CLAIMS

1. An insertion fitting device for coupling to a flowpath, comprising:

a first fitting assembly, comprising:

a first coupler that includes a first through hole and a stem portion, the first through hole extending through the stem portion;

a first nut that includes a second through hole, a rim portion and a body portion; and

a first body member that includes a third through hole and an outer flange,

wherein the first body member is positioned at least partially in the first through hole of the first coupler with an end of the stem portion engaging the outer flange,

wherein the first body member and the stem portion of the first coupler are positioned at least partially in the ~~third~~ second through hole of the body portion of the first nut, ~~and~~

wherein an inner side of the body portion of the first nut engages with an outer side of the stem portion of the first coupler such that the outer flange is secured between the rim portion of the first nut and the end of the stem portion of the first coupler,

wherein a connection portion of the first body member extends through and past the second through hole of the rim portion of the first nut, and wherein the third through hole of the first body member extends through the connection portion, and

wherein the connection portion of the first body member includes at least one first locking slot extending therethrough from an exterior surface thereof to the third through hole.

2. The device according to claim 1, wherein the end of the stem portion of the first coupler directly engages a first side of the outer flange of the first body member, and the rim portion of the first nut directly engages a second side of the flange of the first body member.

~~3. The device according to claim 1, wherein a connection portion of the first body member extends through and past the second through hole of the rim portion of the first nut, and wherein the third through hole of the first body member extends through the connection portion.~~

~~4. The device according to claim 3, wherein the connection portion of the first body member includes at least one first locking slot extending therethrough from an exterior surface thereof to the third through hole.~~

~~5~~3. The device according to claim ~~4~~1, wherein the first fitting assembly further comprises a lock clip configured to extend through the at least one first locking slot and into the third through hole.

~~6~~4. The device according to claim ~~5~~3, wherein the first fitting assembly further comprises a lock grip member extending at least partially about the connection portion of the first body member and including at least one second locking slot extending therethrough, wherein the lock clip extends through first and second at least one locking slots in a first position of the lock grip member with respect to the connection portion, and wherein the lock clip extends through at least one second locking slot but not the at least one first locking slot in a second position of the lock grip member with respect to the connection portion that differs from the first position thereof.

~~6~~5. The device according to claim ~~5~~4, further comprising a second fitting assembly, comprising:

a second coupler that includes a fourth through hole and a stem portion;

a second nut that includes a fifth through hole, a rim portion and a body portion; and

a second body member that includes a sixth through hole and an outer flange,

wherein the second body member is positioned at least partially in the fourth through hole of the first coupler with an end of the stem portion engaging the outer flange of the second body member,

wherein the second body member and the stem portion of the second coupler are positioned at least partially in the ~~sixth~~ fifth through hole of the body portion of the second nut,

wherein an inner side of the body portion of the second nut engages with an outer side of the stem portion of the second coupler such that the outer flange of the second body member is secured between the rim portion of the second nut and the end of the stem portion of the second coupler, and

wherein a connection portion of the second body member extends through and past the fifth through hole of the rim portion of the second nut, and the sixth through hole of the second body member extends through the connection portion of the second body member.

~~7~~6. The device according to claim ~~6~~5, wherein an outer surface of the connection portion of the second body member includes at least one locking groove therein, and wherein the third through hole of the first body member is configured to accept the connection portion of the second body member therein such that the at least one locking groove is aligned with the at least one first locking slot of the connection portion of the first body member, the lock clip being configured to extend through the at least one first locking slot and into the at least one locking groove to couple the first and second assemblies together.

~~8~~7. The device according to claim ~~6~~5, wherein the end of the stem portion of the second coupler directly engages a first side of the outer flange of the second body member, and the rim portion of the second nut directly engages a second side of the flange of the second body member.

~~9~~8. The device according to claim ~~6~~5, wherein the connection portion of the second body member extends from a reducer portion of the second body member, wherein the sixth through hole of the second body member extends through the reducer portion of the second body member, and wherein the sixth through hole includes a first diameter in the connection portion of the second body and a second diameter that is less than the first diameter in the reducer portion of the second body.

~~10~~9. The device according to claim ~~6~~5, wherein the connection portion of the second body member extends into the third through hole of the first body, wherein the first body member includes an inner narrow portion in the third through hole that defines an annular groove, and wherein an end of the connection portion of the second body member includes an annular protrusion that mates within the annular groove of the first body member.

~~11~~10. The device according to claim ~~6~~5, wherein the first fitting assembly further comprises first check member positioned within the third through hole of the first body member that is naturally resiliently biased into engagement with a first seat portion within the third through hole of the first body member, and wherein the third through hole is closed off by the first check member and the first seat portion when the first check member engages the first seat portion.

~~12~~11. The device according to claim ~~11~~10, wherein the first check member is naturally resiliently biased into engagement with the first seat portion via a first spring captured between a first spring retainer and the first check member within the third through hole of the first body member.

~~13~~12. The device according to claim ~~12~~11, wherein the second fitting assembly further comprises second check member positioned within the sixth through hole of the second body member that is naturally resiliently biased into engagement with a second seat portion within the sixth through hole of the second body member, and wherein the sixth through hole is closed off by the second check member and the second seat portion when the second check member engages the second seat portion.

