CLAIMS

What is claimed is:

1. A dressing for treating a tissue site with negative pressure, the dressing comprising:
    a manifold comprising a first surface and a second surface opposite the first surface;
    a first layer adjacent to the first surface and a second layer adjacent to the second surface, the first layer and the second layer each comprising a polymer film, wherein the first layer and the second layer form a sleeve around the manifold;
    a plurality of fluid restrictions in the polymer film adjacent to at least the first surface; and
    a sealing layer adjacent to the sleeve, the sealing layer having a plurality of apertures fluidly coupled to the fluid restrictions.

2. The dressing of claim 1, wherein the polymer film is hydrophobic.

3. The dressing of claim 1, wherein the polymer film has a contact angle with water greater than 90 degrees.

4. The dressing of any of claims 1-3, wherein the polymer film is a polyethylene film.

5. The dressing of any of claims 1-3, wherein the polymer film is selected from a group consisting of polythene, polyurethane, acrylics, polyolefines, polyacetates, polyamides, polyesters, polyether block amide, thermoplastic vulcanizates, polyethers, and polyvinyl alcohol.

6. The dressing of any of claims 1-3, wherein the polymer film is a polyethylene film having an area density of less than 30 grams per square meter.

7. The dressing of any of claims 1-6, wherein the fluid restrictions comprise a plurality of slots configured to permit fluid flow and inhibit exposure of the manifold to the tissue site.

8. The dressing of any of claims 1-6, wherein the fluid restrictions comprise a plurality of slots, each of the slots having a length less than 4 millimeters.

9. The dressing of any of claims 1-6, wherein the fluid restrictions comprise a plurality of slots, each of the slots having a width less than 2 millimeters.

10. The dressing of any of claims 1-6, wherein the fluid restrictions comprise a plurality of slots, each of the slots having a length less than 4 millimeters and a width less than 2 millimeters.

11. The dressing of claim 10, wherein the width is less than 1 millimeter.

12. The dressing of claim 10, wherein the length is less than 3 millimeters and the width is less than 1 millimeter.

13. The dressing of claim 10, wherein the width is at least 0.5 millimeters.

14. The dressing of claim 10, wherein the length is at least 2 millimeters.

15. The dressing of any of claims 1-6, wherein the fluid restrictions comprise or consist essentially of elastomeric valves in the polymer film that are normally closed.

16. The dressing of claim 15, wherein the elastomeric valves are fenestrations.

17. The dressing of claim 15, wherein the elastomeric valves are slits.

18. The dressing of any of claims 15, wherein the fluid restrictions comprise a plurality of slits in the polymer film, each of the slits having a length less than 4 millimeters.

19. The dressing of claim 18, wherein the length is less than 3 millimeters.

20. The dressing of claim 18 or claim 19, wherein the length is at least 2 millimeters.

21. The dressing of any one of claims 1-20, wherein the plurality of fluid restrictions in the polymer film are adjacent to the first surface and to the second surface.

22. The dressing of any one of claims 1-21, wherein the fluid restrictions are coextensive with the polymer film.

23. The dressing of any one of claims 1-21, wherein the fluid restrictions are coextensive with the manifold.

24. The dressing of any one of claims 1-23, wherein the first layer and the second layer are laminated to the manifold.

25. The dressing of claim 1, wherein at least one edge of the manifold is exposed through the sleeve.

26. The dressing of any one of claims 1-25, wherein the sleeve is configured to be interposed between the manifold and the tissue site.

27. The dressing of any one of claims 1-26, wherein the sleeve comprises an exposed surface that is smooth.

28. The dressing of any one of claims 1-26, wherein the sleeve comprises an exposed surface that is matte.

29. The dressing of any one of claims 1-26, wherein the sleeve comprises an exposed surface that is not rough.

30. The dressing of any of claims 1-29, wherein the manifold comprises a foam.

31. The dressing of claim 30, wherein the foam is a polymer foam.

32. The dressing of claim 30, wherein the foam is a polyurethane ether foam.

33. The dressing of claim 30, wherein the foam is open-cell foam.

34. The dressing of claim 30, wherein the foam reticulated.

35. The dressing of claim 30, wherein the foam is a reticulated polymer foam.

36. The dressing of claim 30, wherein the foam is a reticulated polyurethane ether foam.

37. The dressing of any one of claims 30-33, wherein the foam is reticulated and has a free volume of at least 90%.

38. The dressing of any one of claims 30-37, wherein the foam is porous and has an average pore size in a range of 400-600 microns.

39. The dressing of any one of claims 1-38, wherein the manifold has a thickness less than 7 millimeters.

40. The dressing of any one of claims 1-38, wherein the manifold has a thickness in a range of 2 millimeters to 7 millimeters.

41. The dressing of any of claims 1-40, wherein the manifold is hydrophobic.

42. The dressing of any one of claims 1-41, wherein the fluid restrictions are distributed across the polymer film in a uniform pattern.

43. The dressing of claim 42, wherein the uniform pattern comprises a grid of parallel rows and columns.

44. The dressing of any one of claims 1-43, wherein:

the fluid restrictions are distributed across the polymer film in parallel rows and columns;

the rows are spaced about 3 millimeters on center; and

the fluid restrictions in each of the rows are spaced about 3 millimeters on center.

