METHOD OF FORMING A PIPE JOINT BETWEEN TELESCOPING PIPE SECTIONS

An annular gasket is provided having a female stop and a male stop, the female stop and male stop being joined by a sealing zone such that the female stop and male stop are arranged on opposing sides of the sealing zone. The sealing zone also comprises a female face and a male face, the male face substantially conforming to the outside surface of the male end of the male pipe. In one embodiment of the gasket, least one annular protuberance is provided on the female face of the gasket. The joint is then formed by placing the annular gasket on the male end of the male pipe, wherein the male face of the gasket fits tightly against the outside surface of the male end of the male pipe, and the male end is forced against the male stop. The male and female pipe ends are then forced together, the gasket therebetween, wherein the female end is forced against the female stop of the gasket. The inside surface of the female end makes substantial contact with the annular protuberance such that the annular protuberance is deformed against the inside surface of the female end, the sealing zone and stops thus forming a continuous joint between the pipes. This effectuates more efficient transport of telescoped sections of pipe that are taken to a remote site and assembled into a continuous string of pipes using the gasket provided herein for such applications as sewer lines and low pressure irrigation.

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METHOD OF FORMING A PIPE JOINT BETWEEN TELESCOPING PIPE SECTIONS

Description

Technical Field

The present invention is directed in general to a method of forming a continuous string of pipes having a generally uniform diameter, wherein one pipe can be inserted into the other for ease of transport. More specifically, the present invention is directed to a pipe joint between a uniform male and a uniform female pipe end having a gasket there between, the gasket having a female stop, a male stop, and a sealing zone to effectuate a seal and prevent over-insertion of the pipes into one another.

Background Art

In forming pipe joints, it is often desirable to have a simple and efficient means of joining straight ended, substantially uniform in diameter, pipe ends. This is especially important at remote job sites and in locations where it is difficult to obtain more complex bell- and spigot-type pipe joints, or flanged and coupled joints. In the past, several types of elastomeric seals or gaskets have been used with these pipe joints, mounted on either a spigot or a bell end of a pipe. These prior art types of pipe joints perform mostly the sealing function of a gasket, while often being inadequate for such functions as leading the spigot end into proper insertion, sealing from both internal and external pressure, and protecting the joint from deflection loading.

The prior art methods of joining non-belled and non-flanged pipes offer no solution to stop the spigot from being over-inserted into the bell pipe and to isolate the seal from the deflection loading. The joints formed in prior art methods of forming
continuous strings of pipes with non-belied or non-flanged pipes do not pass standard internal and external pressure testing, even at particular low pressure such as between -1.0 MPa and 1.0 MPa. This is especially true if the joint involves deflection loading, unless very high compression ratios are used, which may in turn generate excessive loads on the pipe.

An example of joining non-belied pipe ends is described in the Foresta, et al patent (Pat. No. 4,480,860), which discloses the use of varying diameter sizes of elastimeric rings around the smaller male end pipe and around the larger female end pipe, and then effectuating a seal by a clamp around the entire set of elastomeric rings, the male and female pipes forming a non-telescoping or non-overlapping joint. Another more complex method of joining pipes is shown by Jones (Pat. No. 4,685,705) wherein multiple elastomeric rings and bell stubs are used to apply pressure at the ends of two pipes of similar diameter, thus forming a joint. Finally, Petroff, et al. (Pat. No. 5,180,195) discloses a method of joining two pipes of uniform diameter and having similar diameter, wherein elastimeric members are fitted on either end of two pipes to form a bell-like and a spigot-like assembly, the two pipe ends then forced together to form a "locking wedge".

These prior art methods have the disadvantage of either being complex, and thus too expensive for many projects, or being insufficient to guard against deflection loading and other problems associated with forming a continuous string of pipes for major projects such as sewer lines and irrigation systems in remote regions. In such situations, where a relatively low pressure liquid transport pipe assembly is desired, it would be desirable to have an improved method of forming pipe joints. Further, it would be an improvement over the prior art to provide a method of transporting piping by using telescoping male and female pipe members that can be transported with male pipes inserted into the female pipes, thus increasing the number of pipes that can be
transported and increasing the efficiency of transporting the pipes to remote sites for assembly.

