What is claimed is:

1. A valve connectable in fluid communication with a fluid-receiving chamber and forming a substantially fluid-tight seal therebetween, the valve comprising a relatively rigid valve seat, a relatively flexible valve member overlying the valve seat and forming an axially-elongated, normally-closed valve opening therebetween defining an inlet at one end of the valve seat, an outlet at an opposite end of the valve seat, and an axially-extending seal therebetween that forms a fluid-tight seal between the inlet and outlet of the normally-closed valve opening, an axially-extending valve body radially spaced relative to the valve member and forming a space therebetween allowing fluid-flow therethrough for cleaning the valve and fluid-receiving chamber, and a seal engageable with the fluid-receiving chamber and forming a substantially fluid-tight seal therebetween to seal the valve outlet and fluid-receiving chamber with respect to ambient atmosphere, wherein the valve member is movable radially away from the valve seat in response to substance at the inlet to the valve opening exceeding a valve opening pressure to flow into the normally closed valve opening, through the outlet, and into the fluid-receiving chamber.

2. A valve as defined in claim 1, further comprising a deflector extending axially beyond the outlet of the normally closed valve opening.

3. A valve as defined in claim 2, wherein the deflector extends axially beyond a distal end of the valve body.

4. A valve as defined in claim 2, wherein the deflector extends axially from the valve seat.

5. A valve as defined in claim 4, wherein the deflector defines a distal end and the valve body defines a distal end, and the distal end of the deflector either (1) extends axially about the same extent as the distal end of the valve body, or (2) extends axially beyond the distal end of the valve body.

6. A valve as defined in claim 4, wherein the deflector is substantially conical shaped.

7. A valve as defined in claim 1, wherein the valve member and the valve seat form an interference fit therebetween.

8. A valve as defined in claim 7, wherein the valve member and valve seat define a decreasing level of interference at the inlet relative to the outlet of the normally-closed valve opening.

9. A valve as defined in claim 8, wherein the valve member and valve seat define a progressively decreasing level of interference in the direction from the inlet to the outlet of the normally-closed valve opening.

10. A valve as defined in claim 1, wherein the valve member defines a first thickness at the inlet and a second thickness at the outlet that is less than the first thickness.

11. A valve as defined in claim 10, wherein the first thickness is at least about 1-1/4 times greater than the second thickness.

12. A valve as defined in claim 1, wherein the valve member defines a distal end, the valve body defines a distal end, and the distal end of the valve member is spaced axially inwardly relative to the distal end of the valve body.

13. A valve as defined in claim 7, wherein the valve body extends annularly about the valve member.

14. A valve as defined in claim 13, wherein the valve member extends annularly about the valve seat and includes a base located approximately at the valve opening or upstream of the valve opening, wherein the base extends radially between the valve seat and valve body.

15. A valve as defined in claim 14, wherein the base of the valve member defines a curvilinear surface extending substantially radially between the valve seat and valve body.

16. A valve as defined in claim 15, wherein the base includes a first curvilinear surface portion adjacent to the valve seat defined by a first radius, a second curvilinear surface portion adjacent to the valve body defined by a second radius, and wherein the first radius is greater than the second radius.

17. A valve as defined in claim 15, wherein the seal extends annularly about a distal end of the valve body.

18. A valve as defined in claim 17, wherein the seal is formed integral with the valve member.

19. A valve as defined in claim 17, wherein the valve member and seal are co-molded to the valve body.

20. A valve as defined in claim 18, wherein the valve member, seal, and valve body define a space that extends annularly along the valve member and radially between the valve member and valve body for receiving fluid therethrough for cleaning the valve.

21. A valve as defined in claim 1, wherein the chamber is a dilution chamber or a mixing chamber for receiving a perishable food product, the dilution chamber or mixing chamber and valve are subjected to a clean-in-place process involving elevated temperatures above ambient temperature and vacuum pressure, and the valve member is made of a material and is configured to define a valve opening pressure that is sufficiently high to maintain a hermetic seal between the valve member and valve seat during the clean-in-place process.

22. A valve as defined in claim 21, wherein the valve opening pressure is at least about 5 psi.

23. A valve as defined in claim 1, wherein the valve member is made of silicone.

24. A device including a valve as defined in claim 1 and a variable-storage chamber connected in fluid communication with the inlet.

