

CLAIMS

What is claimed is:

1. A method for coupling a tube to a tube fitting, the method comprising:
 - 5 radially outwardly expanding a tubular compression collar from a constricted state to an expanded state, the compression collar having a throughway extending there through and being comprised of a resiliently flexible material;
 - inserting an end of a tube within the throughway of the expanded
 - 10 compression collar, the tube bounding a passageway;
 - inserting a tube fitting within the passageway of the tube either before or after inserting the end of the tube within the throughway of the expanded compression collar; and
 - allowing the tubular compression collar to resiliently rebound back
 - 15 towards the constricted state so that the compression collar pushes the tube against the tube fitting.
2. The method as recited in claim 1, wherein the step of radially outwardly expanding the tubular compression collar comprises:
 - inserting the prongs of an expander into the throughway of the tubular
 - 20 compression collar while in the constricted state; and
 - radially outwardly moving the prongs so as to expand the compression collar to the expanded state.
3. The method as recited in claim 1, wherein the step of radially outwardly expanding the tubular compression collar comprises:
 - 25 inserting a bladder within the throughway of the tubular compression collar while in the constricted state;
 - expanding the bladder so as to expand the compression collar to the expanded state.
4. The method as recited in claim 1, wherein the step of radially
- 30 outwardly expanding the tubular compression collar comprises advancing a rotating mandrel within the throughway of the tubular compression collar so that the mandrel expands the compression collar to the expanded state
5. The method as recited in claim 4, wherein the mandrel comprises a tapered body and a plurality of rollers rotatably disposed thereon.

6. The method as recited in claim 1, wherein the step of radially outwardly expanding the tubular compression collar comprises rotating the tubular compression collar at a sufficiently high speed to cause the compression collar to expand from the constricted state to the expanded state.

5 7. The method as recited in claim 1, wherein the tubular compression collar comprises a tubular body having the throughway extending therethrough and a first stop lip radially inwardly projecting from the tubular body, wherein the step of inserting the end of the tube within the throughway of the expanded compression collar comprises inserting the end of the tube into the throughway until the tube abuts
10 the first stop lip.

8. The method as recited in claim 1, wherein the tubular compression collar comprises a tubular body having an interior surface and an opposing exterior surface that extend between a first end and an opposing second end, the interior surface bounding the throughway extending through the tubular body, a first window
15 extends laterally through the tubular body between the interior surface and the exterior surface, the tube being visible through the window when the end of the tube is within the throughway of the expanded compression collar.

9. The method as recited in claim 1, wherein the step of inserting the tube fitting within the passageway of the tube comprises inserting a tubular port of the tube
20 fitting into the passageway of the tube.

10. The method as recited in claim 1, wherein the step of inserting the tube fitting within the passageway of the tube comprises inserting an annular barb of the tube fitting within the passageway of the tube.

11. The method as recited in claim 1, wherein the compression collar is
25 radially outwardly expanded without concurrently radially outwardly expanding the tube.

12. The method as recited in claim 1, wherein it takes at least 30 minutes for the compression collar to rebound so as to lose 90% of its expansion from the constricted state to the expanded state.

30 13. The method as recited in claim 1, wherein the throughway has a diameter, the diameter being expanded by at least 150% relative to the original constricted state as the compression collar is moved from the constricted state to the expanded state.

14. The method as recited in claim 1, wherein the tube fitting is inserted

within the passageway of the tube while at least a portion of the tube is disposed within the throughway of the compression collar.

15. The method as recited in claim 1, wherein the tube fitting is inserted within the passageway of a portion of the tube while the portion of the tube is
5 disposed outside of the throughway of the expanded compression collar.

16. The method as recited in claim 1, further comprising applying gamma radiation to the tubular compression collar while or after the tubular compression collar resiliently rebounds back towards the constricted state.

17. The method as recited in claim 11, wherein the tubular compression
10 collar is comprised of high-density polyethylene (HDPE) and the step of applying the gamma radiation increases the stiffness of the compression collar.

18. The method as recited in claim 1, wherein the compression collar comprises a tubular body having the throughway extending between a first end and an opposing second end, a spacer tab outwardly projects from the first end of the tubular
15 body, wherein the method further comprises positioning the tube fitting so that a flange of the tube fitting butts against a terminal end of the spacer tab.