Disclosure of Invention

Thus, it is one object of the present invention to provide a gasket for joining two sections of pipe having substantially uniform ends and dissimilar diameters.

It is another object of the present invention to provide a means of transporting telescoping sections of pipe and assembling them into a continuous string of pipes for use in sewer lines and low pressure irrigation systems.

It is yet another object of the present invention to provide a means of forming a continuous string of pipes from pipes having no belled end, no flange, or without the use of couplings.

It is yet another object of the present invention to provide a simple and low cost means of assembling a string of pipes, typically plastic pipes, at remote sites and in areas where complex pipe fittings are undesirable or unattainable.

It is yet another object of the present invention to provide a means of forming a pipe joint that avoids over-insertion of one pipe into another, thus creating consistent pipe joints throughout a string of pipes. Further, the present invention protects a pipe joint formed from telescoping ends of pipe from deflection loading.

These and other objects are achieved by providing a method of creating a continuous pipe joint between at least a female pipe having a female end with an inside surface and a male pipe having a male end with an outside surface. An annular gasket is provided having a female stop and a male stop, the female stop and male stop
being joined by a sealing zone such that the female stop and male stop are arranged on opposing sides of the sealing zone. The sealing zone also comprises a female face and a male face, the male face substantially conforming to the outside surface of the male end of the male pipe.

In one embodiment of the gasket, at least one annular protuberance is provided on the female face of the gasket. The joint is then formed by placing the annular gasket on the male end of the male pipe, wherein the male face of the gasket fits tightly against the outside surface of the male end of the male pipe, and the male end is forced against the male stop. The male and female pipe ends are then forced together, the gasket being therebetween, wherein the female end is forced against the female stop of the gasket. The inside surface of the female end makes substantial contact with the annular protuberance such that the annular protuberance is deformed against the inside surface of the female end, the sealing zone and stops thus forming a continuous joint between the pipes.

Provided further by the present invention is a method of shipping a plurality of pipe joints used to form a continuous string of plastic pipe and then assembling the joints to form the pipe string, the pipe joints forming fluid tight seals for the transport of fluid within the pipe string. A plurality of female pipe members formed of a plastic material is provided, the female pipe members having a generally uniform external diameter and a generally uniform internal diameter and each of which has a mouth opening formed by the ends. Also provided is a plurality of male pipe members having a mating pipe end, the male pipe members also being formed of a plastic material having a generally uniform external diameter which is slightly less than the internal diameter of the female pipe members and each having a generally uniform internal diameter. The male pipe member is then inserted at least partly within the inside diameter of a female pipe member, wherein the process is repeated for additional pairs of pipe members to
form a plurality of nested pairs.

The nested pairs of pipe are then shipped to a remote location wherein they are then telescoped and disassembled. An annular gasket is then installed on a selected one of the male pipe members and the female pipe members adjacent the mouth opening and mating pipe ends, followed by inserting the male mating pipe end within the mouth opening of the female pipe member, the annular gasket being located between overlapping regions of uniform pipe diameter, thereby forming a fluid tight seal between the male and female members.

Further provided by the present invention is a gasket for creating a continuous string of plastic male and female pipes, the male pipes having a smaller diameter than the female pipes, both male and female pipes having overlapping regions of uniform pipe diameter. The gasket has a female stop and a male stop, the female stop and the male stop being joined by a sealing zone such that the female stop and the male stop are arranged on opposing sides of the sealing zone. The sealing zone has a female face and a male face, the male face substantially conforming to the outside surface of the male end of the male pipe. Finally the gasket is fitted between the male and female pipe ends to be joined such that the ends abut the male and female stops, the stops and the sealing zone thus forming a seal between the male and female pipe having substantially uniform pipe diameter.

Additional objects, features and advantages will be apparent in the written description which follows.

