Claims

What is claimed is:

1. An absorbent core for incorporation into a disposable absorbent article, the absorbent core comprising:

a first nonwoven;

a second nonwoven;

absorbent material, wherein the absorbent material is positioned between the first and second nonwovens, embedded within the first nonwoven, embedded within the second nonwoven, or combinations thereof; and

wherein at least one section of the second nonwoven comprises bulkified nonwoven.

2. The absorbent core of claim 1, wherein an entirety the second nonwoven comprises bulkified nonwoven.

3. The absorbent core of claim 1, wherein the second nonwoven comprises one or more sections of bulkified nonwoven and one or more sections of non-bulkified nonwoven, wherein the one or more sections of non-bulkified nonwoven have a high bulk density and a lower void volume than the one or more sections of bulkified nonwoven.

4. The absorbent core of claim 3, wherein the absorbent material is positioned on or embedded within the one or more sections of bulkified nonwoven, the one or more sections of non-bulkified nonwoven, or combinations thereof.

5. The absorbent core of claim 3, wherein each of the sections of bulkified nonwoven and non-bulkified nonwoven extend along a longitudinal centerline of the absrobent core.

6. The absorbent core of claim 3, further comprsising one or more absorbent material-free sections coincident with the one or more sections of bulkified nonwoven and one or more absorbent material-containing sections coincident with the one or more sections of non-bulkified nonwoven.

7. The absorbent core of claim 3, further comprsising one or more absorbent material-free sections coincident with the one or more sections of non-bulkified nonwoven and one or more absorbent material-containing sections coincident with the one or more sections of bulkified nonwoven.

8. The absorbent core of claim 7, wherein the absorbent material-free sections are fluid channels.

9. The absorbent core of claim 1, wherein the absorbent core further comprises a third nonwoven and a second population of absorbent material, wherein the second population of absorbent material is positioned between the third nonwoven and the second nonwoven, embedded within the second nonwoven, embedded within the third nonwoven, or combinations thereof.

10. The absorbent core of claim 1, wherein the first nonwoven is an air-through nonwoven, a slitted nonwoven, an SMS nonwoven, a spunbond nonwoven, or an airlaid nonwoven,

11. The absorbent core of claim 1, wherein the absorbent material comprises SAP particles.

12. The absorbent core of claim 1, wherein the first nonwoven is adhered to the second nonwoven.

13. The absorbent core of claim 1, wherein the bulkified nonwoven provides wicking paths for fluid within the absorbent core.

14. The absorbent core of claim 1, wherein at least a portion of the second nonwoven is densified.

15. The absorbent core of claim 1, wherein the second nonwoven is selectively bulkified in a central, crotch region of the absorbent core.

16. The absorbent core of claim 3, wherein the bulkified sections have a bulk density that is from 5% to 50% less than a bulk density of the non-bulkified sections.

17. The absorbent core of claim 3, wherein the bulkified sections have void volume that is from 5% to 75% greater than a void volume of the non-bulkified sections.

18. The absorbent core of claim 3, wherein the bulkified sections are capable of containing a greater basis weight of SAP than the non-bulkified sections.

19. A system for bulkifying a nonwoven, the system comprising:

a nonwoven supply;

a nonwoven manipulator positioned to receive a nonwoven from the nonwoven supply and bulkify the nonwoven; and

a collector positioned to receive the bulkified nonwoven from the nonwoven manipulator.

20. The system of claim 19, wherein the nonwoven manipulator comprises a mechanical manipulator positioned to mechanically manipulate the nonwoven, a thermal manipulator positioned to thermally manipulate the nonwoven, or combinations thereof.

21. The system of claim 20, wherein the mechanical manipulator comprises one or more rotary brushes positioned to brush one or more surfaces of the nonwoven as the nonwoven passes through the nonwoven manipulator.

22. The system of claim 21, wherein the one or more rotary brushes comprise bristles positioned to brush one or more surfaces of the nonwoven.

23. The system of claim 21, wherein the one or more rotary brushes are positioned and arranged to engage and manipulate two, opposing surfaces of the nonwoven.

24. The system of claim 21, wherein the one or more rotary brushes are positioned and arranged to engage and manipulate only one surface of the nonwoven.

