CLAIMS

1. A connector assembly for making fluid connections comprising:

a first hollow connector body and a second hollow connector body, each body having first and second ends, an exterior, and an interior which extends between the first and second ends;

a coupling mechanism arranged to couple the first and second connector bodies at the first ends of the bodies;

a hollow piston having first and second ends, an interior extending between the first and second ends, an exterior, and first and second seals on the exterior of the piston, the piston being moveable from a first position, wherein the piston is positioned in the interior of the first connector body, to a second position, wherein the piston extends between the first and second connector bodies and the exterior of the piston is sealed to the interiors of the first and second bodies; and

a moveable actuator, the actuator being axially moveable from a first position, wherein the actuator is located on the exterior of the first connector body, to a second position, wherein the actuator is located around the coupling mechanism, the actuator and the piston being coupled to move the piston from the first position to the second position in response to movement of the actuator from the first position to the second position.

2. The connector assembly of claim 1 wherein the first connector body has at least one side opening, and wherein the actuator is mechanically coupled through the side opening in the first connector body to the piston between the first and second piston seals.

3. The connector assembly of claim 1 wherein the actuator and the piston are mechanically coupled without being integrally connected.

4. The connector assembly of claim 1 wherein the piston includes a protrusion and wherein the actuator is arranged to abut the protrusion without being integrally connected to the protrusion.

5. The connector assembly of claim 1 wherein the coupling mechanism comprises a snap-fit arrangement including at least one bendable arm extending between the first and second connector bodies and wherein the moveable actuator is axially spaced from the bendable arm in the first position of the actuator and is positioned along the exterior of the bendable arm in the second position to prevent the arm from bending.

6. The connector assembly of claim 1 wherein in the first position the first and second ends of the piston are located between the first and second ends of the first connector body and wherein in the second position the first end of the piston is located between the first and second ends of the second connector body and the second end of the piston is located between the first and second ends of the first connector body, the interior of the piston fluidly communicating between the second ends of the first and second connector bodies.

7. The connector assembly of claim 1 further comprising a seal layer positioned along the first end of at least one of the first and second connector bodies.

8. The connector assembly of claim 7 wherein the seal layer comprises a removable peel strip.

9. The connector assembly of claim 1 wherein at least one of the first and second connector bodies includes a seal located at the first end of the connector body and arranged to seal against the other connector body at the first end.

10. The connector assembly of claim 1 wherein each connector body includes a seal located at the first end of the connector body and arranged to seal against the seal of the other connector body.

11. A connector assembly for making fluid connections comprising:

a first hollow connector body and a second hollow connector body, each body having first and second ends, an exterior and an interior which extends between the first and second ends;

a coupling mechanism arranged to couple the first and second connector bodies at the first ends of the bodies;

a hollow piston having first and second ends and an interior extending between the first and second ends, the piston being movable from a first position, wherein the piston is movably located in the interior of the first connector body and the first and second ends of the piston are located between the first and second ends of the first connector body, to a second position, wherein the piston bridges and seals against the interiors of the first and second connector bodies and the first end of the piston is located between the first and second ends of the second connector body and the second end of the piston is located between the first and second ends of the first connector body, the interior of the piston fluidly communicating between the second ends of the first and second connector bodies; and

a rotatable actuator mounted around the exterior of at least one of the first and second connector bodies and coupled to the piston to move the piston from the first position to the second position in response to rotation of the actuator.

12. The connector assembly of claim 11 wherein the piston has an exterior and first and second seals on the exterior of the piston, wherein the first connector body has at least one side opening, and wherein the actuator is mechanically coupled through the side openings in the first connector body to the piston between the first and second piston seals.

13. The connector assembly of claim 11 wherein the actuator and the piston are mechanically coupled without being integrally connected.

14. The connector assembly of claim 11 wherein the rotatable actuator is axially moveable from a first position, wherein the actuator is axially spaced from the coupling mechanism, to a second position, wherein the actuator is located around the coupling mechanism, the actuator and the piston being mechanically coupled to move the piston from the first position to the second position in response to movement of the actuator from the first position to the second position.

15. The connector assembly of claim 11 wherein each connector body has an opening at the first end communicating with the interior of the connector body, wherein at least one of the first and second connector bodies includes a seal surrounding the opening, and wherein the connector assembly includes a removable peel strip extending along the first end of each connector body and covering the opening to seal the interior of the connector body from exterior contaminants.