45. The dressing of claim 44, wherein the fluid restrictions in adjacent rows are offset.

46. The dressing of any one of claims 1-45, further comprising:

a drape disposed over the sleeve adjacent to the second surface; and

a fluid port coupled to the drape and fluidly coupled to the manifold through the drape and the sleeve.

47. The dressing of any one of claims 1-46, the sealing layer coupled to the sleeve, the sealing layer comprising a hydrophobic gel having a plurality of apertures aligned with the fluid restrictions.

48. The dressing of any one of claims 1-46, the sealing layer coupled to the sleeve, the sealing layer comprising a hydrophobic gel having a plurality of apertures in registration with at least some of the plurality of fluid restrictions.

49. The dressing of any one of claims 1-46, the sealing layer coupled to the sleeve, the sealing layer comprising a hydrophobic gel having a plurality of apertures coextensive with sealing layer and substantially all the plurality of apertures are in registration with the plurality of fluid restrictions.

50. The dressing of any one of claims 1-49, wherein the sealing layer comprises a silicone gel.

51. The dressing of any one of claims 1-49, wherein the sealing layer comprises a bonded silicone.

52. The dressing of any one of claims 1-46, the sealing layer coupled to the sleeve, the sealing layer having a plurality of apertures adjacent to the fluid restrictions and an area density less than 300 grams per square meter.

53. The dressing of any one of claims 1-52, wherein the sealing layer has a hardness of between 5 Shore OO and 80 Shore OO.

54. The dressing of any one of claims 1-53, wherein the sealing layer is configured to be interposed between the manifold and the tissue site.

55. The dressing of any of claims 1-54, wherein the fluid restrictions have an average length that does not substantially exceed an average dimension of the apertures.

56. The dressing of any of claims 1-55, wherein the apertures limit an effective size of the fluid restrictions.

57. The dressing of any one of claims 46-56, wherein the drape and the sealing layer enclose the sleeve and the manifold.

58. The dressing of any one of claims 1-56, wherein the sealing layer has a smooth lower surface.

59. The dressing of any one of claims 1-56, wherein the sealing layer is configured to provide a fluid-tight seal with the tissue site.

60. The dressing of any one of claims 46-59, wherein the drape and the sealing layer enclose the manifold and the sleeve, and the sealing layer is adapted to contact the tissue site.

61. The dressing of any one of claims 46-60, wherein the drape comprises a polymer film.

62. The dressing of any of claims 1-61, wherein the sleeve is bonded to the manifold.

63. The dressing of any of claims 46-62, wherein the drape comprises a margin that extends beyond the manifold and the sleeve, and an adhesive layer is disposed in the margin.

64. The dressing of any one of claims 1-63, wherein the dressing comprises a smooth surface configured to contact the tissue site.

65. The dressing of any one of claims 1-63, wherein the dressing comprises a matte surface configured to contact the tissue site.

66. The dressing of any one of claims 1-63, wherein the dressing comprises a surface that is not rough and is configured to contact the tissue site.

67. The dressing of any one of claims 1-66, wherein the manifold has a rough lower surface and is not exposed to tissue when the dressing is placed on the tissue site.

68. A dressing for treating a tissue site with negative pressure, the dressing comprising:

a manifold formed from a hydrophobic material;

a film substantially enclosing the manifold, the film formed from a hydrophobic material;

a plurality of fluid passages through the film, the plurality of fluid passages configured to expand in response to a pressure gradient across the film; and

a hydrophobic gel coupled to the film and including a plurality of apertures through the hydrophobic gel fluidly coupled to at least some of the plurality of fluid passages through the film.

69. The dressing of claim 68, further comprising:

a polymer drape coupled to the film;

the hydrophobic gel coupled to the film opposite the polymer drape, the hydrophobic gel having an area density less than 300 grams per square meter.

70. The dressing of claim 68 or claim 69, wherein the film forms a sleeve around the manifold.

71. The dressing of claim 68 or claim 69, wherein the film forms an envelope around the manifold.

72. A dressing for treating a tissue site with negative pressure, the dressing comprising:

a first layer comprising a first film having a flat surface texture;

a second layer adjacent to the first layer, the second layer comprising a manifold;

a third layer adjacent to the second layer opposite the first layer, the third layer comprising a second film having a flat surface texture;

a plurality of fluid restrictions through the first film, the plurality of fluid restrictions configured to be responsive to a pressure gradient across the fluid restrictions; and

a gel layer coupled to the first layer opposite the second layer, the gel layer including a plurality of apertures through the gel layer aligned with at least some of the plurality of fluid restrictions.

73. The dressing of claim 72, wherein the plurality of fluid restrictions are through the first film and the second film.

74. The dressing of claim 72 or claim 73, further comprising:

a fourth layer coupled to the third layer opposite the first layer, the fourth layer comprising a polymer drape;

the gel layer having an area density less than 300 grams per square meter and a hardness between 5 Shore OO and 80 Shore OO.