25. The system of claim 22, wherein the one or more rotary brushes comprise one or more brushing regions that include bristles attached to a brush axle, and one or more non-brushing regions that lack bristles attached to the brush axle.

26. The system of claim 21, wherein the mechanical manipulator comprises two, opposing rotatory brushes.

27. The system of claim 26, wherein the two, opposing rotatory brushes are arranged to rotate counter to movement of the nonwoven through the nonwoven manipulator.

28. The system of claim 22, wherein the one or more rotary brushes comprise a first brushing region including bristles extending from a brush axle at a first height, and a second brushing region including bristles extending from the brush axle at a second height, wherein the first height is greater than the second height.

29. The system of claim 22, wherein the one or more rotary brushes include bristles that vary in a length of bristles, a width of bristles, a packing density of the bristles, a material composition of the bristles, and stiffness of the bristles.

30. The system of claim 21, wherein the one or more rotary brushes are articulable to be selectively moved toward and away from the nonwoven.

31. The system of claim 20, wherein the thermal manipulator comprises a hot air source positioned to impact the nonwoven with hot air, a cold air source positioned to impact the nonwoven with cold air, or combinations thereof.

32. The system of claim 31, wherein the hot air source is positioned to impart a stream of heated air onto the nonwoven prior to the nonwoven being mechanically manipulated by the mechanical manipulator.

33. The system of claim 31, wherein the heated air is at a temperature of at least 80ºC.

34. The system of claim 31, wherein the cold air source is positioned to impart a stream of cold air onto the nonwoven after the nonwoven has been mechanically manipulated by the mechanical manipulator.

35. The system of claim 31, wherein the cold air is at a temperature of less than 80ºC.

36. The system of claim 20, wherein the thermal manipulator comprises an source of IR positioned to irradiate the nonwoven.

37. The system of claim 22, wherein the mechanical manipulator comprises two rotary brushes positioned to simultaneous brushes a top and a bottom surface of the nonwoven.

38. The system of claim 37, wherein the two rotary brushes rotate in the same direction.

39. The system of claim 37, wherein the two rotary brushes rotate in opposite directions.

40. The system of claim 37, wherein the two rotary brushes rotate at the same rate.

41. The system of claim 37, wherein the two rotary brushes rotate at different rates.

42. The system of claim 37, further comprising a SAP dispenser positioned to dispense SAP onto the bulkified nonwoven.

43. The system of claim 19, further comprising:

a second nonwoven supply;

a combining roller positioned to receive a second nonwoven form the second nonwoven supply and to receive the bulkified nonwoven form the nonwoven manipulator, and to combine the nonwoven and the second nonwoven; and

a second nonwoven manipulator positioned to receive and bulkify the combination of the nonwoven and the second nonwoven; and

wherein the collector is positioned to receive the bulkified combination of the nonwoven and the second nonwoven from the second nonwoven manipulator.

44. The system of claim 43, further comprising a third nonwoven manipulator positioned to receive and bulkify the second nonwoven, prior to combining the nonwoven and the second nonwoven.

45. The system of claim 19, further comprising a SAP applicator positioned to deposit SAP on the bulkified nonwoven, and a hot melt adhesive applicator positioned to apply hot melt adhesive to the bulkified nonwoven after or before deposition of the SAP onto the bulkified nonwoven.

46. The system of claim 19, further comprising a SAP applicator positioned to deposit SAP on the nonwoven prior to bulkification of the nonwoven.

47. A method of bulkifying a nonwoven, the method comprising:

mechanically manipulating one or more surfaces of a nonwoven, thermally manipulating the one or more surfaces of the nonwoven, or combinations thereof, forming a bulkified nonwoven;

wherein the bulkified nonwoven exhibits a bulk density that is less than the nonwoven, and wherein the bulkified nonwoven exhibits a void volume that is greater than the nonwoven.

48. The method of claim 47, wherein mechanically manipulating the one or more surfaces of the nonwoven include brushing the one or more surfaces of the nonwoven with a rotary brush.

