CLAIMS

1. A spoolable swivel for coupling a first and second length of coiled tubing comprising:

an inner tubular element having

a first distal end having a first distal surface,

a first proximal end having a first proximal surface, and

a first race disposed on the first proximal surface; and

an outer tubular element having

a second proximal end having a second proximal surface,

a second race disposed on the second proximal surface, and

a second distal end having a second distal surface,

wherein the first race aligns with the second race to define an annular void when the first proximal end of the inner tubular element is inserted into the second proximal end of the outer tubular element,

wherein a plurality of bearings are positioned within the annular void to provide a swiveling coupling between the inner tubular element and the outer tubular element, and

wherein the second length of coiled tubing is attached to at least one weight thereby keeping the outer tubular element in an approximately fixed position while the inner tubular element is allowed to swivel.

2. The spoolable swivel according to Claim 1, wherein said spoolable swivel is oriented such that the outer tubular element is connected to the first length of coiled tubing and the inner tubular element is connected to the second length of coiled tubing; and

wherein the at least one weight can hold the inner tubular element in an approximately fixed position while the outer tubular element is allowed to swivel.

3. The spoolable swivel according to Claim 1 or 2, wherein the spoolable swivel can be at least one in number which can be incorporated into the coiled tubing anywhere along a swivel region, extending from an injected head to the at least one weight.

4. The spoolable swivel according to Claim 1 or 2, further comprising: a first plurality of dimples disposed on the first distal surface, and a second plurality of dimples disposed on the second distal surface.

5. The spoolable swivel according to Claim 1 or 2, wherein the first length of coiled tubing is attached to the inner tubular element via the first plurality of dimples, and wherein the second length of coiled tubing is attached to the outer tubular element via the second plurality of dimples.

6. The spoolable swivel according to Claim 1 or 2, further comprising at least one additional annular void defined by one or more additional races disposed on the first proximal and on the second proximal surface,

wherein at least one additional plurality of bearings are positioned within the at least one additional annular void to provide the swiveling coupling between the inner tubular element and the outer tubular element.

7. The spoolable swivel according to Claim 1 or 2, further comprising at least one annular lip seal disposed on the first distal surface of the inner tubular element.

8. The spoolable swivel according to Claim 1 or 2, further comprising at least one ring seal disposed within the outer tubular element.

9. The spoolable swivel according to Claim 1 or 2, wherein the inner tubular element comprises a material selected from the group consisting of a non-corrosive metal, a non-corrosive metal alloy, a rigid polymer material, and combinations thereof.

10. The spoolable swivel according to Claim 1 or 2, wherein the outer tubular element comprises a material selected from the group consisting of a non-corrosive metal, a non-corrosive metal alloy, a rigid polymer material, and combinations thereof.

11. The spoolable swivel according to Claim 1 or 2, wherein the plurality of bearings comprise a material selected from the group consisting of a non-corrosive metal, a non-corrosive metal alloy, a rigid polymer material, and combinations thereof.

12. The spoolable swivel according to Claim 1 or 2,

wherein the first distal end has

a first distal inner diameter and

a first distal outer diameter,

wherein the first proximal end has

a first proximal inner diameter and

a first proximal outer diameter,

wherein the second proximal end has

a second proximal inner diameter and

a second proximal outer diameter,

wherein the second distal end has

a second distal inner diameter and

a second distal outer diameter,

wherein the first distal inner diameter, the first proximal inner diameter, and the second distal inner diameter are approximately equal,

wherein the first distal outer diameter, the first proximal outer diameter, the second proximal inner diameter, the second distal outer diameter are approximately equal.

13. The spoolable swivel according to Claim 12, wherein a difference between the second proximal outer diameter and the first distal outer diameter is approximately equal to a thickness of the first length of coiled tubing.

14. The spoolable swivel according to Claim 12, wherein a difference between the second proximal outer diameter and the second distal outer diameter is approximately equal to a thickness of the second length of coiled tubing.

15. The spoolable swivel according to Claim 12, wherein a difference between the second proximal outer diameter and the second distal inner diameter is approximately equal to a thickness of the first proximal end of the inner tubular element.

16. A method for joining a first length of coiled tubing to a second length of coiled tubing, the method comprising:

disposing a spoolable swivel between the first length of coiled tubing and the second length of coiled tubing, wherein the spoolable swivel comprises:

an inner tubular element having

a first distal end having a first distal surface,

a first plurality of dimples disposed on the first distal surface,

a first proximal end having a first proximal surface, and a first race disposed on the first proximal surface, and

an outer tubular element having

a second proximal end having a second proximal surface, a second race disposed on the second proximal surface, a second distal end having a second distal surface, and a second plurality of dimples disposed on the second distal surface,

wherein the first race aligns with the second race to define an annular void when the first proximal end of the inner tubular element is inserted into the second proximal end of the outer tube,

wherein a plurality of bearings are positioned within the annular void to provide a swiveling coupling between the inner tubular element and the outer tubular element;

deforming the first length of coiled tubing into the first plurality of dimples at a first plurality of points along the first length of coiled tubing;

deforming the second length of coiled tubing into the second plurality of dimples at a second plurality of points along the second length of coiled tubing; and

wherein the second length of coiled tubing is attached to at least one weight thereby keeping the outer tubular element in an approximately fixed position while the inner tubular element is allowed to swivel.

