CONNECTOR FOR PIPES

BACKGROUND

Description of Related Art

[0001] A pipe connector may be used to connect pipes to form a pipeline. Pipe connectors are useful for connecting unbonded :flexible pipe, which may be used to transmit fluid such as a production fluid like oil or gas from one location to another. Such :flexible pipe may be used for offshore purposes as well as onshore or over land purposes. Extensive welding is used to form some existing pipe connectors, and while the welded pipe connectors connect :flexible pipes together, welding is an expensive and time consuming process. Certified welders, welding materials, and weld inspections make welding costly.

[0002] Interference fits are used between parts in order to form other existing pipe connectors. While the pipe connectors formed by interference fits connect :flexible pipes together, parts must be held to very tight tolerances, which is costly in manufacturing, and heat and liquid nitrogen may be used to assemble the pipe connector. Interference fit pipe connectors contain potential hazards and are costly.

SUMMARY OF INVENTION

[0003] An aspect of the disclosure provides a pipe connector for connecting pipes comprising: an elongate tubular body having a groove formed on an outer diameter;

a sleeve coupled to the elongate tubular body, the sleeve having a groove formed on an inner diameter that is spaced from a first end of the sleeve and aligned with the groove of the elongate tubular body;

a first wire ring disposed within the groove of the elongate tubular body and within the groove of the sleeve, wherein the sleeve is coupled to the elongate tubular body by the first wire ring; and

a wire insertion cutout formed on the first end of the sleeve that extends from the first end of the sleeve across the groove of the sleeve,

wherein the first wire ring is disposed within the groove of the elongate tubular body and the groove of the sleeve through the wire insertion cutout.

[0003a] Another aspect of the disclosure provides a pipe connector for connecting pipes comprising:

an elongate tubular body having an outer diameter, the outer diameter comprising:

a shoulder that protrudes from the outer diameter; and

a groove formed on the outer diameter that is spaced from the shoulder;

a sleeve having a first end and a second end, the sleeve disposed over the elongate tubular body such that the first end of the sleeve abuts the shoulder when the sleeve shifts in a first direction, and wherein the sleeve is coupled to the elongate tubular body;

a first wire ring disposed within the groove of the elongate tubular body such that the second end of the sleeve abuts the first wire ring when the sleeve shifts in a second direction; and

a second wire ring disposed on the outer diameter of the elongate tubular body directly between the first end of the sleeve and the shoulder, wherein the sleeve is longitudinally fixed relative to the elongate tubular body by abutment with the first wire ring and the second wire ring.

[0003b] Another aspect of the disclosure provides a method of assembly of a pipe connector comprising:

coupling a sleeve to an elongate tubular body, wherein coupling the sleeve to the elongate tubular body comprises:

sliding a sleeve over an outer diameter of an elongate tubular body until a groove on an inner diameter of the sleeve is aligned with a groove of an outer diameter of the elongate tubular body; and

inserting a first wire ring into the groove of the elongate tubular body and the groove of the sleeve that are aligned,

wherein the groove on the inner diameter of the sleeve is spaced from a first end of the sleeve, and

wherein inserting a first wire ring into the groove of the elongate tubular body and the groove of the sleeve that are aligned comprises:

passing the first wire ring through a wire insertion cutout of the sleeve,

wherein the wire insertion cutout is formed on a first end of the sleeve that extends from the first end of the sleeve across the groove of the sleeve.

[0004]

Another aspect of the disclosure provides a method of assembly of a pipe connector comprising:

coupling a sleeve to an elongate tubular body, wherein coupling the sleeve to the elongate tubular body comprises:

installing a sleeve over an outer diameter of an elongate tubular body, wherein the elongate tubular body comprises:

a shoulder that protrudes from the outer diameter of the elongate tubular body; and

a groove formed on the outer diameter of the elongate tubular body that is spaced from the shoulder; and

installing a first wire ring into the groove of the elongate tubular body,

wherein, when the sleeve is coupled to the elongate tubular body, the sleeve is disposed between the first wire ring and the shoulder of the elongate tubular body;

shifting the sleeve such that the sleeve abuts the first wire ring; and

installing a second wire ring between the sleeve and the shoulder of the elongate tubular body, wherein the sleeve is longitudinally fixed relative to the elongate tubular body by abutment with the first wire ring and the second wire ring.

[0005] Other aspects and advantages of the invention will be apparent from the following description and the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

[0006] Fig. 1 includes an isometric view of a pipe connector according to one or more embodiments of the present disclosure.

[0007] Fig. 2 includes a cross-sectional view of a pipe connector according to one or more embodiments of the present disclosure.

[0008] Figs. 3A-3D includes cross-sectional views of possible profiles of a sleeve according to one or more embodiments of the present disclosure.

[0009] Fig. 4 includes an isometric view of a pipe connector according to one or more

embodiments of the present disclosure.

[0010] Figs. 5A and 5B include multiple views of a pipe connector according to one or more embodiments of the present disclosure.

DETAILED DESCRIPTION

[0011] In one aspect, embodiments disclosed herein generally relate to an apparatus for connecting pipes. In other aspects, embodiments disclosed herein relate to a method of assembling the apparatus for connecting pipes.