75. An apparatus for treating a tissue site with negative pressure, the apparatus comprising:

a tissue interface comprising a manifold and a film covering at least two sides of the manifold, the manifold and the film formed from a hydrophobic material;

a plurality of elastomeric valves through the film, the plurality of elastomeric valves configured to expand in response to a pressure gradient across the film;

a sealing layer adjacent to the film and configured to contact the tissue site, and at least one aperture in the sealing layer fluidly coupled to at least one of the elastomeric valves in the film; and

a cover configured to be attached to the tissue site;

wherein the cover and the tissue interface are assembled in a stacked relationship with the cover configured to be attached to an attachment surface adjacent to the tissue site.

76. The apparatus of claim 75, wherein the film is configured to be interposed between the manifold and the tissue site.

77. The apparatus of claim 75 or claim 76, wherein the film comprises a polymer film having an area density less than 30 grams per square meter.

78. The apparatus of any one of claims 75-77, wherein the film comprises a polymer film having a contact angle with water greater than 90 degrees.

79. The apparatus of any one of claims 75-78, wherein the film has a surface with height variations not exceeding 0.2 millimeters over 1 centimeter.

80. -The apparatus of claim 75, wherein at least one of the apertures is configured to expose at least some of the film to the tissue site.

81. The apparatus of claim 75, wherein at least one of the apertures is configured to expose at least some of the elastomeric valves to the tissue site.

82. The apparatus of claim 75, wherein at least some portion of the film is exposed through at least one of the apertures.

83. The apparatus of claim 75, wherein at least some portion of the elastomeric valves are exposed through the apertures in the third layer.

84. A dressing for treating a tissue site with negative pressure, the dressing comprising:

a first layer comprising a film having a flat surface texture;

a second layer adjacent to the first layer, the second layer comprising a manifold;

a plurality of fluid restrictions through the film, the plurality of fluid restrictions configured to be responsive to a pressure gradient across the fluid restrictions; and

a gel layer coupled to the first layer opposite the second layer.

85. A system for treating a tissue site, the system comprising:

the dressing or apparatus of any of claims 1-84; and

a negative-pressure source fluidly coupled to the dressing or apparatus.

86. The system of claim 85, further comprising a fluid container fluidly coupled between the dressing and the negative-pressure source.

87. A dressing or apparatus for use in treating a surface wound with negative pressure, the use comprising:

applying the dressing or apparatus of any of claims 1-84 to a tissue site;

sealing the dressing or apparatus to epidermis adjacent to the tissue site;

fluidly coupling the dressing or apparatus to a negative-pressure source; and

applying negative pressure from the negative-pressure source to the dressing or apparatus.

88. The use of claim 87, wherein the manifold is not substantially exposed to the tissue site during the step of applying negative pressure.

89. The use of claim 87 or claim 88, wherein at least one of the first layer and the second layer is configured to be exposed to the tissue site during the step of applying negative pressure.

90. The use of any one of claims 87-89, wherein applying the dressing comprises disposing at least part of the dressing across an edge of the surface wound.

91. The use of any one of claims 87-90, wherein applying negative pressure opens the fluid restrictions.

92. The use of claim 91, further comprising reducing negative pressure from the negative-pressure source, wherein reducing negative pressure closes the fluid restrictions.

93. The use of any one of claims 87-92, further comprising fluidly coupling a fluid container between the dressing and the negative-pressure source, and transferring exudate from the dressing to the fluid container.

94. The use of any one of claims 87-93, further comprising applying a manifold between the dressing and the surface wound.

95. A dressing for use in promoting granulation in a surface wound, the use comprising:

applying a dressing to the surface wound, the dressing comprising a manifold having a first surface and a second surface opposite the first surface, and a perforated polymer film covering at least the first surface;

positioning a gel layer between the surface wound and at least a portion of the dressing; and

applying negative pressure from a negative-pressure source to the dressing and promoting granulation;

wherein the perforated polymer film is hydrophobic and is applied to the surface wound.

96. The use of claim 95, wherein the perforated polymer film is polyethylene.

97. The use of any one of claims 95-96, wherein the perforated polymer film has a smooth surface applied to the surface wound.

98. The use of claim any one of claims 95-97, further comprising:

sealing the perforated polymer film to the surface wound and covering at least a portion of a periwound adjacent to the surface wound;

attaching the cover to epidermis around the perforated polymer film; and

fluidly coupling the dressing to the negative-pressure source.

99. The use of any one of claims 95-98, wherein the dressing remains on the surface wound for at least 5 days.

100. The use of any one of claims 95-98, wherein the dressing remains on the surface wound for at least 7 days.

101. The use of any one of claims 95-100, wherein the perforated polymer film substantially prevents exposure of tissue in the surface wound to the manifold and inhibits growth of tissue into the manifold.

102. The use of any one of claims 95-101, further comprising applying a wound filler between the perforated polymer film and the surface wound.

103. The use of claim 102, wherein the wound filler is applied interior to the periwound.

104. The use of claim 102 or claim 103, wherein the wound filler is a foam.

105. The use of any one of claims 95-104, wherein the dressing substantially prevents maceration of the periwound.