CLAIMS

What is claimed is:

1. A threaded connection comprising:
   a pin member comprising a first pin step and a second pin step, and pin wedge threads disposed on each of the first and second pin steps; and
   a box member comprising a first box step and a second box step, and box wedge threads disposed on each of the first and second box steps;
   wherein an axial separation of the first and second pin steps differs from an axial separation of the first and second box steps.

2. The threaded connection of claim 1, wherein the axial separation of the first and second box steps is less than the axial separation of the first and second pin steps.

3. The threaded connection of claim 2, further comprising:
   corresponding stab flanks and load flanks on the corresponding first pin and box steps, wherein the corresponding load flanks are configured to engage before the corresponding stab flanks on the corresponding first pin and box steps; and
   corresponding stab flanks and load flanks on the corresponding second pin and box steps, wherein the corresponding stab flanks are configured to engage before the corresponding load flanks on the corresponding second pin and box steps.

4. The threaded connection of claim 1, wherein the axial separation of the first and second pin steps is less than the axial separation of the first and second box steps.

5. The threaded connection of claim 4, further comprising:
   corresponding stab flanks and load flanks on the corresponding first pin and box steps, wherein the corresponding stab flanks are configured to engage before the corresponding load flanks on the corresponding first pin and box steps; and
   corresponding stab flanks and load flanks on the corresponding second pin and box steps, wherein the corresponding load flanks are configured to engage before the corresponding stab flanks on the corresponding second pin and box steps.

6. The threaded connection of claim 1, further comprising a threadless mid-step region disposed between the first and second pin and box steps.

7. The threaded connection of claim 6, further comprising a metal-to-metal mid-seal disposed between the first and second pin and box steps.

8. The threaded connection of claim 1, wherein corresponding pin and box wedge threads on the first steps have a first wedge ratio and the corresponding pin and box wedge threads on the second steps have a second wedge ratio.

9. The threaded connection of claim 8, wherein the corresponding pin and box wedge threads on the first steps engage before the corresponding pin and box wedge threads on the second steps.

10. The threaded connection of claim 8, wherein the corresponding pin and box wedge threads on the first steps engage after the corresponding pin and box wedge threads on the second steps.

11. The threaded connection of claim 8, wherein the corresponding pin and box wedge threads on the first steps engage simultaneously with the corresponding pin and box wedge threads on the second steps.

12. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by between about 0.0005 inches and about 0.015 inches.

13. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by about 0.002 and 0.005 inches.

14. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by about 0.003 inches.

15. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by about 0.0005 times the OD of the pipe.

16. The threaded connection of claim 1, wherein the pin and box wedge threads comprise a generally dovetail-shaped cross-section.

17. The threaded connection of claim 1, wherein clearance exists between roots and crests of the pin and box wedge threads on both the corresponding first and second pin and box steps at a final makeup.

18. The threaded connection of claim 1, wherein interference exists between roots and crests of the pin and box wedge threads on both the corresponding first and second pin and box steps at a final makeup.

19. The threaded connection of claim 1, wherein clearance exists between roots and crests of the pin and box wedge threads on the corresponding first pin and box steps, and interference exists between roots and crests of the pin and box wedge threads on the corresponding second pin and box steps at a final makeup.

20. The threaded connection of claim 1, wherein interference exists between roots and crests of the pin and box wedge threads on the corresponding first pin and box steps, and clearance exists between roots and crests of the pin and box wedge threads on the corresponding second pin and box steps at a final makeup.

21. The threaded connection of claim 1, wherein interference exists between roots and crests of the pin and box wedge threads on the corresponding first pin and box steps, and clearance exists between roots and crests of the pin and box wedge threads on the corresponding second pin and box steps at a final makeup.

22. The threaded connection of claim 1, wherein the pin wedge threads and the box wedge threads interfere at thread roots and crests over all or a portion of the pin wedge threads and the box wedge threads.

23. The threaded connection of claim 1, wherein the pin wedge threads and the box wedge threads interfere at thread roots on the first corresponding box and pin steps and at thread crests on the second corresponding box and pin steps, wherein there is a radial clearance between thread roots on the second corresponding box and pin steps and thread crests of the first corresponding box and pin steps.

24. The threaded connection of claim 1, further comprising a vanishing box thread on the box member, wherein a thread height of the box thread diminishes along an axial length of the box thread.

25. A threaded connection comprising:

a pin member comprising a first pin step and a second pin step, and pin wedge threads disposed on each of the first and second pin steps; and

a box member comprising a first box step and a second box step, and box wedge threads disposed on each of the first and second box steps;

wherein the pin wedge threads on at least one of the first and second pin steps and the corresponding box wedge threads on at least one of the first and second box steps are axially misaligned.

26. A method of making up a threaded connection, the method comprising:

rotationally engaging a pin member having pin wedge threads with a box member having corresponding box wedge threads, wherein the pin and box wedge threads are formed on corresponding first and second pin and box steps of the pin and box members; and

engaging opposing pin and box stab and load flanks at different times during makeup of the threaded connection.