[0012] Referring to Figures 1 and 2, an isometric view and a cross-sectional view of a pipe connector 1 according to one or more embodiments of the present disclosure are shown. In one or more embodiments, the pipe connector 1 may include an elongate tubular body 10, a sleeve 20, a first wire ring 30, and a second wire ring 40. The

CLAIMS

1. A pipe connector for connecting pipes comprising:

an elongate tubular body having a groove formed on an outer diameter;

a sleeve coupled to the elongate tubular body, the sleeve having a groove formed on an inner diameter that is spaced from a first end of the sleeve and aligned with the groove of the elongate tubular body;

a first wire ring disposed within the groove of the elongate tubular body and within the groove of the sleeve, wherein the sleeve is coupled to the elongate tubular body by the first wire ring; and

a wire insertion cutout formed on the first end of the sleeve that extends from the first end of the sleeve across the groove of the sleeve,

wherein the first wire ring is disposed within the groove of the elongate tubular body and the groove of the sleeve through the wire insertion cutout.

2. The pipe connector according to claim 1, wherein the sleeve is longitudinally fixed relative to the elongate tubular body by the first wire ring.

3. The pipe connector according to claim 1, wherein the elongate tubular body further comprises a raised portion, and wherein the groove of the elongate tubular body is located on the raised portion of the elongate tubular body.

4. The pipe connector according to claim 3, wherein the raised portion is generally in the center of the elongate tubular body.

5. The pipe connector according to claim 1, wherein the sleeve is substantially one of U-shaped, L-shaped, and T-shaped having a substantially cylindrical inner bore extending longitudinally through the sleeve.

6. The pipe connector according to claim 1, wherein the pipe connector is a mid-line pipe connector.

7. The pipe connector according to claim 1, wherein the pipe connector is an end fitting.

8. A pipe connector for connecting pipes comprising:

an elongate tubular body having an outer diameter, the outer diameter comprising:

a shoulder that protrudes from the outer diameter; and

a groove formed on the outer diameter that is spaced from the shoulder;

a sleeve having a first end and a second end, the sleeve disposed over the elongate tubular body such that the first end of the sleeve abuts the shoulder when the sleeve shifts in a first direction, and wherein the sleeve is coupled to the elongate tubular body;

a first wire ring disposed within the groove of the elongate tubular body such that the second end of the sleeve abuts the first wire ring when the sleeve shifts in a second direction; and

a second wire ring disposed on the outer diameter of the elongate tubular body directly between the first end of the sleeve and the shoulder, wherein the sleeve is longitudinally fixed relative to the elongate tubular body by abutment with the first wire ring and the second wire ring.

9. The pipe connector according to claim 8, wherein the sleeve is coupled to the elongate tubular body by the first wire ring and the shoulder.

10. The pipe connector according to claim 8, wherein the sleeve further comprises a groove on an inner diameter on the second end of the sleeve, the groove of the sleeve being configured to abut the first wire ring when the sleeve shifts in the second direction, and wherein the groove on the second end of the sleeve comprises an extended lip that covers the first wire ring.

11. The pipe connector according to claim 8, wherein the elongate tubular body further comprises a raised portion, wherein the shoulder is located on a first end of the raised portion, and wherein the groove of the elongate tubular body is located on a second end of the raised portion.

12. The pipe connector according to claim 11, wherein the raised portion is generally in the center of the elongate tubular body.

13. The pipe connector according to claim 8, wherein the sleeve is substantially one of U-shaped, L-shaped, and T-shaped having a substantially cylindrical inner bore extending longitudinally through the sleeve.

14. The pipe connector according to claim 8, wherein an inner diameter of the first wire ring is smaller than a diameter of the groove of the elongate tubular body such that the first wire ring grips the groove of the elongate tubular body.

15. A method of assembly of a pipe connector comprising:

coupling a sleeve to an elongate tubular body, wherein coupling the sleeve to the elongate tubular body comprises:

sliding a sleeve over an outer diameter of an elongate tubular body until a groove on an inner diameter of the sleeve is aligned with a groove of an outer diameter of the elongate tubular body; and

inserting a first wire ring into the groove of the elongate tubular body and the groove of the sleeve that are aligned,

wherein the groove on the inner diameter of the sleeve is spaced from a first end of the sleeve, and

wherein inserting a first wire ring into the groove of the elongate tubular body and the groove of the sleeve that are aligned comprises:

passing the first wire ring through a wire insertion cutout of the sleeve,

wherein the wire insertion cutout is formed on a first end of the sleeve that extends from the first end of the sleeve across the groove of the sleeve.

16. A method of assembly of a pipe connector comprising:

coupling a sleeve to an elongate tubular body, wherein coupling the sleeve to the elongate tubular body comprises:

installing a sleeve over an outer diameter of an elongate tubular body, wherein the elongate tubular body comprises:

a shoulder that protrudes from the outer diameter of the elongate tubular body; and

a groove formed on the outer diameter of the elongate tubular body that is spaced from the shoulder; and

installing a first wire ring into the groove of the elongate tubular body,

wherein, when the sleeve is coupled to the elongate tubular body, the sleeve is disposed between the first wire ring and the shoulder of the elongate tubular body;

shifting the sleeve such that the sleeve abuts the first wire ring; and

installing a second wire ring between the sleeve and the shoulder of the elongate tubular body, wherein the sleeve is longitudinally fixed relative to the elongate tubular body by abutment with the first wire ring and the second wire ring.

17. The method according to claim 16, wherein installing the first wire ring comprises:

spreading the first wire ring such that an inner diameter of the first wire ring is larger than an outer diameter of the elongate tubular body;

aligning the first wire ring with the groove of the elongate tubular body; and

closing the first wire ring within the groove of the elongate tubular body.

18. The method according to claim 16, wherein installing a second wire ring comprises:

spreading the second wire ring such that an inner diameter of the second wire ring is larger than an outer diameter of the elongate tubular body;

aligning the second wire ring with a gap between the sleeve and the shoulder of the elongate tubular body; and

closing the first wire ring over the outer diameter of the elongate tubular body.