herein are agnostic of a door position and tolerance stack-up. Further, the example configurations disclosed herein are operable with conventional IV tubes, so that specialized IV tubes, receptacles, cartridges, or additional parts are not needed. Materials for the different components of the infusion pumps discussed below may include metal, plastic, rubber and combinations thereof.

[0004] Aspects of the subject matter described herein may be useful alone or in combination with one or more other aspect described herein. Without limiting the foregoing description, in a first aspect of the present disclosure, an infusion pump for delivering an intravenous ("IV") fluid includes a housing including an actuation area configured to engage a portion of an IV tube, the actuation area including a first end to receive the IV tube from a fluid container and a second end to provide the IV tube to a patient and a seal section located along a perimeter of at least a portion of the actuation area. The example seal section includes a gasket rib positioned along the seal section and a tube channel having a horizontal orientation when the infusion pump is positioned for operation, the tube channel configured to cradle a second portion of the IV tube. The infusion pump also includes a door connected to the housing and configured to engage the gasket rib to enclose the actuation area of the housing. The door includes a recess section configured to align with the tube channel when the door is closed, the recess section configured to cradle the second portion of the IV tube such that the recess section and tube channel together enclose the second portion of the IV tube, and a channel relief lip configured to engage the second portion of the IV tube entering the door.

[0005] In accordance with a second aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the seal section includes a tube guidance section located between the tube channel and the actuation area, the tube guidance section configured to cradle the IV tube, causing the IV tube to bend for a desired orientation in the actuation area.

[0006] In accordance with a third aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the tube channel includes a surface that is at least one of (i) smooth, (ii) course ribbed, or (iii) fine ribbed.

[0007] In accordance with a fourth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the gasket rib includes at least one of (i) a single rib, or (ii) at least two ribs in parallel.

CLAIMS

Claim 1: An infusion pump for delivering an intravenous ("IV") fluid comprising:

a housing including

an actuation area configured to engage a first portion of an IV tube in a vertical orientation, the actuation area including a first end to receive the IV tube from a fluid container and a second end to provide the IV tube to a patient, and

a seal section located along a perimeter of at least a portion of the actuation area, the seal section including

a gasket rib positioned along the seal section, and

a tube channel having a horizontal orientation when the infusion pump is positioned for operation, the tube channel configured to cradle a second portion of the IV tube; and

a door connected to the housing and configured to engage the gasket rib to enclose the actuation area of the housing, the door including

a recess section configured to align with the tube channel when the door is closed, the recess section configured to cradle the second portion of the IV tube such that the recess section and tube channel together enclose the second portion of the IV tube, and

a channel relief lip configured to engage the second portion of the IV tube entering the door.

Claim 2: The infusion pump of Claim 1, wherein the seal section includes a tube guidance section located between the tube channel and the actuation area, the tube guidance section configured to cradle the second portion of the IV tube, causing a third portion of the IV tube, located between the first and second portions of the IV tube, to bend to the vertical orientation in the actuation area.

Claim 3: The infusion pump of Claims 1 or 2, wherein the tube channel includes a surface that is at least one of (i) smooth, (ii) course ribbed, or (iii) fine ribbed.

Claim 4: The infusion pump of any one of Claims 1, 2 or 3, wherein the gasket rib includes at least one of (i) a single rib, or (ii) at least two ribs in parallel.

Claim 5: The infusion pump of Claims 1 or 4, wherein the gasket rib includes an elastomeric material.

Claim 6: The infusion pump of any one of Claims 1, 4, or 5, wherein the gasket rib is molded with the housing.

Claim 7: The infusion pump of Claims 1 or 6, wherein the door includes a roof configured to extend over the housing at the first end of the actuation area, the roof including the at least one of the recess section or the channel relief lip.

Claim 8: The infusion pump of Claim 7, wherein the cradling of the second portion of the IV tube by the recess section and the tube channel causes the second portion of the IV tube to bend into the horizontal orientation under the roof.

Claim 9: The infusion pump of Claim 7, wherein the roof further includes a rib located on a side of the roof that is configured to engage a channel of the housing that is adjacent to the actuation area, the engagement of the rib with the channel preventing the roof from moving upwards.

Claim 10: The infusion pump of any one of Claims 1, 6, 7, or 9, wherein the channel relief lip includes at least one rib configured to cause at least one region in the IV tube to remain un-collapsed at the location where the second portion of the IV tube is bent.

Claim 11: The infusion pump of any one of Claims 1, 6, 7, or 10 wherein the first end is a top end of the actuation area and the second end is a bottom end of the actuation area.

Claim 12: The infusion pump of any one of Claims 1, 6, 7, or 11, wherein the gasket rib includes a tube window positioned adjacent to the first end of the actuation area configured to receive the IV tube.

Claim 13: The infusion pump of Claim 12, wherein the tube channel is located at the tube window.

Claim 14: The infusion pump of Claim 1, wherein the door is hingedly connected to the housing.

Claim 15: An infusion pump for delivering an intravenous ("IV") fluid comprising:

a housing including

an actuation area configured to engage a first portion of an IV tube, the actuation area including a first end to receive the IV tube from a fluid container and a second end to provide the IV tube to a patient, and

a seal section located along a perimeter of at least a portion of the actuation area, the seal section including

a gasket rib positioned along the seal section, and

a tube channel having a horizontal orientation when the infusion pump is positioned for operation, the tube channel, the tube channel configured to cradle a second portion of the IV tube; and

a door connected to the housing and configured to engage the gasket rib to enclose the actuation area of the housing, the door including a roof configured to extend over the housing at the first end of the actuation area, the roof including a recess section and a channel relief lip,

wherein the recess section is configured to align with the tube channel when the door is closed, the recess section being configured to cradle the second portion of the IV tube such that the recess section and tube channel together enclose the second portion of the IV tube.

Claim 16: The infusion pump of Claim 15, wherein the cradling of the second portion of the IV tube by the tube channel causes the second portion of the IV tube to bend into the horizontal orientation under the roof.

Claim 17: The infusion pump of Claims 15 or 16, wherein the roof further includes a rib located on a side of the roof that is configured to engage a channel of the housing that is adjacent to the actuation area, the engagement of the rib with the channel preventing the roof from moving upwards.

Claim 18: The infusion pump of Claims 15 or 17, wherein

the channel relief lip is configured to engage the second portion of the IV tube entering the door.

Claim 19: The infusion pump of Claim 18, wherein the channel relief lip includes at least one rib configured to cause at least one region in the IV tube to remain un-collapsed at the location where the second portion of the IV tube is bent.