19. The method as recited in claim 1, wherein the compression collar comprises a tubular body having an interior surface that at least partially bounds the throughway, one or more compression ribs radially inwardly project from the interior
20 surface of the body, the one or more compression ribs press against the tube when the compression collar rebounds back towards the constricted state.

20. A method for coupling a tube, the method comprising:

radially outwardly expanding a tubular compression collar from a constricted state to an expanded state, the compression collar having a
25 throughway extending there through and being comprised of a resiliently flexible material;

allowing the tubular compression collar to resiliently rebound so that the tubular compression collar constricts to compress a tube against a tube fitting that are at least partially disposed within the throughway of the tubular
30 compression collar; and

applying radiation to the compression collar while or after the compression collar resiliently rebounds.

21. The method as recited in claim 20, wherein the tubular compression collar is comprised of a cross-linked polyethylene.

22. The method as recited in claim 20, wherein the radiation comprises gamma radiation.

23. The method as recited in claim 22, wherein the gamma radiation increasing the stiffness of the compression collar.

5 24. A tubular compression collar used for coupling a tube to a tube fitting, the tubular compression collar comprising:

 a tubular body comprised of a resiliently flexible material and having an interior surface and an opposing exterior surface that extend between a first end and an opposing second end, the interior surface bounding a throughway extending through the tubular body; and

10 a first window extending laterally through the tubular body between the interior surface and the exterior surface.

25. The tubular compression collar as recited in claim 24, wherein the tubular body is comprised of a cross-linked polyethylene.

15 26. The tubular compression collar as recited in claim 24, wherein the first end of the tubular body terminates at a terminal end face, the first window extending through a portion of the terminal end face.

27. The tubular compression collar as recited in claim 24, wherein the first window has an arched shaped configuration.

20 28. The tubular compression collar as recited in claim 24, wherein the first window is completely encircled by the tubular body.

29. The tubular compression collar as recited in claim 24, further comprising a second window extending laterally through the tubular body between the interior surface and the exterior surface, the second window being spaced apart from the first window.

25 30. The tubular compression collar as recited in claim 29, wherein the second window is disposed on a side of the tubular body that is opposite the first window.

31. The tubular compression collar as recited in claim 29, wherein the second window is spaced apart from the first window along a length of the tubular body.

32. The tubular compression collar as recited in claim 24, further comprising one or more spacer tabs outwardly projecting from the first end of the tubular body.

33. The tubular compression collar as recited in claim 32, wherein the first end of the tubular body terminates at a terminal end face, the one or more spacer tabs outwardly projecting from the terminal end face so as to extend parallel to a longitudinal axis of the tubular body.

5 34. The tubular compression collar as recited in claim 24, further comprising a first stop lip radially inwardly projecting from the tubular body at the first end.

35. The tubular compression collar as recited in claim 34, wherein the first end of the tubular body terminates at a terminal end face, the first stop lip radially inwardly projecting from the terminal end face.

36. The tubular compression collar as recited in claim 34, wherein the first stop lip radially inwardly projects from the interior surface of the compression collar.

37. The tubular compression collar as recited in claim 34, further comprising a second stop lip radially inwardly projecting from the tubular body at the first end, the second stop lip being radially spaced apart from the first stop lip.

38. The tubular compression collar as recited in claim 24, wherein the throughway of the tubular body has a length extending between the first end and the opposing second end, at least a majority of the length of the throughway having a constant diameter.

20 39. The tubular compression collar as recited in claim 24, further comprising one or more compression ribs radially inwardly projecting from the interior surface of the tubular body.

40. The tubular compression collar as recited in claim 24, further comprising one or more annular retention ribs radially outwardly projecting from the exterior surface of the tubular body.

41. The tubular compression collar as recited in claim 24, further comprising a hump formed on and radially outwardly projecting from the exterior surface of the tubular body.

42. A coupling assembly comprising:
30 the tubular compression collar as recited in claim 24,
 an end of a tube disposed within the throughway of the compression collar, the tube bounding a passageway; and
 a tube fitting disposed within the passageway of the tube, the compression collar radially inwardly compressing the tube against the tube

fitting so that a liquid tight seal is formed between the tube and the tube fitting.

43. The coupling assembly as recited in claim 42, wherein the tube is visible through the first window.

5 44. The coupling assembly as recited in claim 42, wherein the tube fitting comprises a tubular stem having an annular barb formed thereon.