16. A process for making fluid connections comprising:

coupling first and second hollow connector bodies at first ends of the bodies by a coupling mechanism;

moving an actuator from a first position, wherein the actuator is located on an exterior of the first connector body, to a second position, wherein the actuator is located around the coupling mechanism; and

in response to movement of the actuator, moving a hollow piston coupled to the actuator from a first position, wherein the piston is positioned in an interior of the first connector body, to a second position, wherein the piston extends between the first and second connector bodies and the exterior of the piston is sealed to interiors of the first and second bodies.

17. The process of claim 16 further comprising removing peel strips from the first ends of the first and second connector bodies after coupling the first and second connector bodies.

18. The process of claim 16 wherein moving the actuator includes rotating the actuator.

19. A process for making fluid connections comprising:

coupling first and second hollow connector bodies at first ends of the bodies;

rotating an actuator around an exterior of at least one of the first and second connector bodies; and

in response to rotating the actuator, moving a hollow piston coupled to the actuator from a first position, wherein the piston is slideably located in the interior of the first connector body and first and second ends of the piston are located between first and second ends of the first connector body, to a second position, wherein the piston bridges and seals against interiors of the first and second connector bodies, the first end of the piston is located between the first and second ends of the second connector body and the second end of the piston is located between first and second ends of the first connector body, and the interior of the piston fluidly communicates between the second ends of the first and second connector bodies.

20. The process of claim 19 further comprising removing peel strips from the first ends of the first and second connector bodies after coupling the first and second bodies.

21. A fluid system comprising a conduit and the connector assembly of claim 1, wherein the conduit is connected to one of the first and second connector bodies.

22. A fluid system comprising a component and the connector assembly of claim 1, wherein the component includes a container and one of the first and second connector bodies is integrally connected to the container.

23. A fluid system comprising a conduit and the connector assembly of claim 11, wherein the conduit is connected to one of the first and second connector bodies.

24. A fluid system comprising a component and the connector assembly of claim 11, wherein the component includes a container and one of the first and second connector bodies is integrally connected to the container.

CLAIMS

1. A connector assembly for making fluid connections comprising:

a first hollow connector body and a second hollow connector body, each body having first and second ends, an exterior, and an interior which extends between the first and second ends;

a coupling mechanism arranged to couple the first and second connector bodies at the first ends of the bodies;

a hollow piston having first and second ends, an interior extending between the first and second ends, an exterior, and first and second seals on the exterior of the piston, the piston being moveable from a first position, wherein the piston is positioned in the interior of the first connector body and the first and second seals seal against the interior of the first connector body, to a second position, wherein the piston extends between the first and second connector bodies and the first and second seals seal against the interiors of the first and second connector bodies, respectively; and

a moveable actuator, the actuator being axially moveable from a first position, wherein the actuator is located on the exterior of the first connector body, to a second position, wherein the actuator is located around the coupling mechanism, the actuator and the piston being coupled to move the piston from the first position to the second position in response to movement of the actuator from the first position to the second position.

2. The connector assembly of claim 1 wherein the first connector body has at least one side opening, and wherein the actuator is mechanically coupled through the side opening in the first connector body to the piston between the first and second piston seals.

3. The connector assembly of claim 1 wherein the actuator and the piston are mechanically coupled without being integrally connected.

4. The connector assembly of claim 1 wherein the piston includes a protrusion and wherein the actuator is arranged to abut the protrusion without being integrally connected to the protrusion.

5. The connector assembly of claim 1 wherein the coupling mechanism comprises a snap-fit arrangement including at least one bendable arm extending between the first and second connector bodies and wherein the moveable actuator is axially spaced from the bendable arm in the first position of the actuator and is positioned along the exterior of the bendable arm in the second position to prevent the arm from bending.

6. The connector assembly of claim 1 wherein in the first position the first and second ends of the piston are located between the first and second ends of the first connector body and wherein in the second position the first end of the piston is located between the first and second ends of the second connector body and the second end of the piston is located between the first and second ends of the first connector body, the interior of the piston fluidly communicating between the second ends of the first and second connector bodies.

7. The connector assembly of claim 1 further comprising a seal layer positioned along the first end of at least one of the first and second connector bodies.

8. The connector assembly of claim 7 wherein the seal layer comprises a removable peel strip.

9. The connector assembly of claim 1 wherein at least one of the first and second connector bodies includes a seal located at the first end of the connector body and arranged to seal against the other connector body at the first end.

