CLAIMS

What is claimed is:

1. A method for coupling a tube to a tube fitting, the method comprising:

radially outwardly expanding a tubular compression collar (10B-10K, 10N) from a constricted state to an expanded state, the compression collar being comprised of a resiliently flexible material and comprising a tubular body (12) having a throughway (22) extending between a first end (18) and an opposing second end (20), a spacer tab (24, 24A, 24B, 24C) outwardly projecting from the first end of the tubular body;

inserting an end of a tube (40) within the throughway of the expanded compression collar, the tube bounding a passage (50);

inserting a tube fitting (42) within the passage of the tube (40) either before or after inserting the end of the tube within the throughway of the expanded compression collar, the tube fitting having a flange (70) outwardly projecting therefrom; and

allowing the tubular compression collar to resiliently rebound back towards the constricted state so that the compression collar pushes the tube against the tube fitting,

wherein a terminal end (54) of the tube and a terminal end (19) of the spacer tab are both butting against the flange (70) of the tube fitting while the tubular compression collar resiliently rebounds back towards the constricted state.

2. The method as recited in claim 1, wherein the step of radially outwardly expanding the tubular compression collar comprises:

inserting the prongs (98) of an expander (80) into the throughway of the tubular 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 advancing a rotating mandrel (150) within the throughway of the tubular compression collar so that the mandrel expands the compression collar to the expanded state.

4. The method as recited in any preceding claim, wherein the step of inserting the

tube fitting within the passage of the tube comprises inserting an annular barb (68A, 68B) of the tube fitting within the passage of the tube and wherein the annular barb is centrally disposed within the throughway of the tubular body (12) while the tubular compression collar resiliently rebounds.

5. The method as recited in any preceding claim, wherein the compression collar (10B-10K, 10N) is radially outwardly expanded without concurrently radially outwardly expanding the tube (40).

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

7. The method as recited in any preceding claim, wherein the spacer tab has a height extending from a terminal end face (23) of the tubular body (12) to the terminal end (19) of the spacer tab that is at least 2 mm, 4 mm, 7 mm, or 10 mm.

8. The method as recited in any preceding claim, further comprising a second spacer tab (24, 24A, 24B, 24C) outwardly projecting from the first end of the tubular body (12) and having a terminal end (19) butting against the flange (70) of the tube fitting (42).

9. The method as recited in any preceding claim, further comprising at least one of:

a hump (136) disposed on and outwardly projecting from an exterior surface (16) of the tubular body (12) along a weld line (117) of the tubular body (12);

a window (146) extending through the tubular body (12) so as to be encircled by the tubular body;

an annular retention rib (140) radially outwardly projecting from the exterior surface (16) of the tubular body (12); and

one or more compression ribs (120, 122) radially inwardly projecting from the interior surface of the tubular body (12).

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

a tubular body (12) comprised of a resiliently flexible material and having an interior surface (14) and an opposing exterior surface (16) that extend between a first end and an opposing second end, the interior surface bounding a throughway extending through the tubular body, the tubular body being adapted to expand radially outward to an expanded state and to resiliently rebound back towards a constricted state; and

a first spacer tab (24, 24A, 24B, 24C) outwardly projecting from the first end of the tubular body, the first spacer tab having an interior surface (29) that extends flush with and continuously with the interior surface (14) of the tubular body (12); and

a second spacer tab (24, 24A, 24B, 24C) outwardly projecting from the first end of the tubular body (12), the second spacer tab being spaced apart from the first spacer tab.

11. The tubular compression collar as recited in claim 10, 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

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

12. A coupling assembly comprising:

a tubular compression collar (10B-10K, 10N) comprising:

a tubular body (12) comprised of a resiliently flexible material and having an interior surface (14) and an opposing exterior surface (16) that extend between a first end (18) and an opposing second end (20), the interior surface bounding a throughway (22) extending through the tubular body; and

a first spacer tab (24, 24A, 24B, 24C) outwardly projecting from the first end of the tubular body;

an end of a tube (40) disposed within the throughway (22) of the compression collar, the tube bounding a passage (50);

a tube fitting (42) having an outwardly projecting flange (70) and an end disposed within the passage of the tube, the compression collar radially inwardly compressing the tube (40) against the tube fitting (42) so that a liquid tight seal is formed between the tube and the tube fitting,

wherein the tubular compression collar (10B-10K, 10N) is adapted to be expanded radially outward to an expanded state to allow the end of the tube (40) to be inserted within the throughway (22) of the expanded compression collar and to allow the tube fitting (42) to be inserted within the passage of the tube (40) either before or after inserting the end of the tube within the throughway of the expanded compression collar, and is adapted to resiliently rebound back towards a constricted state in which the compression collar pushes the tube against the tube fitting,

wherein a terminal end (54) of the tube and a terminal end (19) of the first spacer tab are both butting against the flange (70) of the tube fitting on the constricted state of the tubular compression collar.

13. The coupling assembly as recited in claim 12, wherein the first spacer tab has a height extending from a terminal end face (23) of the tubular body (12) to the terminal end face (19) of the first spacer tab that is at least 2 mm, 4 mm, 7 mm, or 10 mm.

14. The coupling assembly as recited in claim 12 or 13, further comprising a second spacer tab (24, 24A, 24B, 24C) outwardly projecting from the first end of the tubular body (12) and having a terminal end (19) butting against the flange (70) of the tube fitting (42).

15. The coupling assembly as recited in claim 12, 13, or 14, wherein the first spacer tab has an interior surface (29) that extends flush with and continuously with the interior surface (14) of the tubular body (12).

16. The coupling assembly as recited in any one of claims 12-15, wherein the tube fitting comprises an annular barb (68A, 68B) received within the passage of the tube (40), the annular barb being centrally disposed within the throughway of the tubular body (12).

17. The coupling assembly as recited in any one of claims 12-16, wherein the first spacer tab outwardly projects from the first end of the tubular body so as to extend parallel to a central longitudinal axis of the tubular body.

18. The coupling assembly as recited in any one of claims 12-17, further comprising at least one of:

a hump (136) disposed on and outwardly projecting from an exterior surface (16) of the tubular body (12) along a weld line (117) of the tubular body (12);

a window (146) extending through the tubular body (12) so as to be encircled by the tubular body;

an annular retention rib (140) radially outwardly projecting from the exterior surface (16) of the tubular body (12); and

one or more compression ribs (120, 122) radially inwardly projecting from the interior surface of the tubular body (12).

19. The coupling assembly as recited in any one of claims 12-18, wherein the terminal end (54) of the tube (40) and the terminal end (19) of the first spacer tab (24, 24A, 24B, 24C) are disposed in a common plane.