45. The coupling assembly as recited in claim 42, further comprising a first stop lip radially inwardly projecting from the tubular body at the first end thereof, a terminal end of the tube being disposed against the first stop lip.

10 46. The coupling assembly as recited in claim 42, further comprising a first spacer tab outwardly projecting from the first end of the tubular body, a terminal end of the first spacer tab butting against a flange of the tube fitting.

47. A tubular compression collar used for coupling a tube to a tube fitting, the tubular compression collar comprising:

15 a tubular body comprised of a resiliently flexible material and having an interior surface and an opposing exterior surface that extend between a first end and an opposing second end, the interior surface bounding a throughway extending through the tubular body; and

20 a first compression rib radially inwardly projecting from the interior surface of the tubular body.

48. The tubular compression collar as recited in claim 47, wherein the first compression rib is annular and encircles the throughway.

49. The tubular compression collar as recited in claim 47, wherein the first compression rib does not encircle the throughway.

25 50. The tubular compression collar as recited in claim 47, further comprising a second compression rib radially inwardly projecting from the interior surface of the tubular body, the second compression rib being spaced apart from the first compression rib.

30 51. The tubular compression collar as recited in claim 50, wherein the second compression rib is disposed at the same location along the length of the tubular body but is radially spaced apart from the first compression rib.

52. The tubular compression collar as recited in claim 50, wherein the second compression rib is spaced apart from the first compression rib along the length of the tubular body.

53. The tubular compression collar as recited in claim 47, further comprising a first stop lip radially inwardly projecting from the tubular body at the first end.

54. The tubular compression collar as recited in claim 47, further
5 comprising one or more spacer tabs outwardly projecting from the first end of the tubular body.

55. The tubular compression collar as recited in claim 54, wherein the first end of the tubular body terminates at a terminal end face, the one or more spacer tabs outwardly projecting from the terminal end face so as to extend parallel to a
10 longitudinal axis of the tubular body.

56. The tubular compression collar as recited in claim 47, wherein the tubular body is comprised of a cross-linked polyethylene.

57. The tubular compression collar as recited in claim 47, further comprising one or more annular retention ribs radially outwardly projecting from the
15 exterior surface of the tubular body.

58. A coupling assembly comprising:

the tubular compression collar as recited in claim 47;

an end of a tube disposed within the throughway of the compression collar, the tube bounding a passageway;

20 a tube fitting disposed within the passageway of the tube, the compression collar radially inwardly compressing the tube against the tube fitting so that a liquid tight seal is formed between the tube and the tube fitting, the first compression rib pressing against the tube.

59. The coupling assembly as recited in claim 58, wherein the tube fitting
25 comprises a tubular stem having an annular barb outwardly projecting therefrom.

60. A tubular compression collar used for coupling a tube to a tube fitting, the tubular compression collar comprising:

30 a tubular body comprised of a resiliently flexible material and having an interior surface and an opposing exterior surface that extend between a first end and an opposing second end, the interior surface bounding a throughway extending through the tubular body; and

a first spacer tab outwardly projecting from the first end of the tubular body.

61. The tubular compression collar as recited in claim 60, wherein the first

spacer tab projects longitudinally away from the tubular body.

62. The tubular compression collar as recited in claim 60, further comprising a second spacer tab outwardly projecting from the first end of the tubular body and spaced apart from the first spacer tab.

5 63. The tubular compression collar as recited in claim 60, wherein the first end of the tubular body terminates at a terminal end face, the first spacer tab outwardly projecting from the terminal end face so as to extend parallel to a longitudinal axis of the tubular body.

10 64. The tubular compression collar as recited in claim 60, further comprising at least one of:

a hump disposed on and outwardly projecting from the exterior surface of the tubular body;

a window extending through the tubular body; and

15 an annular retention rib radially outwardly projecting from the exterior surface of the tubular body.

65. A coupling assembly comprising:

the tubular compression collar as recited in claim 60;

an end of a tube disposed within the throughway of the compression collar, the tube bounding a passageway;

20 a tube fitting having an outwardly projecting flange and an end disposed within the passageway of the tube, the compression collar radially inwardly compressing the tube against the tube fitting so that a liquid tight seal is formed between the tube and the tube fitting.

25 66. The coupling assembly as recited in claim 65, wherein a terminal end of the first spacer tab is butted against the flange of the tube fitting.