49. The method of claim 48, wherein one or more rotary brushes are used to brush the nonwoven, and wherein the one or more rotary brushes are positioned and arranged to provide a pattern of bulkified sections and un-bulkified sections on the nonwoven.

50. The method of claim 48, further comprising varying the presence of bulkification on the nonwoven, the degree of bulkification of the nonwoven, or combinations thereof by varying a pressure at which bristles of the rotary brush engage the nonwoven, varying a rate at which the bristles rotate relative to the surface of the nonwoven, or combinations thereof.

51. The method of claim 48, wherein brushing the fibers displaces the fibers relative to each other, creating increased void space between the fibers.

52. The method of claim 48, wherein a first surface is brushed of the nonwoven, followed by brushing of a second, opposing surface of the nonwoven.

53. The method of claim 52, wherein prior to brushing the first surface, the first surface is heated, and wherein after brushing the second surface, the second surface is cooled.

54. The method of claim 48, wherein a first surface and a second, opposing surface of the nonwoven are simultaneously brushed via two rotary brushes.

55. The method of claim 47, further comprising combining the bulkified nonwoven with one or more additional nonwovens.

56. The method of claim 47, further comprising deposing SAP on the nonwoven.

57. The method of claim 56, wherein the SAP is deposited after bulkification of the nonwoven.

58. The method of claim 57, further comprising applying adhesive to the bulkified nonwoven.

59. The method of claim 58, wherein the adhesive is applied after applying the SAP.

60. The method of claim 56, wherein the SAP is deposited with the SAP in a dry state.

61. The method of claim 48, further comprising heating of the nonwoven during or prior to brushing the nonwoven to make the nonwoven more pliable, and cooling the nonwoven after brushing the nonwoven to initiate re-bonding at least some fibers of the nonwoven to stabilize the bulkified nonwoven.

62. The method of claim 47, further comprising embossing the bulkified nonwoven to a second nonwoven, wherein the embossing densifies portions of the bulkified nonwoven.

63. The method of claim 47, further comprising selectively bulkifying region of the nonwoven and selectively densifying regions of the nonwoven to provide the bulkified nonwoven with a gradient pore structure.

64. The method of 48, wherein a speed at which the rotary brush moves relative to the nonwoven is varied during brushing.

65. The method of claim 48, wherein the brushing is performed using multiple rotary brushes.

66. The method of claim 65, wherein the multiple rotary brushes vary in: thickness of bristles, length of bristles, material composition, spacing between bristles, and pattern of bristles.

67. The method of claim 47, wherein both a bodyside surface of the nonwoven and a surface opposite the bodyside surface are bulkified.

68. The method of claim 47, wherein only one side of the nonwoven are bulkified.

69. The method of claim 68, further comprising depositing SAP on the bulkified side of the bulkified nonwoven.

70. The method of claim 69, wherein the non-brushed side of the bulkified nonwoven is denser and has less void volume than the brushed side of the bulkified nonwoven, such that the non-brushed side captures the SAP, reducing or preventing filtering of the SAP through the bulkified nonwoven.

71. The method of claim 47, wherein bulkified sections of the bulkified nonwoven exhibit an increase in void volume ranging from 5% to 75%, relative to prior to bulkification, and a decrease in density ranging from 5% to 50%, relative to prior to bulkification.

72. The method of claim 48, wherein opposing sides of the nonwoven are simultaneously brushed.

73. The method of claim 48, wherein opposing sides of the nonwoven are sequentially brushed.

74. An absorbent core, the core comprising:

a first nonwoven layer;

a second nonwoven layer coupled with the first nonwoven layer;

a third nonwoven layer engaged with the second nonwoven layer opposite the first nonwoven layer; and

absorbent material embedded within the second nonwoven layer.

75. The core of claim 74, further comprising a forth nonwoven layer coupled with the third nonwoven layer.

76. The core of claim 75, wherein the fourth nonwoven layer is a spunbond nonwoven layer, a tissue, or an aperture nonwoven.

77. The core of claim 74, the third nonwoven layer comprises a layer of bicomponent fibers.

78. The core of claim 77, wherein the third nonwoven layer is a non-bulkified nonwoven or a densified air-through nonwoven.