17. The method according to Claim 16, wherein said spoolable swivel is oriented such that the outer tubular element is connected to the first length of coiled tubing and the inner tubular element is connected to the second length of coiled tubing; and

wherein the at least one weight can hold the inner tubular element in an approximately fixed position while the outer tubular element is allowed to swivel.

18. The method according to Claim 16 or 17,

wherein the first distal end has

a first distal inner diameter and

a first distal outer diameter,

wherein the first proximal end has

a first proximal inner diameter and

a first proximal outer diameter,

wherein the second proximal end has

a second proximal inner diameter and

a second proximal outer diameter,

wherein the second distal end has

a second distal inner diameter and

a second distal outer diameter,

wherein the first distal inner diameter, the first proximal inner diameter, and the second distal inner diameter are approximately equal,

wherein the first distal outer diameter, the first proximal outer diameter, the second proximal inner diameter, the second distal outer diameter are approximately equal.

19. The method according to Claim 18, wherein a difference between the second proximal outer diameter and the first distal outer diameter is approximately equal to a thickness of the first length of coiled tubing.

20. The method according to Claim 18, wherein a difference between the second proximal outer diameter and the second distal outer diameter is approximately equal to a thickness of the second length of coiled tubing.

21. The method according to Claim 18, wherein a difference between the second proximal outer diameter and the second distal inner diameter is approximately equal to a thickness of the first proximal end of the inner tubular element.

22. A system for providing a connection to an underwater pipeline, the system comprising :

a spoolable swivel coupling a first length of coiled tubing to a second length of coiled tubing, wherein the spoolable swivel comprises:

an inner tubular element having

a first distal end having a first distal surface,

a first plurality of dimples disposed on the first distal surface,

a first proximal end having a first proximal surface, and a first race disposed on the first proximal surface; and

an outer tubular element having

a second proximal end having a second proximal surface, a second race disposed on the second proximal surface, a second distal end having a second distal surface, and a second plurality of dimples disposed on the second distal surface,

wherein the first race aligns with the second race to define an annular void when the first proximal end of the inner tubular element is inserted into the second proximal end of the outer tube, and

wherein a plurality of bearings are positioned within the annular void to provide a swiveling coupling between the inner tubular element and the outer tubular element;

wherein the first length of coiled tubing is deformed into the first plurality of dimples at a first plurality of points along the first length of coiled tubing; and

wherein the second length of coiled tubing is deformed into the second plurality of dimples at a second plurality of points along the second length of coiled tubing; and

wherein the system further comprises at least one weight attached to the second length of coiled tubing thereby keeping the outer tubular element in an approximately fixed position while the inner tubular element is allowed to swivel.

23. The system according to Claim 22, wherein said spoolable swivel is oriented such that the outer tubular element is connected to the first length of coiled tubing and the inner tubular element is connected to the second length of coiled tubing; and

wherein the at least one weight can hold the inner tubular element in an approximately fixed position while the outer tubular element is allowed to swivel.

24. The system according to Claim 22 or 23, wherein the first length of coiled tubing is disposed to be coupled to surface equipment, wherein the second length of coiled tubing is disposed to be coupled to underwater equipment.

25. A method for providing a connection to an underwater pipeline, the method comprising:

submerging a spoolable swivel coupling a first length of coiled tubing to a second length of coiled tubing, wherein the spoolable swivel comprises:

an inner tubular element having

a first distal end having a first distal surface,

a first plurality of dimples disposed on the first distal surface,

a first proximal end having a first proximal surface, and a first race disposed on the first proximal surface, and

an outer tubular element having

a second proximal end having a second proximal surface, a second race disposed on the second proximal surface, a second distal end having a second distal surface, and a second plurality of dimples disposed on the second distal surface,

wherein the first race aligns with the second race to define an annular void when the first proximal end of the inner tubular element is inserted into the second proximal end of the outer tube, and

wherein a plurality of bearings are positioned within the annular void to provide a swiveling coupling between the inner tubular element and the outer tubular element,

wherein the first length of coiled tubing is deformed into the first plurality of dimples at a first plurality of points along the first length of coiled tubing,

wherein the second length of coiled tubing is deformed into the second plurality of dimples at a second plurality of points along the second length of coiled tubing;

coupling the second length of coiled tubing to the underwater pipeline; and

wherein the method further comprises at least one weight attached to the second length of coiled tubing thereby keeping the outer tubular element in an approximately fixed position while the inner tubular element is allowed to swivel.

26. The method according to Claim 25, wherein said spoolable swivel is oriented such that the outer tubular element is connected to the first length of coiled tubing and the inner tubular element is connected to the second length of coiled tubing; and

wherein the at least one weight can hold the inner tubular element in an approximately fixed position while the outer tubular element is allowed to swivel.