

25. The luer connection device of claim 24 wherein the flow diverter is connected to the flow expansion channel.

26. The luer connection device of claim 24 wherein the flow expansion channel is located upstream from the flow diverter.

27. The luer connection device of claim 24 wherein the flow diverter directs fluid flow into the flow expansion channel.

28. The luer connection device of claim 24 wherein the flow expansion channel directs fluid flow into the flow diverter.

29. The luer connection device of claim 24 wherein the flow expansion channel is configured to extend in a rotational taper towards the central axis of the lumen and flow diverter is configured to extend in a straight taper towards the central axis of the lumen.