79. The core of claim 74, wherein the second nonwoven layer is a layer of bicomponent fibers having a density that is less than a density of the layer of bicomponent fibers of the third nonwoven layer.

80. The core of claim 79, wherein the second and third nonwoven layers are a single, unitary fiber layer having a density gradient.

81. The core of claim 74, wherein the first nonwoven layer is an airlaid nonwoven, a tissue layer, an SMS nonwoven, a spunbond nonwoven, or an airthrough nonwoven.

82. The core of claim 74, wherein the absorbent material comprises SAP particles that are spaced apart within the second nonwoven layer and intermixed with the fibers thereof.

83. The core of claim 74, further comprising a SAP-free lane.

84. A method of making an absorbent core, the method comprising:

depositing bicomponent fibers onto a nonwoven layer, forming a web of fibers;

wherein settling of the fibers forms a higher density region of the bicomponent fibers at a bottom of the deposited web and a lower density population of the bicomponent fibers at a top of the deposited web; and

depositing SAP onto the web of fibers.

85. The method of claim 84, further comprising applying a second nonwoven layer over the web of fibers, opposite the nonwoven layer.

86. The method of claim 85, wherein the nonwoven is an airlaid and the second nonwoven is an SMS.

97. The method of claim 85, wherein the second nonwoven is an airlaid and the nonwoven is an SMS.

88. An absorbent core, the core comprising:

a first nonwoven;

a second nonwoven;

absorbent material, wherein the absorbent material is positioned between the first and second nonwovens, embedded within the first nonwoven, embedded within the second nonwoven, or combinations thereof; and

a loose fiber layer positioned between the first and second nonwovens.

89. The absorbent core of claim 88, wherein the loose fiber layer is positioned between two layers of the absorbent material.

90. The absorbent core of claim 88, wherein fibers of the loose fiber layer are randomly oriented.

91. The absorbent core of claim 88, wherein fibers of the loose fiber layer are aligned along a single direction.

92. The absorbent core of claim 88, wherein fibers of the loose fiber layer comprise polyester fibers, cellulose fibers, polypropylene fibers, polyethylene fibers, or combinations thereof.

93. The absorbent core of claim 88, wherein the fibers of the loose fiber layer comprise a mixture of fibers that vary in shape, composition, density, mass, thickness, length, width, or combinations thereof.

94. The absorbent core of claim 88, wherein the fibers of the loose fiber layer are positioned within SAP-containing lanes of the core.

95. A method of forming an absorbent core having a fiber layer, the method comprising:

depositing loose fibers onto a first nonwoven layer; and

applying a second nonwoven layer over the loose fibers.

96. The method of claim 95, wherein an absorbent material is positioned between the first and second nonwoven layers.

97. The method of claim 96, wherein the loose fibers are positioned between two layers of the absorbent material.

98. The method of claim 95, wherein SAP is applied onto the loose fibers and is mixed therein.

99. The method of claim 95, wherein further comprising orienting the loose fibers to generally extend in a single direction.

100. The method of claim 99, wherein the orienting includes applying an electrostatic force to the fibers.

101. The method of claim 95, wherein the loose fibers comprise cellulose fibers, polypropylene fibers, polyethylene fibers, polyester fibers, or combinations thereof.

102. The method of claim 95, wherein the loose fibers including a mixture of fibers that vary in shape, composition, density, mass, thickness, length, width, or combinations thereof.

103. The method of claim 95, wherein the fibers are deposited within SAP-containing lanes of the nonwoven.

104. The method of claim 95, wherein the fibers are deposited within SAP-free lanes of the nonwoven.

105. The method of claim 95, wherein a needle roll scatterer or flocking is used to scatter the fibers onto the nonwoven layer.

106. The method of claim 95, further comprising at least partially binding at least some of the loose fibers with other loose fibers, with the nonwoven, or combinations thereof to form a fiber web in-situ.

107. The method of claim 106, wherein the binding includes deposited an adhesive onto the loose fibers, the nonwoven, or combinations thereof.

108. The method of claim 107, wherein the adhesive is deposited after depositing SAP onto the loose fibers.

109. The method of claim 106, wherein the binding includes mixing thermoplastic fibers within the loose fibers, and, after depositing the loose fibers, heating the loose fibers to thermally fuse the loose fibers.

