Claims

1. A cover system, comprising:

a cover adapted for covering a load on or in a unit load device or on a skid transported by air,

a means for securing the cover in a covered position around the load on or in the unit load device or on the skid, wherein the cover provides thermal protection to the load on or in the unit load device or on the skid from conductive and convective heat transfer.

2. The cover system according to claim 1, wherein the cover allows the respiration of horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the load and the surrounding environment.

3. The cover system according to claim 1, wherein the cover allows water vapor exchange between the load and the surrounding environment, wherein the water vapor exchange between the load and the surrounding environment acts to maintain a level of relative humidity to avoid condensation on the load.

4. The cover system according to claim 1, wherein the cover allows the exchange of gases between the load and the surrounding environment, wherein when the load is horticultural products the exchange of gases between the load and the surrounding environment acts to allow the respiration of the horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the horticultural products and the surrounding environment.

5. The cover system according to claim 4, wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d).

6. The cover system according to claim 4, wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d).

7. The cover system according to claim 3, wherein the cover has a permeance for water vapor between 1 x 10^3 $g_{water}/(m^2$ atm d) and 50 x 10^3 $g_{water}/(m^2$ atm d).

8. The cover system according to claim 1, wherein the cover comprises TYVEK.

9. The cover system according to claim 4, wherein the cover allows water vapor exchange between the load and the surrounding environment, wherein the water vapor exchange between the load and the surrounding environment acts to maintain a level of relative humidity to avoid condensation on the load.

10. The cover system according to claim 5, wherein the cover has a permeance for carbon dioxide of at least 23.4 x 10^3 $L_{CO2}/(m^2$ atm d).

11. The cover system according to claim 10, wherein the cover has a permeance for water vapor between 1 x 10^3 $g_{water}/(m^2$ atm d) and 50 x 10^3 $g_{water}/(m^2$ atm d).

12. The cover system according to claim 1, wherein the cover has a permeance for carbon dioxide of at least 23.4 x 10^3 $L_{CO2}/(m^2$ atm d) and wherein the cover has a permeance for oxygen of at least 15.6 x 10^3 $L_{O2}/(m^2$ atm d).

13. The cover system according to claim 12, wherein the cover has a permeance for water vapor between 1 x 10^3 $g_{water}/(m^2$ atm d) and 50 x 10^3 $g_{water}/(m^2$ atm d).

14. The cover system according to claim 1, wherein the cover has a permeance for water vapor between 1 x 10^3 $g_{water}/(m^2$ atm d) and 50 x 10^3 $g_{water}/(m^2$ atm d).

15. The cover system according to claim 1, wherein the cover has a permeance for oxygen of at least 15.6 x 10^3 $L_{O2}/(m^2$ atm d).

16. The cover system according to claim 1, wherein the cover has a permeance for carbon dioxide of at least 23.4 x 10^3 $L_{CO2}/(m^2$ atm d).

17. A method for covering a load on or in a unit load device or on a skid transported by air, comprising:

covering a load on or in a unit load device or on a skid transported by air with a cover, securing the cover in a covered position around the load on or in the unit load device or on the skid, wherein the cover provides thermal protection to the load on or in the unit load device or on the skid from conductive and convective heat transfer.

18. The method according to claim 17, wherein the cover allows the respiration of horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the load and the surrounding environment.

19. The method according to claim 17, wherein the cover allows water vapor exchange between the load and the surrounding environment, wherein the water vapor exchange between the load and the surrounding environment acts to maintain a level of relative humidity to avoid condensation on the load.

20. The method according to claim 17, wherein the cover allows the exchange of gases between the load and the surrounding environment, wherein when the load is horticultural products the exchange of gases between the load and the surrounding environment acts to allow the respiration of the horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the horticultural products and the surrounding environment.

21. The method according to claim 20, wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d).

22. The method according to claim 20, wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d).

23. The method according to claim 19, wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m^2$ atm d) and 50×10^3 $g_{water}/(m^2$ atm d).

24. The method according to claim 17, wherein the cover comprises TYVEK.

25. The method according to claim 20, wherein the cover allows water vapor exchange between the load and the surrounding environment, wherein the water vapor exchange between the load and the surrounding environment acts to maintain a level of relative humidity to avoid condensation on the load.