25. A device as defined in claim 24, further comprising a flexible tube connected in fluid communication between the valve and variable-volume storage chamber.

26. A valve as defined in claim 1, further comprising a relatively flexible filler extending axially and radially between the valve member and valve body, wherein the valve member defines a first hardness that allows the valve member to flex outwardly relative to the valve seat in response to a substance at the valve inlet exceeding the valve opening pressure; and

the filler defines a second hardness less than the first hardness for flexing with movement of the valve member and allowing the valve member to move substantially radially between normally closed and open positions and for substantially preventing debris and like substances from collecting between the valve member and body.

27. A valve as defined in claim 26, wherein the first hardness is within the range of about 25 A to about 70 A, and the second hardness is within the range of about 35 A to about 40A.

28. A valve for storing a sterile food product hermetically sealed in a variable-volume storage chamber, and dispensing the sterile food product through the valve and into a dilution chamber or a mixing chamber, wherein the valve is connectable in fluid communication with the dilution chamber or mixing chamber and forms a substantially fluid-tight seal therebetween, the valve comprising: first means for forming a relatively rigid valve sealing surface; second means that is relatively flexible for overlying the first means and forming an axially-elongated, normally closed valve opening therebetween defining an inlet at one end of the first means, an outlet at an opposite end of the first means, and an axially-extending seal therebetween, and for moving radially away from the first means in response to sterile food product at the inlet exceeding a valve opening pressure to allow the sterile food product to flow into the normally closed valve opening, through the outlet, and into the dilution chamber or mixing chamber; third means for enclosing the first and second means that is radially spaced relative to the second means and extends axially adjacent to the second means for forming a space therebetween and allowing fluid-flow therethrough for cleaning the valve and the dilution chamber or mixing chamber; and fourth means engageable with the dilution chamber or the mixing chamber for forming a substantially fluid-tight seal therebetween and sealing the outlet and the dilution chamber or the mixing chamber with respect to ambient atmosphere.

29. A valve as defined in claim 27, wherein the first means is a valve seat, the second means is a valve member, the third means is a valve body, and the fourth means is a seal.

30. A device comprising a valve as defined in claim 29, and further comprising fifth means coupled in fluid communication with the inlet for storing multiple portions of the sterile perishable food product hermetically sealed with respect to ambient atmosphere.

31. A method comprising the following steps:

i) providing a one-way valve connected in fluid communication with a variable-volume storage chamber storing therein a liquid that is hermetically sealed with respect to ambient atmosphere;

ii) connecting the one-way valve in fluid communication with a dilution chamber or a mixing chamber, and forming a substantially fluid-tight seal between the one-way valve and the dilution chamber or the mixing chamber;

iii) pressurizing a portion of the liquid from the variable-volume storage chamber to a pressure that exceeds a valve opening pressure of the one-way valve;

iv) introducing the pressurized liquid into an inlet of a normally closed valve opening of the one-way valve;

v) moving with the pressurized liquid a flexible valve member radially away from a relatively rigid valve seat of the one-way valve to open a normally-closed axially extending valve opening of the one-way valve;

vi) allowing the pressurized liquid to flow from the inlet, through the normally-closed axially extending valve opening and, in turn, through an outlet of the normally-closed valve opening and into the dilution chamber or the mixing chamber;

vii) upon passage of the pressurized liquid through the normally-closed valve opening, allowing the resilient flexible valve member to move radially into engagement with the valve seat to seal the normally-closed valve opening; and

viii) maintaining the liquid in the variable-volume storage chamber sterile and hermetically sealed with respect to ambient atmosphere throughout the foregoing steps.

32. A method as defined in claim 31, wherein the liquid is a perishable food product.

33. A method as defined in claim 32, wherein the perishable food product is a milk product or a chocolate product.

34. A method as defined in claim 31, further comprising the steps of providing in combination a plurality of variable-volume storage chamber and one-way valve assemblies, and releasably connecting each one-way valve assembly to a respective dilution chamber or mixing bowl.

35. A method as defined in claim 34, wherein the providing step further includes providing in each variable-volume storage chamber a respective perishable liquid food product sealed therein with respect to ambient atmosphere.

36. A method as defined in claim 31, further comprising the step of frangibly connecting a cover to the one-way valve to protect the valve during handling prior to the connecting step.

37. A method as defined in claim 31, wherein the pressurizing step includes pressurizing the portion of the liquid to a pressure at or above a valve opening pressure.