110. An absorbent core, the core comprising:

a first nonwoven;

a second nonwoven;

an absorbent material layer between the first and second nonwoven, wherein the absorbent material layer includes absorbent material-containing lanes and absorbent material-free lanes; and

wherein embossing lines bind the first nonwoven with the second nonwoven, wherein the embossing lines are coincident with the absorbent material-free lanes, such that the first nonwoven is embossed to the second nonwoven at locations corresponding to the absorbent material-free lanes.

111. The core of claim 110, further comprising a third nonwoven coupled with the second nonwoven, wherein absorbent material is positioned between the second and third nonwovens.

112. The core of claim 110, wherein alignment of the absorbent material-free lanes with the embossing lines defines bend lines in the core.

113. The core of claim 112, wherein the bend lines allow bending of the core from a flat configuration into a folded or bunched configuration.

114. The core of claim 110, wherein the embossing lines extend parallel with a longitudinal centerline of the core.

115. The core of claim 113, wherein, in the folded or bunched configuration, a trough is defined on a bodyside of the core.

116. A multilayer absorbent core, the core comprising:

a first, bodyside nonwoven;

a second nonwoven;

a first absorbent material layer positioned between the first and second nonwovens, embedded within the first nonwoven, embedded within the second nonwoven, or combinations thereof;

a third nonwoven; and

a second absorbent material layer positioned between the second and third nonwovens, embedded within the second nonwoven, embedded within the third nonwoven, or combinations thereof.

117. The core of claim 116, wherein the first, bodyside nonwoven and the second nonwoven comprise air-through nonwovens, and wherein the third nonwoven comprises an SMS nonwovne.

118. The core of claim 116, further comprising:

a fourth nonwoven; and

a third absorbent material layer positioned between the third and fourth nonwovens, embedded within the third nonwoven, embedded within the fourth nonwoven, or combinations thereof.

119. The core of claim 117, further comprising:

a fifth nonwoven; and

a fourth absorbent material layer positioned between the fourth and fifth nonwovens, embedded within the fourth nonwoven, embedded within the fifth nonwoven, or combinations thereof.

120. The core of claim 116, wherein each nonwoven comprises an SMS nonwoven, an air-through nonwoven, a bulky nonwoven, a slitted nonwoven, an airlaid nonwoven, a bulkified bulky nonwoven, or a spunbond nonwoven.

121. The core of claim 116, wherein the first and second absorbent material layers comprise absorbent material-free lanes.

122. The core of claim 121, wherein the position of the absorbent material-free lanes in the first and second absorbent material layers are aligned in the direction from the bodyside to the opposing, backside of the core.

123. The core of claim 121, wherein the position of the absorbent material-free lanes in the first and second absorbent material layers are staggered in the direction from the bodyside to the opposing, backside of the core.

124. The core of claim 116, wherein at least two of the first, second and third nonwoven vary in width or thickness.

125. The core of claim 124, wherein the first and second nonwovens are thicker than the third nonwoven, and wherein the second absorbent material layer is thicker than the first absorbent material layer.

126. The core of claim 116, wherein the first absorbent material layer comprises absorbent material-containing lanes and absorbent material-free lanes.

127. The core of claim 126, wherein the absorbent material-free lanes extend in the CD.

128. The core of claim 126, wherein the absorbent material-free lanes extend in the MD.

129. The core of claim 126, wherein the absorbent material-free lanes extend diagonal to both the CD and the MD.

130. The core of claim 126, wherein the absorbent material-free lanes form a grid pattern.

131. The core of claim 126, wherein the second absorbent material layer lacks absorbent material-free lanes.

132. The core of claim 126, wherein the second absorbent material layer comprises absorbent material-containing lanes and absorbent material-free lanes.

133. The core of claim 132, wherein the absorbent material-free lanes of the first absorbent material layer extend in the MD, and wherein the absorbent material-free lanes of the second absorbent material layer extend in the CD.