26. The method according to claim 21, wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d).

27. The method according to claim 26, wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m^2$ atm d) and 50×10^3 $g_{water}/(m^2$ atm d).

28. The method according to claim 17, wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d) and wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d).

29. The method, according to claim 28, wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m^2$ atm d) and 50×10^3 $g_{water}/(m^2$ atm d).

30. The method according to claim 17, wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m^2$ atm d) and 50×10^3 $g_{water}/(m^2$ atm d).

31. The method according to claim 17, wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d).

32. The method according to claim 17, wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d).

CLAIMS

The invention claimed is:

1. A cover system, comprising:

a cover adapted for covering an entire load on a unit load device or on a skid transported by air such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment,

a means for securing the cover in a covered position around the entire load on the unit load device or on the skid such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment, wherein the cover provides thermal protection to the entire load on the unit load device or on the skid from conductive and convective heat transfer,

wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d),

wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d),

wherein the cover allows water vapor exchange between the load and the surrounding environment.

2. The cover system according to claim 1, wherein the cover is adapted for covering various size loads on the unit load device or on the skid.

3. The cover system according to claim 1, wherein the cover comprises an outside surface with physical properties affecting radiative heat transfer with the surrounding environment in such a way that the cover helps to maintain the temperature of the load.

4. The cover system according to claim 1, wherein the cover comprises a single layer.

5. The cover system according to claim 1, wherein the cover comprises multiple layers.

6. The cover system according to claim 1, wherein the cover comprises multiple parts.

7. The cover system according to claim 1, wherein the cover allows the respiration of horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the load and the surrounding environment.

8. The cover system according to claim 1, wherein when the load is horticultural products the exchange of gases between the load and the surrounding environment acts to allow the respiration of the horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the horticultural products and the surrounding environment.

9. A cover system, comprising:
a cover adapted for covering an entire load on a unit load device or on a skid transported by air such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment,

a means for securing the cover in a covered position around the entire load on the unit load device or on the skid such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment, wherein the cover provides thermal protection to the entire load on the unit load device or on the skid from conductive and convective heat transfer,

wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d),

wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d),

wherein for a covered load loaded in an aircraft cargo hold, the cover allows the exchange of water vapor between the load and the aircraft cargo hold environment so as to avoid a release of water vapor in the aircraft cargo hold sufficient to trigger an aircraft cargo hold compartment smoke detection system.

10. The cover system according to claim 1, wherein the cover comprises a material that absorbs or eliminates ethylene.

11. The cover system according to claim 1, wherein the cover comprises a material imbedded or coated with antimicrobial agents that will decrease and/or stop the growth of microorganisms and/or kill microorganisms.

12. The cover system according to claim 1, wherein the cover protects the covered shipment from one or more of the following: precipitation, condensation, dust, wind, insects, and small animals.

13. The cover system according to claim 1, wherein the cover is made entirely or partially from a material or a combination of materials that is RFID friendly.

14. The cover system according to claim 1, wherein the cover allows the use on and/or under the cover of RFID tags such as but not limited to passive, semi-passive, active, semi-active.

15. The cover system according to claim 1, wherein the cover is perforated.

16. The cover system according to claim 10, wherein a concentration of ethylene around the load is <0.01 ppm.

17. A cover system, comprising:

a cover adapted for covering an entire load on a unit load device or on a skid transported by air such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment,

a means for securing the cover in a covered position around the entire load on the unit load device or on the skid such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment, wherein the cover provides thermal protection to the entire load on the unit load device or on the skid from conductive and convective heat transfer,

wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d),

wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d),

wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m$ atm d) and 50×10^3 $g_{water}/(m^2$ atm d).

18. A cover system, comprising:
a cover adapted for covering an entire load on a unit load device or on a skid transported by air such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment,

a means for securing the cover in a covered position around the entire load on the unit load device or on the skid such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment, wherein the cover provides thermal protection to the entire load on the unit load device or on the skid from conductive and convective heat transfer,

wherein the cover has a permeance for oxygen of at least 15.6×10^3 $L_{O2}/(m^2$ atm d),

wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m^2$ atm d) and 50×10^3 $g_{water/(m}{}^2$ atm d).

