

CLAIMS

THE INVENTION CLAIMED IS:

1. A fluid path connector for a medical fluid delivery system, the fluid path connector comprising:
 - a first connector element comprising a body, a first lumen, a first flexible leg, and a second flexible leg; and
 - a second connector element comprising a body defining an undercut, a second lumen, a channel defined in the body, and at least one sealing element positioned within the channel, wherein the first flexible leg comprises a first flange and the second flexible leg comprises a second flange, wherein, upon engagement of the first connector element with the second connector element, the first flange and the second flange engage with the undercut of the body of the second connector element to prevent disengagement of the first connector element and the second connector element, and wherein the sealing element is configured to define a fluid tight seal between the second lumen of the second connector element and the first lumen of the first connector element to form a fluid path when the first connector element and the second connector element are engaged with one another.
2. The fluid path connector of claim 1, wherein the first connector element and the second connector element are each in fluid communication with a fluid element selected from the group consisting of a syringe, a spike member, a fluid tube set, and a bulk fluid container.
3. The fluid path connector of claim 1 or 2, wherein the first flange and the second flange are each angled inwardly towards a longitudinal axis of the first connector element.
4. The fluid path connector of any of claims 1-3, wherein the first flange and the second flange are each angled at 45-75 degrees relative to a longitudinal axis of the first connector element.
5. The fluid path connector of any of claims 1-4, the first connector element further comprising a first actuating arm associated with the first flexible leg and a second actuating arm associated with the second flexible leg, and

wherein, upon applying an inwardly-directed pressure to the first actuating arm and the second actuating arm, the first flexible leg and the second flexible leg move in an outward direction relative to the body of the second connector element to disengage the first flange and the second flange from the undercut to allow the first connector element and the second connector element to be disengaged.

6. The fluid path connector of claim 5, wherein at least one of the first flexible leg and the second flexible leg include at least one reinforcing rib.

7. The fluid path connector of any of claims 1-6, wherein, when the first connector element and the second connector element are connected to one another, the first connector element and the second connector element are configured to withstand a fluid pressure in the fluid path of at least 800 psi.

8. The fluid path connector of any of claims 1-7,
wherein the first connector element further comprises a support base that extends from the body between the first flexible leg and the second flexible leg, and
wherein the support base is configured to reduce deflection of the body due to a fluid pressure exerted by a fluid moving through the fluid path.

9. The fluid path connector of claim 8, wherein the support base comprises at least one reinforcing rib to reduce deflection of the body due to the fluid pressure exerted by the fluid moving through the fluid path.

10. The fluid path connector of any of claims 1-9, wherein the sealing element is one of the following: an elastomeric O-ring, an overmolded sealing surface, and a quad ring.

11. The fluid path connector of any of claims 1-10, wherein the channel is dimensioned such that the at least one sealing element moves along a longitudinal axis of the second connector element in opposite directions within the channel when the first connector element and the second connector element are engaged and disengaged from one another.

12. The fluid path connector of any of claims 1-11, wherein the at least one sealing element moves between a first position in which the at least one sealing member seals a fluid channel

defined in the second connector element to prevent the fluid from flowing through the second connector element and a second position in which the at least one sealing member is moved out of the fluid channel to permit the fluid to flow through the second connector element.

13. The fluid path connector of any of claims 1-12, wherein at least one of the first connector element and the second connector element further comprises a skirt that surrounds the body of the first connector element and the body of the second connector element.

14. The fluid path connector of claim 13, wherein the skirt extends beyond a distal end of the body of at least one of the first connector element and the second connector element.

15. The fluid path connector of claim 13 or claim 14, wherein at least one aperture is defined in the skirt for the second connector element.

16. The fluid path connector of any of claims 1-15, wherein at least one of the first connector element and the second connector element further comprises a fluid path adaptor configured for connecting the at least one of the first connector element and the second connector element to a fluid delivery element.

17. The fluid path connector of any of claims 1-16, wherein the first connector element comprises a slidable sleeve configured to lock the first and second flexible arms when the first connector element is engaged with the second connector element.

18. A medical fluid delivery system, comprising:
a syringe comprising a proximal end, a distal end, and a sidewall extending from the proximal end to the distal end;
a fluid delivery member; and
a fluid path connector, comprising:
a first connector element comprising a body, a first lumen, a first flexible leg, and a second flexible leg; and
a second connector element comprising a body defining an undercut, a second lumen, a channel defined in the body, and at least one sealing element positioned within the channel,
wherein the first connector element is fluidly connected to the fluid delivery member,

wherein the second connector element is fluidly connected to the distal end of the syringe,

wherein the first flexible leg comprises a first flange and the second flexible leg comprises a second flange,

wherein, upon engagement of the first connector element with the second connector element, the first flange and the second flange engage with the undercut of the body of the second connector element to prevent disengagement of the first connector element and the second connector element, and

wherein the sealing element is configured to define a fluid tight seal between the second lumen of the second connector element and the first lumen of the first connector element to form a fluid path when the first connector element and the second connector element are engaged with one another.