**Brief Description of Drawings**

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself however, as well as a preferred mode of use, further objects and
advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1A is an example of a prior art coupling method of joining pipe ends; Figure 1B is another example of a prior art coupling method of joining pipe ends; Figure 1C is an example of a prior art bell and ring-gasket method of joining pipe ends; Figure 1D is an example of a prior art flange method of joining pipe ends;

Figure 2A is a cutaway profile of one embodiment of the gasket of the invention; Figure 2B is a cutaway view of the pipe joint formed by the method of the invention;

Figure 3A is a perspective view of another embodiment of forming a pipe joint of the invention wherein the gasket is placed on a male pipe; Figure 3B is a perspective view of the female pipe being placed upon the male pipe with the gasket thereon;

Figure 4 is a cutaway view of yet another embodiment of the gasket of the invention, wherein the gasket is placed on a male pipe end and the female pipe is being placed on the gasket thereon;

Figure 5 is a detailed view of V in Figure 4;

Figure 6 is a detailed view of VI in Figure 4;

Figure 7 is a detailed view of VII in Figure 4;

Figure 8 is a profile of yet another embodiment of the gasket of the invention;

Figure 9 is a profile of yet another embodiment of the gasket of the invention;
**Figure 10** is a profile of yet another embodiment of the gasket of the invention;

**Figure 11** is a profile of yet another embodiment of the gasket of the invention;

**Figure 12** is a profile of yet another embodiment of the gasket of the invention;

**Figure 13** is a profile of yet another embodiment of the gasket of the invention;

**Figure 14** is a profile of yet another embodiment of the gasket of the invention;

**Figure 15** is a prior art illustration of the stacking of bell and spigot pipes for transportation;

**Figure 16** is an illustration of the present invention method of stacking pipes;

**Figure 17** is a closeup view of a male pipe inserted into a female pipe;

**Figure 18** is a closeup view of the male pipe being telescoped from the female pipe; and

**Figure 19** is a perspective view of one female pipe and two male pipes forming a continuous string of pipes.

**Best Mode for Carrying Out the Invention**

The present invention is a method of creating a continuous string of plastic pipe, the pipe joints joining fluid-tight seals for the transport of fluid within the pipe string. The invention
refers in its preferred embodiment to pipes made from plastic material, but is by no means limited to pipes made of plastic material, but can also include pipes made of metal and concrete and other materials. By "plastic", it is meant, for example, PVC, polyethylene, polypropylene, and other polymeric materials. In the method of the invention, a female pipe member is provided having a generally uniform external diameter and a generally uniform internal diameter, the pipe member also having a mouth opening. A male pipe member is also provided having a mating pipe end, the male pipe member also having a generally uniform external diameter which is less than the internal diameter of the female pipe member, and also having a general uniform internal diameter.

In forming the continuous string of plastic pipe, an annular gasket is located on a selected one of the male pipe member and the female pipe member adjacent the mouth opening and mating pipe end, respectively. The gasket is made from an elastomeric material that is deformable when pressure is applied against the surface of the gasket. The hardness or durometer of the gasket can be controlled by altering the materials used to make the gasket. Further, the gasket may have a dual durometer at various parts of the gasket, which is common in the art for ring-type gaskets.

In forming the pipe joint, the annular gasket can be first applied to the male pipe, followed by insertion of the male pipe having the annular gasket on its end into the female pipe. Likewise, the gasket can be first inserted into the end of the female pipe, followed by the insertion of the male pipe into the female pipe having the gasket therein. The annular gasket is thus located between overlapping regions of the uniform pipe diameter once the male and female pipes are engaged, thereby forming a fluid-tight seal between the male and female members.

The present invention also provides an annular gasket for creating a continuous string of male and female pipes, wherein the male pipes have a smaller diameter than the female pipes. Both
male and female pipes typically having overlapping regions of uniform pipe diameter in the present invention. Further, the gasket is typically made of an elastomeric material. The gasket in its most fundamental embodiment comprises a female stop and a male stop being joined by sealing zone such that the female stop and male stop are arranged on opposing sides of the sealing zone. The sealing zone has a female face for contacting the inside face of a female pipe, and a male face for contacting the outside surface of a male pipe. Typically, the gasket is fitted between the male and female pipe ends to be joined such that the ends sealingly abut the male and female stops, the stops and the sealing zone thus effectuating a seal between the male and female pipe having substantially uniform pipe diameter.

