CLAIMS

What is claimed is:

1. A connector fitting for fluid handling comprising:

a coupling leg defining a bore that extends therethrough, said coupling leg and said bore being concentric about a leg axis, said coupling leg including a neck portion, a shoulder portion extending distal to said neck portion, a threaded portion extending distal to said threaded portion, and a nipple portion extending distal to said threaded portion, said neck portion including locking features extending radially outward therefrom; and

a nut threadably engaged with said threaded portion of the coupling leg,

wherein said coupling leg and said nut are made of a melt processible resin.

2. The connector fitting of claim 1, wherein said locking features include a plurality of protrusions that are distributed about said leg axis at uniform angular intervals.

3. The connector fitting of claim 2, wherein said locking features include a flange portion concentric about the respective leg axis and extending radially outward from the neck portion.

4. The connector fitting of claim 3, wherein each of said plurality of protrusions extend distally from said flange portion and proximally from said shoulder portion.

5. The connector fitting of claim 2, wherein said plurality of protrusions is at least three protrusions and no more than eight protrusions.

6. The connector fitting of claim 5, wherein said plurality of protrusions is four protrusions.

7. The connector fitting of any one of claims 2 - 6, wherein each of said plurality of protrusions include opposing flat sides that face tangentially about said leg axis and a flat top that faces radially outward from said leg axis.

8. The connector fitting of claim 1, wherein said locking features include a flange extending radially outward from said neck portion and a plurality of partitions extending distally from said flange, said flange and said plurality of partitions cooperating to define a plurality of pockets.

9. The connector fitting of claim 8, wherein each of said plurality of pockets are accessible from a distal end of said neck portion.

10. The connector fitting of claim 9, comprising a locking ring that defines and is concentric about a locking ring axis, said locking ring including an inner surface that includes one or more tabs that project radially inward toward said locking ring axis, said one or more tabs being configured to mate within one or more of said plurality of pockets.

11. The connector fitting of claim 10, wherein the locking ring includes an outer surface that includes a plurality of ribs that project radially outward, said plurality of ribs being uniformly distributed about and parallel to said locking ring axis to define a plurality of channels.

12. The connector fitting of claim 9, wherein said one or more tabs of said locking ring are disposed within said one or more of said plurality of pockets of said neck portion, said partitions contacting with said one or more tabs so that said locking ring is non-rotatable with respect to said neck portion.

13. The connector fitting of claim 10, wherein said one or more tabs of said locking ring are disposed within said one or more of said plurality of pockets of said neck portion, said partitions contacting with said one or more tabs to limit said locking ring to a within a range of rotation about said locking ring axis relative to said neck portion.

14. The connector fitting of claim 13, wherein said range of rotation is less than 15 degrees.

15. The connector fitting of claim 14, wherein the range of rotation is less than 10 degrees.

16. The connector fitting of claim 15, wherein the range of rotation is less than 5 degrees.

17. The connector fitting of claim 16, wherein the range of rotation is less than 2 degrees.

18. The connector fitting of claim 1, wherein said locking features include a plurality of spacers on opposing sides of the neck portion, said spacers extending orthogonal to said leg axis and including first and second opposing ends, wherein said first opposing ends of said plurality of spacers define a first plane, and said second opposing ends of said plurality of spacers define a second plane, said first plane and said second plane being parallel to each other and on opposing sides of said coupling leg.

19. The connector fitting of claim 18, wherein said spacers are tubular portions that define a passageway therethrough and openings on said first and second opposing ends.

20. The connector fitting of claim 19, wherein said tubular portions define a circular cross-section.

21. A wrench for tightening the connector fitting of claim 7, the wrench comprising:

a first head having a body portion;

a first leg and a second leg extending in opposing directions from said body portion;

a first tooth that cooperates with the first leg to define a first notch on the first leg;

a second tooth that cooperates with the body portion to define a second notch on said body portion; and

an end boss defined at a distal end of said second leg,

wherein said first notch, said second notch, and said end boss are centered about a rotation axis.

22. The wrench of claim 21, comprising a handle portion, wherein said first head is disposed at a first end of said handle portion, said handle portion defining a handle axis.

23. The wrench of claim 21, comprising a second head at a second end of said handle portion, said second head including an arcuate spanner portion having an inside surface, a plurality of teeth protruding from said inside surface.

24. The wrench of claim any one of claims 21 - 23, wherein said first notch defines a first lead in and said second notch defines a second lead in.

25. The wrench of claim 24, wherein said body portion is centered about said handle axis.

26. The wrench of claim 24, wherein said handle axis passes through one of said first leg and said second leg.

27. A method of installing the connector fitting of claim 7, comprising:

providing at least one wrench of claim 23;

providing a set of installation instructions, said installation instructions comprising:

securing said connector fitting by bringing said first notch of the wrench into contact with a first of said plurality of protrusions, said second notch into contact with a second of said plurality of protrusions, and said boss end into contact with a third of said plurality of notches; and

tightening said nut onto said threaded portion of said coupling leg.

28. The method of claim 27, wherein:

said at least one wrench of claim 23 is two wrenches, a first wrench of said two wrenches being a wrench of claim 25, and a second wrench of said two wrenches being a wrench of claim 26; and

said installation instructions comprise:

using one of said first wrench and said second wrench in the step of securing said connector fitting; and

using the other of said first wrench and said second wrench to tighten said nut.