38. A method as defined in claim 31, wherein the one-way valve defines an axially and radially extending space between the valve member and valve body, and the method further comprises the step of directing a flow of cleaning fluid through said space to clean the valve member and prevent the collection of residue thereon.

39. A method as defined in claim 31, further comprising providing a deflector on the valve and using the deflector to protect and prevent contact with the valve member.

40. A method as defined in claim 39, further comprising recessing a distal end of the valve member within an annular valve body to further protect the valve member.

What is claimed is

1. A valve connectable in fluid communication with a fluid-receiving chamber and forming a substantially fluid-tight seal therebetween, the valve comprising a relatively rigid valve seat, a relatively flexible valve member overlying the valve seat and forming a normally-closed valve opening therebetween defining an inlet at one end of the valve seat, an outlet at an opposite end of the valve seat, and a seal therebetween that forms a fluid-tight seal between the inlet and outlet of the normally-closed valve opening, a valve body spaced relative to the valve member and forming a space therebetween, and a seal engageable with the fluid-receiving chamber and forming a substantially fluid-tight seal therebetween to seal the valve outlet and fluid-receiving chamber with respect to ambient atmosphere, wherein the valve member is movable away from the valve seat in response to substance at the inlet to the valve opening exceeding a valve opening pressure to flow into the normally closed valve opening, through the outlet, and into the fluid-receiving chamber.

2. A valve as defined in claim 1, further comprising a deflector extending axially beyond the outlet of the normally closed valve opening.

3. A valve as defined in claim 2, wherein the deflector extends axially beyond a distal end of the valve body.

4. A valve as defined in claim 2, wherein the deflector extends axially from the valve seat.

5. A valve as defined in claim 4, wherein the deflector defines a distal end and the valve body defines a distal end, and the distal end of the deflector either (1) extends axially about the same extent as the distal end of the valve body, or (2) extends axially beyond the distal end of the valve body.

6. A valve as defined in claim 4, wherein the deflector is substantially conical shaped.

7. A valve as defined in claim 1, wherein the valve member and the valve seat form an interference fit therebetween.

8. A valve as defined in claim 7, wherein the valve member and valve seat define a decreasing level of interference at the inlet relative to the outlet of the normally-closed valve opening.

9. A valve as defined in claim 8, wherein the valve member and valve seat define a progressively decreasing level of interference in the direction from the inlet to the outlet of the normally-closed valve opening.

10. A valve as defined in claim 1, wherein the valve member defines a first thickness at the inlet and a second thickness at the outlet that is less than the first thickness.

11. A valve as defined in claim 10, wherein the first thickness is at least about 1-1/4 times greater than the second thickness.

12. A valve as defined in claim 1, wherein the valve member defines a distal end, the valve body defines a distal end, and the distal end of the valve member is spaced axially inwardly relative to the distal end of the valve body.

13. A valve as defined in claim 7, wherein the valve body extends annularly about the valve member.

14. A valve as defined in claim 13, wherein the valve member extends annularly about the valve seat and includes a base located approximately at the valve opening or upstream of the valve opening, wherein the base extends radially between the valve seat and valve body.

15. A valve as defined in claim 14, wherein the base of the valve member defines a curvilinear surface extending substantially radially between the valve seat and valve body.

16. A valve as defined in claim 15, wherein the base includes a first curvilinear surface portion adjacent to the valve seat defined by a first radius, a second curvilinear surface portion adjacent to the valve body defined by a second radius, and wherein the first radius is greater than the second radius.

17. A valve as defined in claim 15, wherein the seal extends annularly about a distal end of the valve body.

18. A valve as defined in claim 17, wherein the seal is formed integral with the valve member.

19. A valve as defined in claim 17, wherein the valve member and seal are co-molded to the valve body.

20. A valve as defined in claim 18, wherein the valve member, seal, and valve body define a space that extends annularly along the valve member and radially between the valve member and valve body for receiving fluid therethrough for cleaning the valve.

21. A valve as defined in claim 1, wherein the chamber is a dilution chamber or a mixing chamber for receiving a perishable food product, the dilution chamber or mixing chamber and valve are subjected to a clean-in-place process involving elevated temperatures above ambient temperature and vacuum pressure, and the valve member is made of a material and is configured to define a valve opening pressure that is sufficiently high to maintain a hermetic seal between the valve member and valve seat during the clean-in-place process.