134. The core of claim 116, further comprising a loose fiber layer positioned between the first and second nonwovens.

135. The core of claim 116, wherein at least one of the nonwovens comprises bulkified bulky nonwoven.

136. The core of claim 135, wherein the second nonwoven is a bulkified bulky nonwoven.

137. The core of claim 136, wherein the second nonwoven is sectionally bulkified, including bulkified lanes and non-bulkified lanes.

138. The core of claim 137, wherein the first absorbent material layer comprises absorbent material-containing lanes and absorbent material-free lanes.

139. The core of claim 138, wherein the absorbent material-containing lanes are coincident with the bulkified lanes, and the absorbent material-free lanes are coincident with the non-bulkified lanes.

140. The core of claim 138, wherein the absorbent material-containing lanes are coincident with the non-bulkified lanes, and the absorbent material-free lanes are coincident with the bulkified lanes.

141. The core of claim 116, wherein at least one on the nonwovens is a slitted nonwoven.

142. The core of claim 116, wherein at least one of the nonwovens includes at least one low capilarity region and at least one high capilarity region having a capiliary that is greater than the capilarity of the low capilarity region.

143. The core of claim 142, wherein the low capilarity region is positioned in a central, target region of the composite, and wherein the high capilarity regions are positioned on either side of the low capilarity region.

144. The core of claim 142, wherein the nonwoven having the low and high capilarity regions is on the backside of the core, opposite the bodyside.

CLAIMS

1. A multilayer absorbent core, the core comprising:

a first, bodyside nonwoven;

a second nonwoven;

a first absorbent material layer positioned between the first and second nonwovens, embedded within the first nonwoven, embedded within the second nonwoven, or combinations thereof;

a third nonwoven;

a second absorbent material layer positioned between the second and third nonwovens, embedded within the second nonwoven, embedded within the third nonwoven, or combinations thereof; and

wherein the first, second and third nonwovens have a gradient basis weight such that the first and second nonwovens have a higher basis weight than a basis weight of the third nonwoven, and wherein the first and second absorbent material layers have a gradient basis weight, such that the second absorbent material layer has a higher basis weight than a basis weight of the first absorbent material layer.

2. The core of claim 1, wherein at least one section of the second nonwoven comprises bulkified nonwoven.

3. The core of claim 2, wherein an entirety the second nonwoven comprises bulkified nonwoven.

4. The core of claim 2, wherein the second nonwoven comprises one or more sections of bulkified nonwoven and one or more sections of non-bulkified nonwoven, wherein the one or more sections of non-bulkified nonwoven have a high bulk density and a lower void volume than the one or more sections of bulkified nonwoven.

5. The core of claim 4, wherein the absorbent material is positioned on or embedded within the one or more sections of bulkified nonwoven, the one or more sections of non-bulkified nonwoven, or combinations thereof.

6. The core of claim 4, wherein each of the sections of bulkified nonwoven and non-bulkified nonwoven extend along a longitudinal centerline of the absorbent core.

7. The core of claim 4, further comprising one or more absorbent material-free sections coincident with the one or more sections of bulkified nonwoven and one or more absorbent material-containing sections coincident with the one or more sections of non-bulkified nonwoven.

8. The core of claim 4, further comprising one or more absorbent material-free sections coincident with the one or more sections of non-bulkified nonwoven and one or more absorbent material-containing sections coincident with the one or more sections of bulkified nonwoven.

9. The core of claim 8, wherein the absorbent material-free sections are fluid channels.

10. The core of claim 1, wherein at least some of the absorbent material is embedded within the second nonwoven layer.

11. The core of claim 1, further comprising a fourth nonwoven coupled with the third nonwoven.

12. The core of claim 11, wherein the fourth nonwoven is a spunbond nonwoven layer, a tissue, or an aperture nonwoven.

13. The core of claim 1, the third nonwoven comprises a layer of bicomponent fibers.

14. The core of claim 1, wherein the first absorbent material layer includes absorbent material-containing lanes and absorbent material-free lanes; and

wherein embossing lines bind the first nonwoven with the second nonwoven, wherein the embossing lines are coincident with the absorbent material-free lanes, such that the first nonwoven is embossed to the second nonwoven at locations corresponding to the absorbent material-free lanes.

15. The core of claim 1, wherein the first, bodyside nonwoven and the second nonwoven comprise air-through nonwovens, and wherein the third nonwoven comprises an SMS nonwoven.