19. A cover system, comprising:
a cover adapted for covering an entire load on a unit load device or on a skid transported by air such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment,

a means for securing the cover in a covered position around the entire load on the unit load device or on the skid such that the cover separates the entire load on the unit load device or on the skid from the surrounding environment, wherein the cover provides thermal protection to the entire load on the unit load device or on the skid from conductive and convective heat transfer,

wherein the cover has a permeance for carbon dioxide of at least 23.4×10^3 $L_{CO2}/(m^2$ atm d),

wherein the cover has a permeance for water vapor between 1×10^3 $g_{water}/(m^2$ atm d) and 50×10^3 $g_{water}/(m^2$ atm d).

20. The cover system according to claim 1, wherein the cover comprises flash spun high-density polyethylene.

21. The cover system according to claim 6, wherein a first of the multiple parts has a first permeance for oxygen and a first permeance for carbon dioxide, wherein a second of the multiple parts has a second permeance for oxygen and a second permeance for carbon dioxide, wherein the first permeance for oxygen is different than the second permeance for oxygen and the first permeance for carbon dioxide is different than the second permeance for carbon dioxide, wherein the permeance for oxygen is determined by the first permeance for oxygen, the second permeance for oxygen, and permeances for oxygen of any other of the multiple parts, wherein the permeance for carbon dioxide is determined by the first permeance for carbon dioxide, the second permeance for carbon dioxide, and permeances for carbon dioxide of any other of the multiple parts.

22. The cover system according to claim 17, wherein the cover is adapted for covering various size loads on the unit load device or on the skid.

23. The cover system according to claim 17, wherein the cover comprises an outside surface with physical properties affecting radiative heat transfer with the surrounding environment in such a way that the cover helps to maintain the temperature of the load.

24. The cover system according to claim 17, wherein the cover comprises a single layer.

25. The cover system according to claim 17, wherein the cover comprises multiple layers.

26. The cover system according to claim 17, wherein the cover comprises multiple parts.

27. The cover system according to claim 17, wherein the cover allows the respiration of horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the load and the surrounding environment.

28. The cover system according to claim 17, wherein when the load is horticultural products the exchange of gases between the load and the surrounding environment acts to allow the respiration of the horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the horticultural products and the surrounding environment.

29. The cover system according to claim 17, wherein the cover comprises a material that absorbs or eliminates ethylene.

30. The cover system according to claim 17, wherein the cover comprises a material imbedded or coated with antimicrobial agents that will decrease and/or stop the growth of microorganisms and/or kill microorganisms.

31. The cover system according to claim 17, wherein the cover protects the covered shipment from one or more of the following: precipitation, condensation, dust, wind, insects, and small animals.

32. The cover system according to claim 17, wherein the cover is made entirely or partially from a material or a combination of materials that is RFID friendly.

33. The cover system according to claim 17, wherein the cover allows the use on and/or under the cover of RFID tags such as but not limited to passive, semi-passive, active, semi-active.

34. The cover system according to claim 17, wherein the cover is perforated.

35. The cover system according to claim 29, wherein a concentration of ethylene around the load is <0.01 ppm.

36. The cover system according to claim 17, wherein the cover comprises flash spun high-density polyethylene.

37. The cover system according to claim 26, wherein a first of the multiple parts has a first permeance for oxygen and a first permeance for carbon dioxide, wherein a second of the multiple parts has a second permeance for oxygen and a second permeance for carbon dioxide, wherein the first permeance for oxygen is different than the second permeance for oxygen and the first permeance for carbon dioxide is different than the second permeance for carbon dioxide, wherein the permeance for oxygen is determined by the first permeance for oxygen, the second permeance for oxygen, and permeances for oxygen of any other of the multiple parts, wherein the permeance for carbon dioxide is determined by the first permeance for carbon dioxide, the second permeance for carbon dioxide, and permeances for carbon dioxide of any other of the multiple parts.

38. The cover system according to claim 18, wherein the cover is adapted for covering various size loads on the unit load device or on the skid.

39. The cover system according to claim 18, wherein the cover comprises an outside surface with physical properties affecting radiative heat transfer with the surrounding environment in such a way that the cover helps to maintain the temperature of the load.

40. The cover system according to claim 18, wherein the cover comprises a single layer.

41. The cover system according to claim 18, wherein the cover comprises multiple layers.

42. The cover system according to claim 18, wherein the cover comprises multiple parts.

43. The cover system according to claim 18, wherein the cover allows the respiration of horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the load and the surrounding environment.