10. The connector assembly of claim 1 wherein each connector body includes a seal located at the first end of the connector body and arranged to seal against the seal of the other connector body.

11. A connector assembly for making fluid connections comprising:

a first hollow connector body and a second hollow connector body, each body having first and second ends, an exterior and an interior which extends between the first and second ends;

a coupling mechanism arranged to couple the first and second connector bodies at the first ends of the bodies;

a hollow piston having first and second ends, an interior and an exterior extending between the first and second ends, and first and second seals on the exterior of the piston, the piston being movable from a first position, wherein the piston is movably located in the interior of the first connector body, the first and second ends of the piston are located between the first and second ends of the first connector body, and the first and second seals are sealed to the interior of the first connector body, to a second position, wherein the piston bridges the first and second connector bodies, the first end of the piston is located between the first and second ends of the second connector body and the second end of the piston is located between the first and second ends of the first connector body, and the first and second seals seal against the interiors of the first and second connector bodies, respectively, the interior of the piston fluidly communicating between the second ends of the first and second connector bodies; and

a rotatable actuator mounted around the exterior of at least one of the first and second connector bodies and coupled to the piston to move the piston from the first position to the second position in response to rotation of the actuator.

12. The connector assembly of claim 11 wherein the first connector body has at least one side opening and wherein the actuator is mechanically coupled through the side opening in the first connector body to the piston between the first and second piston seals.

13. The connector assembly of claim 11 wherein the actuator and the piston are mechanically coupled without being integrally connected.

14. The connector assembly of claim 11 wherein the rotatable actuator is axially moveable from a first position, wherein the actuator is axially spaced from the coupling mechanism, to a second position, wherein the actuator is located around the coupling mechanism, the actuator and the piston being mechanically coupled to move the piston from the first position to the second position in response to movement of the actuator from the first position to the second position.

15. The connector assembly of claim 11 wherein each connector body has an opening at the first end communicating with the interior of the connector body, wherein at least one of the first and second connector bodies includes a seal surrounding the opening, and

wherein the connector assembly includes a removable peel strip extending along the first end of each connector body and covering the opening to seal the interior of the connector body from exterior contaminants.

16. A process for making fluid connections comprising:

coupling first and second hollow connector bodies at first ends of the bodies by a coupling mechanism;

moving an actuator from a first position, wherein the actuator is located on an exterior of the first connector body, to a second position, wherein the actuator is located around the coupling mechanism; and

in response to movement of the actuator, moving a hollow piston coupled to the actuator from a first position, wherein the piston is positioned in an interior of the first connector body and first and second seals seal on the exterior of the piston are sealed to the interior of the first connector body, to a second position, wherein the piston extends between the first and second connector bodies and the first and second seals are sealed to the interiors of the first and second connector bodies, respectively.

17. The process of claim 16 further comprising removing peel ships from the first ends of the first and second connector bodies after coupling the first and second connector bodies.

18. The process of claim 16 wherein moving the actuator includes rotating the actuator.

19. A process for making fluid connections comprising:

coupling first and second hollow connector bodies at first ends of the bodies;

rotating an actuator around an exterior of at least one of the first and second connector bodies; and

in response to rotating the actuator, moving a hollow piston coupled to the actuator from a first position, wherein the piston is slideably located in the interior of the first connector body, first and second ends of the piston are located between first and second ends of the first connector body, and first and second seals seal on the exterior of the piston seal against the interior of the first connector body, to a second position, wherein the piston bridges the first and second connector bodies, the first end of the

piston is located between the first and second ends of the second connector body and the second end of the piston is located between first and second ends of the first connector body, and the first and second seals seal against the interiors of the first and second connector bodies, respectively, and the interior of the piston fluidly communicates between the second ends of the first and second connector bodies.

20. The process of claim 19 further comprising removing peel strips from the first ends of the first and second connector bodies after coupling the first and second bodies.

21. A fluid system comprising a conduit and the connector assembly of claim 1, wherein the conduit is connected to one of the first and second connector bodies.

22. A fluid system comprising a component and the connector assembly of claim l, wherein the component includes a container and one of the first and second connector bodies is integrally connected to the container.

23. A fluid system comprising a conduit and the connector assembly of claim 11, wherein the conduit is connected to one of the first and second connector bodies.

24. A fluid system comprising a component and the connector assembly of claim 11, wherein the component includes a container and one of the first and second connector bodies is integrally connected to the container.