29. The connector fitting of claim 1, wherein the connector fitting is molded.

30. The connector fitting of claim 1, wherein the connector fitting is machined.

31. The connector fitting of claim 1, wherein the connector fitting is made from at least one of perfluoroalkoxy alkane (PFA), ethylene tetrafluoroethylene (ETFE), and fluorinated ethylene propylene (FEP).

32. A wrench for use with fittings used in fluid handling systems comprising:

a body,

at least two pins extending perpendicularly from the body, the pins dimensioned and configured to mate with at least two tubular portions disposed on the body of a fluid handling fitting.

33. The wrench of claim 32, wherein the wrench has two opposing legs perpendicular to the body and the pins are opposingly distributed on the legs, dimensioned and configured to mate with at least one tubular portion on the fitting.

34. The wrench of claim 33, wherein the wrench has four pins opposingly distributed on the legs, the pins dimensioned and configured to mate with a first and second opening of a first and second tubular portion disposed on the fitting.

35. The wrench of claim 34, wherein the wrench is separable and comprises a first part and a second part individually configured such that the first part mates with a first end of a first tubular portion and the first end of a second tubular portion and the second part mates with the second end of the first tubular portion and the second end of the second tubular portion.

36. A wrench for use with fittings used in fluid handling systems comprising:

a body,

at least two opposing legs extending perpendicularly from the body, the legs comprising a first leg and a second leg dimensioned and configured such that the first leg is configured to engage a first end of a first spacer and the first end of a second spacer and the second leg is configured to engage the second end of the first spacer and the second end of the second spacer, said first spacer and said second spacer being disposed on the neck portion of a connector fitting.

CLAIMS

What is claimed is:

1. A connector fitting for fluid handling comprising:

a coupling leg defining a bore that extends therethrough, said coupling leg and said bore being concentric about a leg axis, said coupling leg including a neck portion, a shoulder portion extending distal to said neck portion, a threaded portion extending distal to said shoulder portion, and a nipple portion extending distal to said threaded portion, said neck portion including locking features extending radially outward therefrom; and

a nut threadably engaged with said threaded portion of the coupling leg,

wherein said coupling leg and said nut are made of a melt processible resin.

2. The connector fitting of claim 1, wherein said locking features include a plurality of protrusions that are distributed about said leg axis at uniform angular intervals, and optionally a flange portion concentric about the respective leg axis and extending radially outward from the neck portion.

3. The connector fitting of claim 2, wherein each of said plurality of protrusions (i) extend distally from said flange portion and proximally from said shoulder portion, (ii) include opposing flat sides that face tangentially about said leg axis and a flat top that faces radially outward from said leg axis, or (iii) both (i) and (ii).

4. The connector fitting of claim 1, wherein said locking features include a flange extending radially outward from said neck portion and a plurality of partitions extending distally from said flange, said flange and said plurality of partitions cooperating to define a plurality of pockets.

5. The connector fitting of claim 1, wherein said locking features include a plurality of spacers on opposing sides of the neck portion, said spacers extending orthogonal to said leg axis and including first and second opposing ends, wherein said first opposing

ends of said plurality of spacers define a first plane, and said second opposing ends of said plurality of spacers define a second plane, said first plane and said second plane being parallel to each other and on opposing sides of said coupling leg.

6. A wrench for tightening the connector fitting of claim 2, the wrench comprising:

a first head having a body portion;

a first leg and a second leg extending in opposing directions from said body portion;

a first tooth that cooperates with the first leg to define a first notch on the first leg;

a second tooth that cooperates with the body portion to define a second notch on said body portion; and

an end boss defined at a distal end of said second leg,

wherein said first notch, said second notch, and said end boss are centered about a rotation axis.

7. A method of installing the connector fitting of claim 2, comprising:

providing at least one wrench of claim 6;

providing a set of installation instructions, said installation instructions comprising:

securing said connector fitting by bringing said first notch of the wrench into contact with a first of said plurality of protrusions, said second notch into contact with a second of said plurality of protrusions, and said boss end into contact with a third of said plurality of notches; and

tightening said nut onto said threaded portion of said coupling leg.

8. The connector fitting of claim 1, wherein the connector fitting is made from at least one of perfluoroalkoxy alkane (PFA), ethylene tetrafluoroethylene (ETFE), and fluorinated ethylene propylene (FEP).

9. A wrench for use with fittings used in fluid handling systems comprising:

a body,

at least two pins extending perpendicularly from the body, the pins dimensioned and configured to mate with at least two tubular portions disposed on the body of a fluid handling fitting, and optionally two opposing legs perpendicular to the body and the pins are opposingly distributed on the legs, dimensioned and configured to mate with at least one tubular portion on the fitting.

10. A wrench for use with fittings used in fluid handling systems comprising:

a body,

at least two opposing legs extending perpendicularly from the body, the legs comprising a first leg and a second leg dimensioned and configured such that the first leg is configured to engage a first end of a first spacer and the first end of a second spacer and the second leg is configured to engage the second end of the first spacer and the second end of the second spacer, said first spacer and said second spacer being disposed on the neck portion of a connector fitting.