

We claim:

1. A hose assembly comprising:
 - an inner core tube;
 - a first coupling member having an inboard nose portion extending into a flared first end of the inner core tube;
 - a metal outer tube surrounding the inner core tube and terminating at a first end axially inward of the first end of the inner core tube, with an outer cavity disposed between the inner core tube and the metal outer tube; and
 - a first collar having:
 - an outboard clamping portion surrounding the nose portion for clamping retention of the first end of the inner core tube therebetween; and
 - an inboard venting portion welded to the first end of the metal outer tube, the inboard venting portion including a venting port in fluid communication with the outer cavity;wherein:
 - an outboard end of the outboard clamping portion has a first inner diameter sized to accommodate the flared first end of the inner core tube;
 - an inboard end of the outboard clamping portion includes a radially inward protrusion having a second inner diameter smaller than the first inner diameter and sized to impede withdrawal of the flared first end of the inner core tube from the first collar; and
 - the inboard venting portion has a third inner diameter larger than the second inner diameter and sized to permit fluid flow between the outer cavity and the venting port.
2. The hose assembly of claim 1, wherein the first collar comprises a first clamping member defining the outboard clamping portion and a first venting port adapter defining the inboard venting portion.
3. The hose assembly of claim 2, wherein the first clamping member is welded to the first venting port adapter.

4. The hose assembly of claim 1, wherein the inboard venting portion is integral with the outboard clamping portion.
5. The hose assembly of any of claims 1-4, wherein the outboard clamping portion of the first collar is welded to the first coupling member.
6. The hose assembly of any of claims 1-5, wherein the outboard clamping portion of the first collar includes an outer radial flange that abuts an outer radial flange of the first coupling member.
7. The hose assembly of claim 6, wherein the outer radial flange of the first collar is welded to the outer radial flange of the first coupling member.
8. The hose assembly of any of claims 1-7, wherein the inner core tube comprises plastic.
9. The hose assembly of any of claims 1-8, wherein the inner core tube comprises at least one of PTFE and PFA.
10. The hose assembly of any of claims 1-9, wherein the inner core tube has a gas permeability greater than about 1×10^{-4} scc/sec.
11. The hose assembly of any of claims 1-10, wherein the metal outer tube comprises stainless steel.
12. The hose assembly of any of claims 1-11, wherein the metal outer tube has a gas permeability less than about 1×10^{-5} scc/sec.
13. The hose assembly of any of claims 1-12, wherein metal outer tube comprises a corrugated flexible metal tube.

14. The hose assembly of claim 13, wherein an outer portion of an endmost corrugation of the corrugated flexible metal tube is welded to the inboard end of the inboard venting portion of the first collar.

15. The hose assembly of any of claims 1-14, further comprising a second coupling member having an inboard nose portion extending into a second end of the inner core tube, and a second collar having an outboard clamping portion surrounding the nose portion of the second coupling member for clamping retention of the second end of the inner core tube therebetween, and an inboard venting portion welded to the second end of the metal outer tube and radially spaced from the inner core tube, the inboard venting portion of the second collar including a venting port in fluid communication with the outer cavity.

16. A method of making a hose assembly, the method comprising:

welding an inboard portion of a first collar to a first end of a metal outer tube, the inboard portion of the first collar including a venting port;

installing an inner core tube through the metal outer tube, such that a first end of the inner core tube is aligned with an outboard portion of the first collar, with an outer cavity disposed between the inner core tube and the metal outer tube and in fluid communication with the venting port; and

inserting a nose portion of a first coupling member into the first end of the inner core tube, such that the first end of the inner core tube is flared into clamping retention between the nose portion and the outboard portion of the first collar.

17. The method of claim 17, further comprising welding the outboard portion of the first collar to the first coupling member.

18. The method of any of claims 16 and 17, wherein inserting the nose portion of the first coupling member into the first end of the inner core tube comprises flaring the first end of the inner core tube into radial engagement with an outboard end of the outboard portion of the first collar, such that a radially inward protrusion at an inboard end of the outboard clamping portion impedes withdrawal of the flared first end of the inner core tube from the first collar.

19. The method of any of claims 16-18, wherein the hose assembly comprises the hose assembly of any of claims 1-15.

20. A method of using a hose assembly having an outer metal tube with a first gas permeability and an inner core tube with a second gas permeability greater than the first gas permeability, the inner core tube defining an inner passage and an outer cavity between the inner core tube and the outer metal tube, with a first end of the inner core tube being secured in clamping retention between an inner nose portion and an outer collar portion of a coupling connection welded to the outer metal tube, the method comprising:

supplying a positive pressure gaseous fluid to the inner passage, such that a portion of the positive pressure gaseous fluid permeates through the inner core tube into the outer cavity;

applying a vacuum to a vent port in the outer collar portion to remove the portion of the positive pressure gaseous fluid from the outer cavity; and

with positive pressure in the outer cavity eliminated, evacuating a remainder of the positive pressure gaseous fluid from the inner passage.

21. The method of claim 20, wherein the hose assembly comprises the hose assembly of any of claims 1-15.