22. A valve as defined in claim 21, wherein the valve opening pressure is at least about 5 psi.

23. A valve as defined in claim 1, wherein the valve member is made of silicone.

24. A device including a valve as defined in claim 1 and a variable-storage chamber connected in fluid communication with the inlet.

25. A device as defined in claim 24, further comprising a flexible tube connected in fluid communication between the valve and variable-volume storage chamber.

26. A valve as defined in claim 1, further comprising a relatively flexible filler extending axially and radially between the valve member and valve body, wherein the valve member defines a first hardness that allows the valve member to flex outwardly relative to the valve seat in response to a substance at the valve inlet exceeding the valve opening pressure; and the filler defines a second hardness less than the first hardness for flexing with movement of the valve member and allowing the valve member to move substantially radially between normally

closed and open positions and for substantially preventing debris and like substances from collecting between the valve member and body.

27. A valve as defined in claim 26, wherein the first hardness is within the range of about 25 A to about 70 A, and the second hardness is within the range of about 35 A to about 40 A.

28. A valve for storing a sterile product hermetically sealed in a variable-volume storage chamber, and dispensing the sterile product through the valve and into a dilution chamber or a mixing chamber, wherein the valve is connectable in fluid communication with the dilution chamber or mixing chamber and forms a substantially fluid-tight seal therebetween, the valve comprising: first means for forming a relatively rigid valve sealing surface; second means that is relatively flexible for overlying the first means and forming a normally closed valve opening therebetween defining an inlet at one end of the first means, an outlet at an opposite end of the first means, and a seal therebetween, and for moving away from the first means in response to sterile product at the inlet exceeding a valve opening pressure to allow the sterile product to flow into the normally closed valve opening, through the outlet, and into the dilution chamber or mixing chamber; third means for enclosing the first and second means that is spaced relative to the second means and extends adjacent to the second means for forming a space therebetween and allowing fluid-flow therethrough for cleaning the valve and the dilution chamber or mixing chamber; and fourth means engageable with the dilution chamber or the mixing chamber for forming a substantially fluid-tight seal therebetween and sealing the outlet and the dilution chamber or the mixing chamber with respect to ambient atmosphere.

29. A valve as defined in claim 28, wherein the first means is a valve seat, the second means is a valve member, the third means is a valve body, and the fourth means is a seal.

30. A device comprising a valve as defined in claim 29, and further comprising fifth means coupled in fluid communication with the inlet for storing multiple portions of the sterile perishable food product hermetically sealed with respect to ambient atmosphere.

31. A method comprising the following steps:

i) providing a one-way valve connected in fluid communication with a variable-volume storage chamber storing therein a liquid that is hermetically sealed with respect to ambient atmosphere;

ii) connecting the one-way valve in fluid communication with a dilution chamber or a mixing chamber, and forming a substantially fluid-tight seal between the one-way valve and the dilution chamber or the mixing chamber;

iii) pressurizing a portion of the liquid from the variable-volume storage chamber to a pressure that exceeds a valve opening pressure of the one-way valve;

iv) introducing the pressurized liquid into an inlet of a normally closed valve opening of the one-way valve;

v) moving with the pressurized liquid a flexible valve member away from a relatively rigid valve seat of the one-way valve to open a normally-closed valve opening of the one-way valve;

vi) allowing the pressurized liquid to flow from the inlet, through the normally-closed axially extending valve opening and, in turn, through an outlet of the normally-closed valve opening and into the dilution chamber or the mixing chamber;

vii) upon passage of the pressurized liquid through the normally-closed valve opening, allowing the resilient flexible valve member to move into engagement with the valve seat to seal the normally-closed valve opening; and

viii) maintaining the liquid in the variable-volume storage chamber sterile and hermetically sealed with respect to ambient atmosphere throughout the foregoing steps.

32. A method as defined in claim 31, wherein the liquid is a perishable food product.

33. A method as defined in claim 32, wherein the perishable food product is a milk product or a chocolate product.

34. A method as defined in claim 31, further comprising the steps of providing in combination a plurality of variable-volume storage chamber and one-way valve assemblies, and releasably connecting each one-way valve assembly to a respective dilution chamber or mixing bowl.

35. A method as defined in claim 34, wherein the providing step further includes providing in each variable-volume storage chamber a respective perishable liquid food product sealed therein with respect to ambient atmosphere.