Finally, the present invention provides a method of shipping a plurality of pipe joints used to form a continuous string of plastic pipe and then assembling the joints to form the pipe string. Typically, a plurality of female pipe members formed of a plastic material, or other material, is provided. The female pipe members have a generally uniform external diameter and a general uniform internal diameter, and each has a mouth opening. Further provided are a plurality of male pipe members having a mating pipe end. Typically, the male pipe members are formed from the same material as the mating female members and typically have a uniform external diameter which is slightly less than the internal diameter of the female pipe members. Further, both the male and female pipe ends have a generally uniform internal diameter and external diameter.

When shipping, the male pipe members are inserted at least partially within the female pipe members. This process is repeated for the additional pairs of pipe members to form a plurality of nested pairs. These pairs can then be shipped as nested to a remote location, wherein they are disassembled for use.

An annular gasket is then typically installed on a selected
one of the male pipe members and the female pipe members adjacent the mouth opening and mating pipe ends respectively. Finally, the male and female pipe ends are inserted into each other, the annular gasket being located between overlapping regions of uniform pipe diameter. Thus, a fluid-tight seal is effectuated between male and female members of pipes having uniform external diameter; hence, having no bell or flange arrangements.

In the prior art, male and female pipe ends are typically joined through such coupling implements as bell formations within a female pipe and/or couplings that fit around the outside or inside of the pipe, or flange built into the male and female pipe ends. General examples of the prior art are described to reference to Figures 1A-1B. For example, Figure 1A shows a pipe end 11 being jointed to a pipe joint 13 through an external coupling 15. The pipes 11 and 13, being either of similar or dissimilar internal and external diameters, are joined together at the ends by inserting each end within a sleeve or coupling 15, and then either adhering the pipe ends within the coupling 15, or by using some other mechanical clamping means to effectuate a tight seal between the coupling 15 and pipes 11 and 13. Likewise, Figure 1B shows an internal coupling 31 joining pipe ends 27 and 29 together. Again, pipes 27 and 29 might have similar or dissimilar, internal and external diameters, the coupling 31 being adjusted to fit the inside diameters of pipes 27 and 29. By forcing pipes 27 and 29 over coupling 31, and then adhering by some means the pipe ends to the coupling 31, a seal is thus effectuated between the two pipe ends. Further, the pipe ends may be machined or glued to provide further support for a seal at, for example, the male pipe end.

One embodiment of a spigot and bell type of arrangement is shown in Figure 1C, wherein spigot pipe 17 is coupled to bell pipe 19 having a bell end 21, an annular groove 23, and a ring-style gasket 25 which fits within the annular groove. The spigot 17 is forced into the bell 21 of pipe 19, the outside surface of 17
making contact with gasket 25, thus effectuating a tight seal between pipes 17 and 19. Finally, Figure 1D shows yet another example of a pipe fitting, wherein pipe 33 and pipe 37 each having flange 35 and 39, respectively, are joined together at the flanges, thus effectuating a seal between pipes 33 and 37. The flanges 35 and 39 may or may not have a elastomeric ring or other material between them to effectuate a seal. The present invention is designed to eliminate the need for sleeves, couplings, either internal or external, flanges, or bell ends on pipes in order to effectuate a continuous string of pipes.

In its most general form, the method of creating a continuous string of pipe, and the gasket itself, is described with reference to Figures 2A and 2B. The annular gasket 41 has three primary components: female stop 43, male stop 45, and sealing zone 47. The sealing zone has two faces, female face 49 and male face 51, each of which is designed to sealingly contact the inside diameter of the female pipe, and the outside diameter of the male pipe, respectively. The gasket 41 being placed within pipe ends to form a pipe joint is further described with reference to Figures 2A and 2B. The gasket 41 is shown forming a pipe joint in Figure 2B, wherein the gasket 41 forms a tight seal between male pipe 53 and female pipe 55. The female pipe end 57 which forms a mouth opening for the female pipe, abuts against the female stop 43. Likewise, the male pipe end 63, which forms a mouth opening for the male pipe, abuts against the male stop 45. A seal is effectuated between the abutment of the pipe ends 57 and 63, and the female and male stops 43 and 45, respectively.