44. The cover system according to claim 18, wherein when the load is horticultural products the exchange of gases between the load and the surrounding environment acts to allow the respiration of the horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the horticultural products and the surrounding environment.

45. The cover system according to claim 18, wherein the cover comprises a material that absorbs or eliminates ethylene.

46. The cover system according to claim 18, wherein the cover comprises a material imbedded or coated with antimicrobial agents that will decrease and/or stop the growth of microorganisms and/or kill microorganisms.

47. The cover system according to claim 18, wherein the cover protects the covered shipment from one or more of the following: precipitation, condensation, dust, wind, insects, and small animals.

48. The cover system according to claim 18, wherein the cover is made entirely or partially from a material or a combination of materials that is RFID friendly.

49. The cover system according to claim 18, wherein the cover allows the use on and/or under the cover of RFID tags such as but not limited to passive, semi-passive, active, semi-active.

50. The cover system according to claim 18, wherein the cover is perforated.

51. The cover system according to claim 45, wherein a concentration of ethylene around the load is <0.01 ppm.

52. The cover system according to claim 18, wherein the cover comprises flash spun high-density polyethylene.

53. The cover system according to claim 42, wherein a first of the multiple parts has a first permeance for oxygen and a first permeance for carbon dioxide, wherein a second of the multiple parts has a second permeance for oxygen and a second permeance for carbon dioxide, wherein the first permeance for oxygen is different than the second permeance for oxygen and the first permeance for carbon dioxide is different than the second permeance for carbon dioxide, wherein the permeance for oxygen is determined by the first permeance for oxygen, the second permeance for oxygen, and permeances for oxygen of any other of the multiple parts,

wherein the permeance for carbon dioxide is determined by the first permeance for carbon dioxide, the second permeance for carbon dioxide, and permeances for carbon dioxide of any other of the multiple parts.

54. The cover system according to claim 19, wherein the cover is adapted for covering various size loads on the unit load device or on the skid.

55. The cover system according to claim 19, wherein the cover comprises an outside surface with physical properties affecting radiative heat transfer with the surrounding environment in such a way that the cover helps to maintain the temperature of the load.

56. The cover system according to claim 19, wherein the cover comprises a single layer.

57. The cover system according to claim 19, wherein the cover comprises multiple layers.

58. The cover system according to claim 19, wherein the cover comprises multiple parts.

59. The cover system according to claim 19, wherein the cover allows the respiration of horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the load and the surrounding environment.

60. The cover system according to claim 19, wherein when the load is horticultural products the exchange of gases between the load and the surrounding environment acts to allow the respiration of the horticultural products by providing adequate gas exchange rates of oxygen and carbon dioxide between the horticultural products and the surrounding environment.

61. The cover system according to claim 19, wherein the cover comprises a material that absorbs or eliminates ethylene.

62. The cover system according to claim 19, wherein the cover comprises a material imbedded or coated with antimicrobial agents that will decrease and/or stop the growth of microorganisms and/or kill microorganisms.

63. The cover system according to claim 19, wherein the cover protects the covered shipment from one or more of the following: precipitation, condensation, dust, wind, insects, and small animals.

64. The cover system according to claim 19, wherein the cover is made entirely or partially from a material or a combination of materials that is RFID friendly.

65. The cover system according to claim 19, wherein the cover allows the use on and/or under the cover of RFID tags such as but not limited to passive, semi-passive, active, semi-active.

66. The cover system according to claim 19, wherein the cover is perforated.

67. The cover system according to claim 61, wherein a concentration of ethylene around the load is <0.01 ppm.

68. The cover system according to claim 19, wherein the cover comprises flash spun high-density polyethylene.

69. The cover system according to claim 58, wherein a first of the multiple parts has a first permeance for oxygen and a first permeance for carbon dioxide, wherein a second of the multiple parts has a second permeance for oxygen and a second permeance for carbon dioxide, wherein the first permeance for oxygen is different than the second permeance for oxygen and the first permeance for carbon dioxide is different than the second permeance for carbon dioxide, wherein the permeance for oxygen is determined by the first permeance for oxygen, the second permeance for oxygen, and permeances for oxygen of any other of the multiple parts, wherein the permeance for carbon dioxide is determined by the first permeance for carbon dioxide, the second permeance for carbon dioxide, and permeances for carbon dioxide of any other of the multiple parts.