36. A method as defined in claim 31, further comprising the step of frangibly connecting a cover to the one-way valve to protect the valve during handling prior to the connecting step.

37. A method as defined in claim 31, wherein the pressurizing step includes pressurizing the portion of the liquid to a pressure at or above a valve opening pressure.

38. A method as defined in claim 31, wherein the one-way valve defines a space between the valve member and a valve body of the valve, and the method further comprises the step of directing a flow of cleaning fluid through said space to clean the valve member and prevent the collection of residue thereon.

39. A method as defined in claim 31, further comprising providing a deflector on the valve and using the deflector to protect and prevent contact with the valve member.

40. A method as defined in claim 39, further comprising recessing a distal end of the valve member within an annular valve body to further protect the valve member.

41. A valve as defined in claims 1, wherein the valve is configured to define a valve opening pressure that is sufficiently high to at least one of (i) maintain a hermetic seal between the valve member and valve seat and (ii) prevent the valve from opening until subjected to a predetermined negative pressure or vacuum pressure.

42. A device as defined in claim 24, wherein the variable-volume storage chamber is a flexible pouch, and the valve is integral to the flexible pouch.

43. A method comprising the following steps:

i) providing a one-way valve connected in fluid communication with a variable-volume storage chamber storing therein a substance that is hermetically sealed with respect to ambient atmosphere, wherein valve comprises a relatively rigid valve seat, a relatively flexible valve member overlying the valve seat and forming a normally-closed

valve opening therebetween defining an inlet at one end of the valve seat, an outlet at an opposite end of the valve seat, and a valve body spaced relative to the valve member and forming a space therebetween, wherein the valve member is movable away from the valve seat into the space and toward the valve body in response to substance at the inlet to the valve opening exceeding a valve opening pressure to flow into the normally closed valve opening and the valve is configured to define a valve opening pressure that is sufficiently high to at least one of (a) maintain a hermetic seal between the valve member and valve seat and (b) prevent the valve from opening until subjected to a predetermined negative pressure or vacuum pressure;

ii) subjecting the valve to a negative pressure or vacuum pressure up to said predetermined negative pressure or vacuum pressure; and

(iii) at least one (a) maintaining a hermetic seal between the valve member and valve seat and (b) preventing the valve from opening.

44. A method as defined in claim 43, further comprising the steps of:

(iv) pressurizing substance from the variable-volume storage chamber to a pressure that exceeds a valve opening pressure of the valve;

(v) introducing said pressurized substance into the inlet;

(vi) moving with said pressurized substance the valve member away from the valve seat into the space and toward the valve body and opening the normally-closed valve opening;

(vii) flowing said pressurized substance from the inlet, through the normally-closed valve opening and, in turn, through the outlet;

(viii) moving the valve member, upon passage of said pressurized substance through the normally-closed valve opening, back into engagement with the valve seat to seal the normally-closed valve opening; and

(ix) maintaining the substance in the variable-volume storage chamber sterile and hermetically sealed with respect to ambient atmosphere throughout steps (i)-(ix).

45. A method as defined in claim 44, wherein step (vii) includes flowing said pressurized substance through the outlet and into a fluid-receiving chamber.

46. A method as defined in claim 43, wherein step (i) includes providing the valve member and the valve seat with an interference fit therebetween.

47. A method as defined in claim 46, including providing the valve member and valve seat with a decreasing level of interference at the inlet relative to the outlet of the normally-closed valve opening.

48. A method as defined in claim 47, including providing the valve member and valve seat with a progressively decreasing level of interference in the direction from the inlet to the outlet of the normally-closed valve opening.

49. A method as defined in claim 43, wherein step (i) includes providing the valve member with a first thickness at the inlet and a second thickness at the outlet that is less than the first thickness.

50. A method as defined in claim 49, wherein the first thickness is at least about 1-1/4 times greater than the second thickness.

51. A method as defined in claim 43, wherein the valve member defines a distal end, the valve body defines a distal end, and the distal end of the valve member is spaced axially inwardly relative to the distal end of the valve body.

52. A method as defined in claim 43, wherein the valve body extends annularly about the valve member.

53. A method as defined in claim 43, wherein the valve member is made of silicone.

54. A method as defined in claim 43, further comprising the step of providing a variable-storage chamber connected in fluid communication with the inlet.