Further effectuating a seal between the pipes and gasket is the abutment of the sealing zone 47 against the male and female pipes. More particularly, the outside surface of the male pipe, or the mating end 48 of the male pipe, sealingly abuts the male face 51 of gasket 41. Likewise, the internal surface of the female pipe 50, the internal surface having a substantially uniform
diameter, sealingly abuts against female face 49. The engagement of surface 50 with face 49, and surface 48 with face 51, further effectuates a tight seal between pipes 53 and 55, thus forming a continuous string of plastic pipes once further ends of the pipes are joined in a similar manner.

The gasket of the present invention is susceptible to various embodiments that expand upon gasket 41 shown in Figures 2A and 2B. Another embodiment of the gasket of the invention, annular gasket 75, and its use in forming a pipe joint are described with reference to Figures 3A and 3B. Male pipe 65, having a mating pipe end or outside surface 67 is shown being coupled to gasket 75 in Figure 3A. Gasket 75 is located or placed over the mating end 67 of the male pipe 65 until the male pipe end 64 sealingly abuts with the male stop 79. The male face 85 makes substantial and uniform contact with surface 67, thus effectuating a seal between the gasket itself and pipe 65. Also located on gasket 75 are the female stop 77, the sealing zone 81, and the female face 83.

Also described in the present embodiment of gasket 75 is an annular protuberance 101. The added features of gasket 75 described below further effectuate a tight seal between the female face of the gasket 75, and the inside diameter and inside surface 73 of female pipe 69, as shown in Figure 3B. Female pipe 69 having an internal surface 73, which is substantially uniform, and an outside surface 71, is forced onto male pipe 65 having gasket 75 located thereon. The female pipe 69 is forced onto the male pipe 65 having a gasket 75 until the female pipe end 74, which forms a mouth opening on the female pipe, is forced against the female stop 77. The complex features on the sealing zone 81 of gasket 75 help effectuate a seal between the inside surface 73 of female pipe 69 and the gasket 75, thus forming a complete seal between the male and female pipes and creating a pipe joint.

The complex surface features of gasket 75 are described in
further detail with reference to Figures 4-7. In particular, the method of forming a joint using the gasket of the invention is described with respect to Figure 4. In the present embodiment, the gasket 75 has been first fitted over the mating end of the male pipe 65. The gasket has been fitted in such a way that the male pipe end completely abuts against the male stop of the gasket 75. In this manner, the female face 83 of gasket 75 is facing outward and exposed so that it can make sealing contact with the inside surface 73 of female pipe 69. In another embodiment of the present invention, the gasket 75 may be first fitted within the internal surface 73 of the female pipe 69, followed by insertion of the male pipe into the female pipe having the gasket 75 therein.

The abutment of the female end 74 against the female stop 77 is described with reference to Figure 5. The female pipe end 74 sealingly contacts the sealing face 89 of the female stop and the female end support 90. The female stop has an outer face 87, which in the present embodiment of gasket 75, remains exposed to the external environment from the pipe joint. The outside surface 67 of male pipe 65 sealingly contacts the male face 85 of gasket 75. Movement of the female pipe 69 onto gasket 75 is effectuated by female end ramp 91. The female end ramp 91 may extend to any length along the female face of the gasket, thus increasing the surface area of the female end support 90.

The sealing contact region at the male stop 79 is described in detail with respect to Figure 6. Gasket 75, being first attached to male pipe 65, makes a sealing contact between the outside surface 67 of the male end, and the male face 85 of gasket 75. The end of the male gasket sealingly abuts against the sealing face 99 of the male stop 79. Male end ramp 93 effectuates the insertion of the female pipe 69 over the male pipe 65 having gasket 75 thereon. Further, a seal between surface 73 and the gasket is formed by the male end support 97, which makes a sealing contact with the inside surface 73 in an annular fashion. Finally, the
male support back face 97 is located adjacent to the male end support 97. The back face 97 may extend to any length along the female face of the gasket, thus increasing the surface area of the male end support 97. The male end ramp 93 and the male support back face 95 may be at varying angles depending on the desired level of sealing between the gasket and inside surface 73 of female pipe 69, and also the desired force required to insert the female pipe over the male pipe. Also the male end support 97 may take any shape or form that will effectuate a sealing contact between surface 73 and male end support 97. For example, if more surface area is provided to male end support 97, the seal between the surface 73 and gasket 75 is stronger. Likewise, referring to Figure 5, the female end ramp 91 can be at varying degree angles to help effectuate a seal and/or ease of insertion of the male pipe into the female pipe.