16. The core of claim 1, further comprising:

a fourth nonwoven; and

a third absorbent material layer positioned between the third and fourth nonwovens, embedded within the third nonwoven, embedded within the fourth nonwoven, or combinations thereof.

17. The core of claim 15, further comprising:

a fifth nonwoven; and

a fourth absorbent material layer positioned between the fourth and fifth nonwovens, embedded within the fourth nonwoven, embedded within the fifth nonwoven, or combinations thereof.

18. The core of claim 1, wherein the first and second absorbent material layers comprise absorbent material-free lanes.

19. The core of claim 18, wherein the position of the absorbent material-free lanes in the first and second absorbent material layers are aligned in the direction from the bodyside to the opposing, backside of the core.

20. The core of claim 18, wherein the position of the absorbent material-free lanes in the first and second absorbent material layers are staggered in the direction from the bodyside to the opposing, backside of the core.

21. The core of claim 1, wherein the first nonwoven has a narrower width than a width of the second and third nonwovens, and wherein the first absorbent material layer is has a narrower width than a width of the second absorbent material layer.

22. The core of claim 1 wherein the first, second and third nonwovens have a gradient thickness such that the first and second nonwovens are thicker than the third nonwoven, and wherein the first and second absorbent material layers have a gradient thickness such that the second absorbent material layer is thicker than the first absorbent material layer.

23. The core of claim 1, wherein the first absorbent material layer comprises absorbent material-containing lanes and absorbent material-free lanes.

24. The core of claim 23, wherein the second absorbent material layer comprises absorbent material-containing lanes and absorbent material-free lanes.

25. The core of claim 24, wherein the absorbent material-free lanes of the first absorbent material layer extend in the MD, and wherein the absorbent material-free lanes of the second absorbent material layer extend in the CD.

26. The core of claim 1, further comprising a loose fiber layer comprising loose fibers positioned between the first and second nonwovens.

27. The core of claim 26, wherein SAP is mixed in the loose fiber.

28. The core of claim 26, wherein the loose fibers are oriented to generally extend in a single direction.

29. The core of claim 26, wherein the first absorbent material layer comprise SAP-containing lanes and SAP-free lanes, and wherein the loose fibers are within the SAP-free lanes.

30. The core of claim 1, wherein at least one of the nonwovens comprises bulkified bulky nonwoven.

31. The core of claim 30, wherein the second nonwoven is a bulkified bulky nonwoven.

32. The core of claim 31, wherein the second nonwoven is sectionally bulkified, including bulkified lanes and non-bulkified lanes.

33. The core of claim 32, wherein the first absorbent material layer comprises absorbent material-containing lanes and absorbent material-free lanes.

34. The core of claim 33, wherein the absorbent material-containing lanes are coincident with the bulkified lanes, and the absorbent material-free lanes are coincident with the non-bulkified lanes.

35. The core of claim 1, wherein the first, second and third nonwovens have a gradient capillarity such that the first and second nonwovens have a lower capillarity than a capillarity of the third nonwoven.

36. The core of claim 35, wherein the first nonwoven has a lower capillarity than a capillarity of the second nonwoven.

37. The core of claim 1, wherein the first and second absorbent material layers have gradient properties such that the first absorbent material layer has a higher permeability than the second absorbent material layer, a slower absorbency rate than the second absorbent material layer, and a lower absorbent capacity than the second absorbent material layer.

38. The core of claim 1, wherein the first, second, and third nonwovens exhibit a gradient void volume such that the first and second nonwovens have a higher void volume than the third nonwoven.

39. The core of claim 1, wherein the first, second, and third nonwovens each have end regions having a first capillarity and central regions having a second capillarity, wherein the first capillarity is greater than the second capillarity.

40. The core of claim 1, wherein at least one of the first, second, and third nonwovens comprise slits.

41. The core of claim 40, wherein the multilayer absorbent core includes SAP-containing lanes and SAP-free lanes.

42. The core of claim 41, wherein the slits are aligned with the SAP-containing lanes.

43. The core of claim 41, wherein the slits are aligned with the SAP-free lanes.