~~14~~13. The device according to claim ~~13~~12, wherein the second check member is naturally resiliently biased into engagement with the second seat portion via a second spring captured between a second spring retainer and the second check member within the sixth through hole of the first body member.

~~15~~14. The device according to claim ~~13~~12, wherein the first check member extends past the first seat portion and an end of the first body member, and wherein the first check member engages with the second check member when the connection portion of the second body member is positioned into the third through hole of the first body such the first check member is moved into a spaced arrangement from the first seat portion and the second check member is moved into a spaced arrangement from the second seat portion.

~~16~~15. The device according to claim 1, wherein the outer flange of the first body member extends angularly outward from an exterior surface portion of the first body member.

~~17~~16. The device according to claim 1, wherein the inner side of the body portion of the first nut and the outer side of the stem portion of the first coupler are threadably engaged.

~~18~~17. The device according to claim 1, wherein the first fitting assembly further comprises a tube member that includes a medial portion, a first expanded end portion, a first transition portion that extends outwardly from the medial portion to the first expanded end portion, and a fourth through hole that extends through the medial portion, the first expanded end portion and the first transition portion.

~~19~~18. ~~The device according to claim 18,~~ An insertion fitting device for coupling to a flowpath, comprising:

a first fitting assembly, comprising:

a first coupler that includes a first through hole and a stem portion, the first through hole extending through the stem portion;

a first nut that includes a second through hole, a rim portion and a body portion; and

a first body member that includes a third through hole and an outer flange,

wherein the first body member is positioned at least partially in the first through hole of the first coupler with an end of the stem portion engaging the outer flange,

wherein the first body member and the stem portion of the first coupler are positioned at least partially in the second through hole of the body portion of the first nut,

wherein an inner side of the body portion of the first nut engages with an outer side of the stem portion of the first coupler such that the outer flange is secured between the rim portion of the first nut and the end of the stem portion of the first coupler,

wherein the first fitting assembly further comprises a tube member that includes a medial portion, a first expanded end portion, a first transition portion that extends outwardly from the medial portion to the first expanded end portion, and a fourth through hole that extends through the medial portion, the first expanded end portion and the first transition portion, and

wherein at least a proximal portion of the first body member that includes the outer flange and a proximal portion of the stem portion of the first coupler that includes the end of the stem portion is positioned within the fourth through hole of the tube member.

~~20~~19. The device according to claim ~~19~~18, wherein the end of the stem portion of the first coupler directly engages a first side of the outer flange of the first body member, an inner side of the first transition portion of the tube member directly engages a second side of the outer flange, and the rim portion of the first nut directly engages an outer side of the first transition portion.

~~21~~20. The device according to claim ~~20~~19, wherein the medial portion of the tube member extends through and past the rim portion of the first nut, and wherein the tube member further includes a second expanded end portion and a second transition portion that extends outwardly from the medial portion to the second expanded end portion, the fourth through hole extending through the second expanded end portion and the second transition portion.

~~22~~21. The device according to claim ~~20~~19, wherein the first body member defines an orifice within the third through hole.

~~23~~22. The device according to claim ~~20~~19, wherein the first body member defines a tapered venturi portion within the third through hole.

~~24~~23. The device according to claim ~~20~~19, wherein the first coupler further includes a second stem portion that defines a ~~fourth~~ sixth through hole that is in communication with the first through hole, and a third stem portion that defines a fifth through hole that is in communication with the first through hole, the ~~fourth~~ sixth and fifth through holes being oriented at an angle therebetween.

~~25~~24. The device according to claim ~~20~~19, wherein the first body member further includes a mixing device positioned within the third through hole.

~~26~~25. The device according to claim ~~25~~24, wherein the mixing device comprises internal threads formed in an inner surface of the first body member.

~~27~~26. The device according to claim ~~25~~24, wherein the mixing device comprises a spiral spring.

~~28~~27. The device according to claim ~~20~~19, wherein the first body member further includes a check member positioned within the third through hole of the first body member that is naturally resiliently biased into engagement with a first seat portion within the third through hole of the first body member, and wherein the third through hole is closed off by the first check member and the first seat portion when the first check member engages the first seat portion.

~~29~~28. The device according to claim ~~28~~27, wherein the check member is naturally resiliently biased into engagement with the first seat portion via a first spring captured between a first spring retainer and the check member within the third through hole of the first body member.

~~30~~29. The device according to claim ~~28~~27, wherein the first seat portion is positioned proximate to the outer flange, and wherein the check member is naturally resiliently biased into engagement with the first seat portion in a direction extending from the first coupler to the tube member.

~~31~~30. The device according to claim ~~28~~27, wherein the first seat portion is positioned proximate to an end portion of the first body member, and wherein the check member is naturally resiliently biased into engagement with the first seat portion in a direction extending from the tube member to the first coupler.

~~32~~31. The device according to claim ~~20~~19, wherein the tube member comprises a compression adapter backing plate, wherein the medial portion of the compression adapter backing plate extends partially over the third through hole of the first body member, and wherein the first body member includes a compression sleeve positioned within a third through hole.

~~33~~32. A method of coupling an insertion fitting device to a flowpath, comprising:

obtaining an insertion fitting device according to any one of claims 1-~~31~~30; and

coupling the first through hole of the first coupler into fluid communication with an existing flowpath of a device.