The complex female face 83 of sealing zone 81 is further described with reference to Figure 7. In the present embodiment of gasket 75, is annular protuberance 101. The annular protuberance 101 is located on the female face 83 of gasket 75. In the present embodiment, more specifically, the annular protuberance 101 comprises two coincident ridges 105 and 107. Any size and number of ridges may be used in an annular protuberance 101 in order to effectuate a seal between inside 73 of the female pipe and the gasket 75. Further, the size and shape of the annular protuberance 101 is not in any way limited by the description shown in the figures.

Various other embodiments of gasket 75 are described with reference to Figures 8-14. In particular, Figures 8-14 highlight the various features that may be altered within the sealing zone 81 of gasket 75. For example, Figure 8 shows gasket 75 having an annular protuberance 101 comprising one ridge of a non-uniform shape. The shape of annular protuberance 101 can be non-uniform as shown in Figure 8, or it could be uniform. Further, Figure 8
shows an annular protrusion 109 on the male face 85 of gasket 75.

Figure 9 highlights a different embodiment of the annular protuberance 101 of the gasket 75, wherein the female face 81, annular protuberance 101 comprises two ridges, each one a mirror image of the other. The ridges can take any form however, depending upon the desired usage of the gasket. For example, if a tighter seal is desired, ridges that create more surface area contact between the gasket and pipe are desirable, whereas decreasing the contact surface area will decrease the amount of force required to insert the male pipe into the female pipe having the gasket there between.

A zip joint in the gasket 75 is described with respect to Figure 10-12. The zip joint 111 can take various forms not limited to those shown in Figures 10-12. The zip joint effectuates a coupling between at least two portions 113 and 115 of gasket 75 by providing a fitted pressure sealed joint between the at least two parts of the gasket. The presence of a zip joint will enhance the ease of placing the gasket onto the male end of a pipe, thus allowing more and larger protuberances to be placed on the female face of the gasket. Figure 13 highlights the optional possibility of having at least two different durometers for the gasket. In particular, Figure 13 is shows gasket 75 having three separate durometers in sections 117, 119, and 121. The durometer may be varied by making the durometer of sections 117 and 121 higher than the durometer of section 119, which may be desirable for forming a sealing joint between the female and male pipes. Finally, Figure 14 shows a different embodiment of annular protuberance 109 comprising two ridges 123 and 125 that are substantially symmetric. The embodiments of the annular protuberance 109 found on the male face 85 are by no means limited to those shown in Figures 8-14, but are susceptible various sizes, and shapes and durometers.

The method of shipping a plurality of pipes used to form a
continuous string of plastic pipe is described with reference to Figures 15-19. The prior art method of shipping typical piping is described with reference to Figure 15, wherein a plurality of pipes 201 having bell ends 203 are aligned together side-by-side. As shown in Figure 15, the bell end 203 is adjacent to the spigot end 205 of the pipe laying next to pipe 201. This is done throughout the stacking process in order to store and transport the pipes.

In contrast, a more efficient method of storing and shipping pipes is shown with reference to Figure 16, which shows one embodiment of the present invention. In Figure 16, male and female pipes are stacked together, wherein substantially uniform female pipe 207 and substantially uniform pipe 209 are stacked such that the male pipe 209 fits completely within female pipe 207. Thus, for every pipe that is laid next to another pipe or stacked on top of another pipe, the stacking of two pipes is achieved, wherein only one can be stacked in the same space in the prior art as shown in Figure 15. Thus, at least twice as many pipes can be shipped and stored for a given amount of space by the method of the present invention, and for a given diameter of pipe. Once reaching a destination, pipes 207 and 209 can be separated from one another, as shown in Figures 17 and 18. Figure 18 shows the male pipe 209 being telescoped out of female pipe 207. Once the male pipe 209 is removed and separated from female pipe 207, a plurality of pipe joints can be formed between the plurality of male and female pipes, wherein gasket 211 is inserted between the male and female ends, thus forming a tight seal between the pipes and forming a continuous string of plastic pipes.