27. The method of claim 26, further comprising:

engaging corresponding load flanks before stab flanks on the corresponding first pin and box steps;

engaging corresponding stab flanks before load flanks on the corresponding second pin and box steps.

28. The method of claim 26, further comprising:

engaging corresponding stab flanks before load flanks on the corresponding first pin and box steps;

engaging corresponding load flanks before stab flanks on the corresponding second pin and box steps.

29. The method of claim 26, further comprising engaging corresponding metal sealing surfaces disposed between first and second pin and box steps.

CLAIMS

1. A threaded connection comprising:

a pin member comprising a first pin step and a second pin step, and pin wedge threads disposed on each of the first and second pin steps; and

a box member comprising a first box step and a second box step, and box wedge threads disposed on each of the first and second box steps;

wherein an axial length of fixed coaxial locations between the first pin step and the second pin step defines an axial separation of the pin member,

wherein an axial length of fixed coaxial locations between the first box step and the second box step defines an axial separation of the box member, and

wherein the axial separation of the pin member differs from the axial separation of the box member.

2. The threaded connection of claim 1, wherein the axial separation of the first and second box steps is less than the axial separation of the first and second pin steps.

3. The threaded connection of claim 2, further comprising:

corresponding stab flanks and load flanks on the corresponding first pin and box steps, wherein the corresponding load flanks are configured to engage before the corresponding stab flanks on the corresponding first pin and box steps; and

corresponding stab flanks and load flanks on the corresponding second pin and box steps, wherein the corresponding stab flanks are configured to engage before the corresponding load flanks on the corresponding second pin and box steps.

4. The threaded connection of claim 1, wherein the axial separation of the first and second pin steps is less than the axial separation of the first and second box steps.

5. The threaded connection of claim 4, further comprising:

corresponding stab flanks and load flanks on the corresponding first pin and box steps, wherein the corresponding stab flanks are configured to engage before the corresponding load flanks on the corresponding first pin and box steps; and

corresponding stab flanks and load flanks on the corresponding second pin and box steps, wherein the corresponding load flanks are configured to engage before the corresponding stab flanks on the corresponding second pin and box steps.

6. The threaded connection of claim 1, further comprising a threadless mid-step region disposed between the first and second pin and box steps.

7. The threaded connection of claim 6, further comprising a metal-to-metal mid-seal disposed between the first and second pin and box steps.

8. The threaded connection of claim 1, wherein corresponding pin and box wedge threads on the first steps have a first wedge ratio and the corresponding pin and box wedge threads on the second steps have a second wedge ratio.

9. The threaded connection of claim 8, wherein the corresponding pin and box wedge threads on the first steps engage before the corresponding pin and box wedge threads on the second steps.

10. The threaded connection of claim 8, wherein the corresponding pin and box wedge threads on the first steps engage after the corresponding pin and box wedge threads on the second steps.

11. The threaded connection of claim 8, wherein the corresponding pin and box wedge threads on the first steps engage simultaneously with the corresponding pin and box wedge threads on the second steps.

12. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by between about 0.0005 inches and about 0.015 inches.

13. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by about 0.002 and 0.005 inches.

14. The threaded connection of claim 1, wherein an axial separation of the first and

second pins steps differs from an axial separation of the first and second box steps by about 0.003 inches.

15. The threaded connection of claim 1, wherein an axial separation of the first and second pins steps differs from an axial separation of the first and second box steps by about 0.0005 times the outer diameter ("OD") of the pipe.

16. The threaded connection of claim 1, wherein the pin and box wedge threads comprise a generally dovetail-shaped cross-section.

17. The threaded connection of claim 1, wherein clearance exists between roots and crests of the pin and box wedge threads on both the corresponding first and second pin and box steps at a final makeup.

18. The threaded connection of claim 1, wherein interference exists between roots and crests of the pin and box wedge threads on both the corresponding first and second pin and box steps at a final makeup.

19. The threaded connection of claim 1, wherein clearance exists between roots and crests of the pin and box wedge threads on the corresponding first pin and box steps, and interference exists between roots and crests of the pin and box wedge threads on the corresponding second pin and box steps at a final makeup.

20. The threaded connection of claim 1, wherein interference exists between roots and crests of the pin and box wedge threads on the corresponding first pin and box steps, and clearance exists between roots and crests of the pin and box wedge threads on the corresponding second pin and box steps at a final makeup.

21. The threaded connection of claim 1, wherein the pin wedge threads and the box wedge threads interfere at thread roots and crests over all or a portion of the pin wedge threads and the box wedge threads.

22. The threaded connection of claim 1, wherein the pin wedge threads and the box wedge threads interfere at thread roots on the first corresponding box and pin steps and at thread crests on the second corresponding box and pin steps, wherein there is a radial

clearance between thread roots on the second corresponding box and pin steps and thread crests of the first corresponding box and pin steps.

23. The threaded connection of claim 1, further comprising a vanishing box thread on the box member, wherein a thread height of the box thread diminishes along an axial length of the box thread.