19. The medical fluid delivery system of claim 18, wherein the first connector element and the second connector element are each in fluid communication with a fluid element selected from the group consisting of a syringe, a spike member, a fluid tube set, and a bulk fluid container.

20. The medical fluid delivery system of claim 18 or 19, wherein the first flange and the second flange are each angled inwardly towards a longitudinal axis of the first connector element.

21. The medical fluid delivery system of any of claims 18-20, wherein the first flange and the second flange are each angled at 45-75 degrees relative to a longitudinal axis of the first connector element.

22. The medical fluid delivery system of any of claims 18-21, the first connector element further comprising a first actuating arm associated with the first flexible leg and a second actuating arm associated with the second flexible leg, and

wherein, upon applying an inwardly-directed pressure to the first actuating arm and the second actuating arm, the first flexible leg and the second flexible leg move in an outward direction relative to the body of the second connector element to disengage the first flange and the second flange from the undercut to allow the first connector element and the second connector element to be disengaged.

23. The medical fluid delivery system of claim 22, wherein at least one of the first flexible leg and the second flexible leg include at least one reinforcing rib.
24. The medical fluid delivery system of any of claims 18-23, wherein, when the first connector element and the second connector element are connected to one another, the first connector element and the second connector element are configured to withstand up a fluid pressure in the fluid path of at least 800 psi.
25. The medical fluid delivery system of any of claims 18-24, wherein the first connector element further comprises a support base that extends from the body between the first flexible leg and the second flexible leg, and
wherein the support base is configured to reduce deflection of the body due to a fluid pressure exerted by a fluid moving through the fluid path.
26. The medical fluid delivery system of claim 25, wherein the support base comprises at least one reinforcing rib to reduce deflection of the body due to the fluid pressure exerted by the fluid moving through the fluid path.
27. The medical fluid delivery system of any of claims 18-26, wherein the channel is dimensioned such that the sealing element moves along a longitudinal axis of the second connector element in opposite directions within the channel when the first connector element and the second connector element are engaged and disengaged from one another.
28. The medical fluid delivery system of any of claims 18-27, wherein at least one of the first connector element and the second connector element further comprises a skirt that surrounds the body of the first connector element and the body of the second connector element.
29. The medical fluid delivery system of claim 28, wherein the skirt extends beyond a distal end of the body of at least one of the first connector element and the second connector element.
30. The medical fluid delivery system of claim 28 or 29, wherein at least one aperture is defined in the skirt for the second connector element.

31. The medical fluid delivery system of any of claims 18-30, wherein at least one of the first connector element and the second connector element further comprises a fluid path adaptor configured for connecting the at least one of the first connector element and the second connector element to a fluid delivery element.

32. The medical fluid delivery system of any of claims 18-31, wherein the first connector element comprises a slidable sleeve configured to lock the first and second flexible arms when the first connector element is engaged with the second connector element.

33. A fluid path connector for a medical fluid delivery system, the fluid path connector comprising:

- a first connector element comprising a body defining a first undercut, a first flexible leg, and a second flexible leg; and

- a second connector element comprising a body defining a second undercut, a third flexible leg, and a fourth flexible leg,

- wherein the first flexible leg comprises a first flange, the second flexible leg defines a second flange, the third flexible leg comprises a third flange, and the fourth flexible leg defines a fourth flange, and

- wherein, upon engagement of the first connector element with the second connector element, the first flange and the second flange link into the second undercut of the body of the second connector element and the third flange and the fourth flange link into the first undercut of the body of the first connector element to ensure the first connector element and the second connector element are prevented from disengaging with one another.

34. The fluid path connector of claim 33, wherein the first flange and the second flange are each angled inwardly towards a longitudinal axis of the first connector element, and

- wherein the third flange and the fourth flange are each angled inwardly towards a longitudinal axis of the second connector element.

35. The fluid path connector of claim 33 or 34, wherein the first flange and the second flange are each angled at 45-75 degrees relative to a longitudinal axis of the first connector element, and

- wherein the third flange and the fourth flange are each angled at 45-75 degrees relative to a longitudinal axis of the second connector element.

36. The fluid path connector of any of claims 33-35, wherein the first connector element further comprises a first actuating arm and a second actuating arm,

wherein the second connector element further comprises a third actuating arm and a fourth actuating arm,

wherein, upon applying an inwardly-directed pressure to the first actuating arm and the second actuating arm, the first flexible leg and the second flexible leg move in an outward direction relative to the body of the second connector element to allow the first connector element and the second connector element to be disengaged, and

wherein, upon applying an inwardly-directed pressure to the third actuating arm and the fourth actuating arm, the third flexible leg and the fourth flexible leg move in an outward direction relative to the body of the second connector element to allow the first connector element and the second connector element to be disengaged.

37. The fluid path connector of claim 36, wherein at least one of the first actuating arm, the second actuating arm, the third actuating arm, and the fourth actuating arm include at least one reinforcing rib.

38. The fluid path connector of any of claims 33-37, wherein, when the first connector element and the second connector element are connected to one another, the first connector element and the second connector element are configured to withstand up a fluid pressure of at least 800 psi.