

Claims

- 1 Apparatus for rolling back the end of a flexible tube, the apparatus comprising
means for retaining a flexible tube; and
means for rolling back the end of the flexible tube, the means being
5 aligned with the means for retaining the flexible tube, comprising
a plunger having a conical end, a tip of the conical end being at
the distal end of the plunger and flaring to a diameter that is the
same or larger than that of the internal diameter of the flexible
tube,
10 a cover expending over the plunger and movable with and
separately to the plunger; and
means for advancing the plunger and cover towards the tube.
- 2 Apparatus according to claim 1, where prior to use, the cover is positioned
15 level with or slightly behind a proximal end of the conical end.
- 3 Apparatus according to claim 1 or claim 2, wherein the means for advancing
the plunger and cover towards the tube is adapted to initially move both
components together, and then to move the cover while retaining the position
20 of the plunger with respect to the tube.
- 4 Apparatus according to claim 1, claim 2 or claim 3, wherein the cover is
provided with an indent on its inner surface, sized to attach a sleeve, the
sleeve being sized to fit over a rolled back end of the flexible tube, securing
25 the same.
- 5 Apparatus according to any preceding claim, wherein means for clamping the
flexible tube, and the means for rolling back the end of the tube are fixed onto
a base.
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- 6 Apparatus according to any preceding claim, wherein the means for advancing
the conical end, plunger and cover is manually operated.
- 7 Apparatus according to any one of claims 1 - 5, wherein the means for
35 advancing the conical end, plunger and sleeve is automated.

- 8 Apparatus according to any preceding claim, wherein the conical end of the plunger assembly and the cover are replaceable by alternatives of different sizes.
- 5 9 Apparatus according to any preceding claim, wherein the conical end flares outwardly with increasing flare from its tip to its widest point where it meets a stem of the plunger.
- 10 10 Apparatus according to any preceding claim, wherein the cover is an open cylinder.
- 11 Apparatus according to any preceding claims, wherein the length of the roll back formed is 80 – 120% of the external diameter of the flexible tube
- 15 12 Apparatus for rolling back the end of a flexible tube, and applying a sleeve, the apparatus comprising
- means for retaining a flexible tube; and
- means for rolling back the end of the tube, the means being aligned with means for retaining the flexible tube, comprising
- 20 a plunger having a conical end, a top of the conical end being at a distal end of the plunger and flaring to a diameter that is the same as or larger than that of the internal diameter of the flexible tube,
- a cover extending over the plunger assembly, movable with and
- 25 separately to the plunger, a distal end thereof holding the sleeve, the sleeve being advanced by movement of the cover; and
- means for advancing the plunger, cover and sleeve towards the tube.
- 30 13 Apparatus according to claim 12, wherein the retaining means is a clamp capable of holding and securing the flexible tube, while not damaging it.
- 14 Apparatus according to claims 12 or 13, wherein the conical end of the plunger assembly and/or the cover are replaceable by alternatives of different
- 35 sizes.
- 15 Apparatus according to any one of claims 12 to 14, wherein in an initial position a distal end of the cover is level with a proximal end of the conical end

of the plunger, or slightly set back therefrom, but movable to a position extending beyond the distal end of the conical end.

5 16 Apparatus according to any one of claims 12 to 15, wherein the conical end has an increasing flare from its tip to a widest point at a proximal end where it meets a stem portion.

10 17 Apparatus according to claim 16, wherein the flare is based on an ellipse or an oval shape.

18 Apparatus according to any one of claims 12 to 17, wherein the means for advancing the plunger assembly and cover is manually operational.

15 19 Apparatus according to any one of claims 12 to 17, wherein the means for advancing the plunger assembly and cover is automated.

20 20 Apparatus according to any one of claims 12 to 19, wherein the length of the roll back formed is example 80 – 120% of the external diameter of the flexible tube

21 A kit comprising the apparatus of any one of claims 1 – 11, or any one of claims 12 - 20, together with a plurality of sleeves, sized for an interference fit with a length of rolled back end.

25 22 A kit according to claim 21, wherein the kit further comprises a plurality of tubing supports, the tubing support sized for a minimum clearance fit over a flexible tube (that has not been rolled back).

30 23 A method of rolling back the end of a tube comprising inserting a conical portion, tip initially, into the end of the tube, until the tube extends over an end of the conical portion thereby creating a flared end of the tube, and pushing the flared end back on itself using a cover extending over the flared conical portion, resulting in a rolled back end.

35 24 A method according to claim 23, wherein the conical portion flares outwardly from its tip with increasing flare.

- 25 A method according to claim 24, wherein the conical portion is partially elliptical or oval in cross-section.
- 5 26 A method of rolling back the end of a tube according to claim 25, wherein the method further comprises supporting the rolled back end with a sleeve sized to fit over the rolled back end.
- 10 27 A method of rolling back the end of a tube according to claim 26, wherein the method further comprising rolling the end back over a tubing support, the tubing support sized for a minimal sliding fit over the flexible tube.
- 28 A method according to claim 27, including the step of connecting the sleeve and tubing support together.
- 15 29 A method according to claim 28, wherein the tubing support is provided with a lip extending substantially perpendicular outwards from a spigot sized to fit over the flexible tubing.
- 20 30 A method according to any one of claims 27 - 29, wherein the method comprises the step of positioning the tubing support over the flexible tube and set back from the end of the tube by a distance equivalent to a length of roll back required.
- 25 31 A method according any one of claims 27 - 30, wherein the cover is used to urge the sleeve over the rolled back end.
- 30 32 A method according to claim 27, wherein the method comprises a modified step of pushing the flared end back on itself using a sleeve supported and moved by the cover extending over the flared conical portion, resulting in a rolled back end secured by the sleeve.
- 35 33 A method according to claim 27 or claim 32, wherein the method comprises the further additional and modified steps of applying a tubing support over a length of flexible tubing, and pushing the flared end back on itself and over the tubing support.

34 A method according to any one of claims 23 – 33, wherein the length of the roll back formed is 80 – 120% of the external diameter of the flexible tube.

5 35 A method of providing a rolled back end of a flexible tube and supporting the rolled back end with a sleeve, the method comprising the steps of
supporting a length of the flexible tube,
inserting a conical portion into the end of the tube, until the tube
extends beyond the conical portion, creating a flared end, and
pushing the flared end back on itself using the sleeve held by a cover
10 extending over the flared conical portion, resulting in a rolled back end
of a flexible tube supported by the sleeve.

15 36 A method according to claim 35, comprising an additional step of
initially fitting a tubing support adjacent the end of the flexible tube,
spaced from the end by the length of tubing to be rolled back.

20 37 A method according to claim 36 further comprising a final step of
pushing the sleeve over the rolled back end to engage with a tubing
support.

38 A method according to any one of claims 35 - 37, wherein the tubing support
is positioned over the flexible tube and set back from the end of the tube by
the distance of roll back required.

25 39 A method according any one of claims 35 - 38, wherein the cover is provided
with an internal cut away to accommodate the sleeve.

30 40 A method according to any one of claims 35 – 38, wherein the length of the
roll back formed is 80 – 120% of the external diameter of the flexible tube

41 A method according to any one of claims 23 - 34 or 35 – 40 using the
apparatus of any of claims 1 – 11 or 12 - 20.