There are several advantages to the present invention. The gasket of the present invention is an improvement in the prior art gaskets and methods of joining substantially uniform male and female pipe ends. The ability to reliably join telescoping male and female pipe ends allows for greater storage and transport capabilities for piping.
The ramps located on the gasket female and male stops create a conical effect and is useful in achieving a tighter fit at the ends of the gasket, while making it easier to mount and align the pipes together. Further, the stops themselves help to place the pipes together in a uniform manner at each joint so that identical overlapping regions result. Thus, over-insertion of the pipes is avoided.

Another advantage of the present invention is that the gasket serves to isolate the sealing zone from deflection loading by allowing several points of contact between the male and the female pipes, so that the points of contact take the deflection loading directly, and not transmitted through the seal.

Another advantage is the presence of the male end support which serves as a means for the male end to rest against the female pipe. This helps to transmit non-uniform radial loads which would otherwise be transmitted through the gasket and generate non-uniform sealing pressures along the perimeter of the gasket. In combination with the female end support it creates an even better isolation of the gasket from deflection loads.

Another advantage to the present invention is the use of zip joints, wherein a snap-in profile is provided to allow assembly of two parts of the gasket where were extruded and spliced separately, or split-extruded. The purpose of this is to be able to extrude a gasket that is wider than the maximum extrusion width possible at a given facility. Further, along with the presence of a zip joint, there is the advantage of having dual durometers that can increase the effectiveness of the gasket.

Yet another advantage to the present invention is the ability to quickly and easily transport pipes to a remote site and assemble them for use in low pressure (-1.0 MPa to 1 MPa) fluid transport such as for sewer pipe, irrigation pipe and other low pressure applications.
While the invention has been shown in only one of its forms, it is not thus limited but is susceptible to various changes and modifications without departing from the spirit thereof.
Claims

What is claimed is:

1. A method of creating a continuous pipe joint between at least a female pipe having a female end and a male pipe having a male end, the method comprising:

   providing an annular gasket having a female stop and a male stop at each opposite ends thereof, the female stop and male stop being joined by a sealing zone such that the female stop and male stop are arranged on opposing sides of the sealing zone, and wherein the sealing zone has a female face and a male face;

   placing the annular gasket on a selected one of the female end and male end of the pipes, respectively, wherein the male face of the gasket fits tightly upon the male end of the male pipe, and the female face of the annular gasket fits tightly upon the female end of the female pipe when placed on a selected pipe end, respectively; and

   forcing together the female and male end of the pipes to be joined with the sealing member therebetween, wherein the female end is forced against the female stop of the gasket and the male end is forced against the male stop of the gasket, the sealing zone and stops thus forming a continuous joint between the pipes.

2. The method of Claim 1, wherein the annular gasket is first located on the female pipe member.

3. The method of Claim 1, wherein the annular gasket is first located on the male pipe member.
4. The method of Claim 1, wherein the continuous string of plastic pipe will withstand fluid flow pressures of between about -1.0 MPa and 1.0 MPa.

5. The method of Claim 1, wherein the male and female pipe members telescope for ease of transportation.

6. The method of Claim 1, wherein the gasket has at least one annular protuberance on the female face.

7. The method of Claim 1, wherein the gasket comprises at least two portions coupled by a zip joint.

8. The method of Claim 1, wherein the gasket further comprises a male end ramp for effectuating the insertion of the male mating pipe onto the female pipe, either of which is fitted with the gasket.

9. The method of Claim 1, wherein the gasket further comprises a female end ramp for effectuating the insertion of the female mating pipe onto the male pipe, either of which is fitted with the gasket.