CLAIMS

1. A single use heat exchanger device comprising:

an outer bag formed from a flexible polymer film and defining an interior compartment, the outer bag having a first port and a second port disposed therein to provide fluid access to and from the interior compartment; and

an inner bag formed from a flexible polymer film and defining an interior flow path that extends between a third port and a fourth port that extend through the outer bag and provide fluid access to and from the interior flow path of the inner bag.

2. The single use heat exchanger device of claim 1, wherein the interior flow path comprises a plurality of separate flow paths or channels disposed along a portion of the inner bag between the third port and the fourth port.

3. The single use heat exchanger device of claim 2, wherein the plurality of separate flow paths or channels have a substantially circular cross-sectional shape.

4. The single use heat exchanger device of claim 2, wherein the plurality of separate flow paths or channels are connected to one other via a web.

5. The single use heat exchanger device of claim 4, wherein the web comprises a plurality of openings formed therein.

6. The single use heat exchanger device of claim 2, wherein the plurality of separate flow or channels paths are substantially straight.

7. The single use heat exchanger device of claim 2, wherein the plurality of separate flow paths or channels are curved.

8. The single use heat exchanger device of claim 2, wherein the plurality of separate flow paths or channels are spaced apart from one another via a web or spacer.

9. The single use heat exchanger device of claim 1, wherein the third port and the fourth port are each welded to the inner bag and the outer bag at separate weld points.

10. The single use heat exchanger device of claim 1, wherein the outer bag is formed from a layer of flexible polymer film that is welded to another layer of flexible polymer film.

11. The single use heat exchanger device of claim 1, wherein the inner bag is formed from a layer of flexible polymer film that is welded to another layer of flexible polymer film.

12. The single use heat exchanger device of claim 1, wherein the inner bag is suspended from an inner surface of the outer bag via the third port and the fourth port.

13. The single use heat exchanger device of claim 1, wherein the first port, second port, third port, and fourth port comprise flanged ports having respective flanges welded to an inner surface of the outer bag and/or inner bag.

14. A method of using the single user heat exchanger device of any of claims 1-13, comprising:

flowing a reagent or product fluid stream into the third port or fourth port; and

flowing a heat exchange fluid into the first port or second port.

15. The method of claim 14, wherein a flow direction of the heat exchange fluid is opposite to the flow direction of the reagent or product fluid stream.

16. A single use heat exchanger device comprising:

an outer bag formed from a flexible polymer film and defining an interior compartment, the outer bag having a first port and a second port disposed therein to provide fluid access to and from the interior compartment; and

an inner bag formed from a flexible polymer film and defining an interior flow path that extends between a third port and a fourth port that provide fluid access to and from the interior flow path of the inner bag, wherein the third port and the fourth port are

suspended by a standoff from a separate fluid passageway located in the first port and second port.

17. The single use heat exchanger device of claim 16, wherein the standoff is a tube.

18. The single use heat exchanger device of claim 16, wherein the first port and the second port comprise a two-part port having a bottom portion and a top portion, wherein an o-ring or gasket is interposed between the bottom portion and the top portion.

19. The single use heat exchanger device of claim 18, wherein the top portion comprise a first nipple and second nipple defining separate flow paths and wherein the second nipple defines the separate fluid passageway.

20. A single use heat exchanger device comprising:

a flexible bag or container having one or more surfaces and defining an interior volume, the flexible bag or container having one or more inlet ports and one or more outlet ports disposed therein to provide fluid access to and from the interior volume wherein one or more of the surfaces of the flexible bag or container comprises a heat exchanger flow path contained thereon, wherein each heat exchanger flow path comprises a heat exchange fluid inlet port and outlet port.

21. The single use heat exchanger device of claim 20, wherein the heat exchanger flow path comprises an s-coil shape.

22. The single use heat exchanger device of claim 20, wherein the heat exchanger flow path comprises dimpled surface.

23. The single use heat exchanger device of claim 20, wherein the heat exchanger flow path comprises a flexible polymer film disposed on an inner surface of the flexible bag or container.

24. The single use heat exchanger device of claim 20, wherein the heat exchanger flow path comprises a flexible polymer film disposed on an outer surface of the flexible bag or container.

25. The single use heat exchanger device of claim 20, wherein the flexible bag or container has a plurality of surfaces and a plurality of heat exchanger flow paths are disposed on the plurality of surfaces.

26. A container or vessel having an integrated heat exchanger comprising:

an inner jacket comprising one or more polymer films or layers;

an outer jacket comprising one or more polymer films or layers;

a first fitting located at one end of the inner jacket and the outer jacket and comprising an inlet, the first fitting further comprising a first radial surface secured to the inner jacket and a second radial surface secured to the outer jacket;

a second fitting located at an opposing end of the inner jacket and the outer jacket and comprising an outlet, the second fitting further comprising a first radial surface secured to the inner jacket and a second radial surface secured to the outer jacket;

at least one heat exchange fluid inlet port disposed in the first fitting and communicating with a fluid passageway contained in the first fitting that fluidically communicates with a space between the inner jacket and the outer jacket; and

at least one heat exchange fluid outlet port disposed in the second fitting and communicating with a fluid passageway contained in the second fitting that fluidically communicates with the space between the inner jacket and the outer jacket.

27. The container or vessel of claim 26, wherein the inner jacket and the outer jacket are cylindrical shaped.

28. The container or vessel of claim 26, further comprising spacers disposed between the inner jacket and the outer jacket.

29. The container or vessel of claim 26, comprising a plurality of heat exchange fluid inlet ports disposed in the first fitting and a plurality of heat exchange fluid outlet ports disposed in the second fitting.

30. The container or vessel of claim 26, wherein the inlet of the first fitting and/or the outlet of the second fitting comprise a flanged end.

31. The container or vessel of claim 30, further comprising a cap secured to the flanged end of the first fitting and having one or more ports extending therethrough.

32. The container or vessel of claim 26, further comprising one or more inlet ports on the outer jacket and in fluid communication with the space between the inner jacket and the outer jacket.