

END SURFACE AND PORT DUAL-REINFORCING DUAL-SEALING DEVICE FOR METAL-PLASTIC COMPOSITE PIPE AND FABRICATION METHOD

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of metal composite pipe structures, and specifically relates to an end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe and a fabrication method.

BACKGROUND ART

[0002] The metal-plastic composite pipe has the characteristics of good mechanical property, health environmental protection, low energy consumption, high water delivery efficiency, low operation cost and the like, has the advantages of high strength, difficulty in deformation of a metal pipe, rustless property of a plastic pipe, acid and alkali corrosion resistance and the like, and is widely applied to the fields of water supply, drainage, pollution discharge, chemical industry and the like. The metal-plastic composite pipe comprises a metal pipe and a plastic layer. The end surface of an existing metal-plastic composite pipe is not treated. In the using process, the pipe end surface is soaked in water for a long time. The metal pipe and the plastic layer on the end surface of the pipe can be slowly stripped under the influence of water tension and environment temperature change. After the metal pipe and the plastic layer are separated, the metal pipe is in direct contact with water and corroded, stripping of the metal pipe and a plastic layer of the metal-plastic composite pipe is further aggravated, and the influence is gradually pushed from the end of the pipe to the interior of the pipe body until the metal pipe and the plastic layer are completely separated. On one hand, the metal pipe is in direct contact with the water to cause serious water pollution, pipeline corrosion is accelerated, and the service life of the pipeline is affected; and on the other hand, the plastic layer blocks the pipeline after being separated from the metal pipe, and normal water supply of the pipeline is affected.

[0003] The present disclosure CN201910683558.7 provides a port reinforcing and end surface sealing device for a metal-plastic composite pipe and a fabrication method, and solves the problem that a metal layer and a plastic layer are stripped and layered when the end surface of a metal-plastic composite pipe is in contact with water in a normal condition to a certain extent. However, the actual use proves that due to the fact that the friction resistance of the contact face of a metal reinforcing ring and a plastic pipe is small, under the action of hoisting or other external forces, the metal reinforcing ring is prone to sliding to cause sealing failure.

SUMMARY

[0004] The present disclosure aims to solve the technical problem of overcoming the defects in the prior art, and provides an end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe and a fabrication method.

[0005] Through the technical scheme adopted for solving the technical problem, an end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite

pipe comprises a metal-plastic composite pipe body having an end surface and a port, a metal reinforcing ring, and a sealing ring, wherein the metal reinforcing ring comprises a metal reinforcing ring body and a flanged edge disposed at one end of the metal reinforcing ring body, and the sealing ring is compressed between the metal reinforcing ring and the metal-plastic composite pipe body; the sealing ring is tightly attached to an outer wall of the metal reinforcing ring, and the sealing ring is tightly attached to the metal-plastic composite pipe body; and the metal reinforcing ring does not make contact with the metal-plastic composite pipe body.

[0006] In the technical scheme, preferably, the end surface of the metal-plastic composite pipe body is wrapped with the sealing ring, namely, the sealing ring is compressed on the outer end surface and part of the inner circle end surface of the metal-plastic composite pipe body by the metal reinforcing ring.

[0007] In the technical scheme, preferably, the cross section of the flanged edge is a straight edge perpendicular to the cross section of the metal reinforcing ring body, and an L-like shape is formed by the cross section of the flanged edge and the cross section of the metal reinforcing ring body.

[0008] In the technical scheme, preferably, the height of the flanged edge at the outer end of the metal reinforcing ring is consistent with the wall thickness of the end surface of the metal-plastic composite pipe.

[0009] In the technical scheme, preferably, the width of the long edge of the cross section of the sealing ring is smaller than or equal to the width of the metal reinforcing ring body, and the width of the short edge of the cross section of the sealing ring is equal to the width of the flanged edge at one end of the metal reinforcing ring.

[0010] In the technical scheme, preferably, the width of the metal reinforcing ring body is larger than or equal to 5 mm, and the thickness of the metal reinforcing ring body is larger than or equal to 0.5 mm.

[0011] In the technical scheme, preferably, the sealing ring is a rubber sealing ring.

[0012] In the technical scheme, preferably, the metal reinforcing ring is a stainless steel reinforcing ring.

[0013] A fabrication method of the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe comprises the following steps:

[0014] S1, fabricating a metal reinforcing ring and a sealing ring;

[0015] S2, sleeving the sealing ring on the metal reinforcing ring, tightly attaching the sealing ring to the outer wall of the metal reinforcing ring, and then sleeving the metal reinforcing ring in a port of a metal-plastic composite pipe; or firstly sleeving the sealing ring in the port of the metal-plastic composite pipe, and then sleeving the metal reinforcing ring on the inner wall of the sealing ring; and

[0016] S3, finally propping a flanged edge at one end of the metal reinforcing ring against by an extrusion equipment mold to longitudinally extrude the metal reinforcing ring into the metal-plastic composite pipe, and extruding the metal reinforcing ring inwards by a mold tool ring while the metal reinforcing ring is extruded radically, so that the metal reinforcing ring is tightly attached to the inner wall of the port of the metal-plastic composite pipe, and the sealing ring is tightly wrapped between the metal reinforcing ring and the metal-plastic composite pipe.

[0017] In the technical scheme, preferably, a fabrication method of the metal reinforcing ring comprises the following steps:

[0018] firstly, stainless steel band length cutting;

[0019] secondly, edge flanging and edge rolling;

[0020] thirdly, welding; and

[0021] fourthly, welding seam polishing.

[0022] Compared with the prior art, the present disclosure has the following beneficial effects.

[0023] Firstly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, by using the technical scheme that the end surface and the port of the metal-plastic composite pipe are dually sealed by the adopted metal reinforcing ring and sealing ring, the friction resistance between the metal reinforcing ring and the metal-plastic composite pipe is greatly increased, the technical problem that the metal reinforcing ring is easily affected by external force to slip is solved, and the problem of sealing failure caused by slip of the metal reinforcing ring is completely eradicated.

[0024] Secondly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, the technical problem that the sealing effect is difficult to guarantee due to the fact that the sealing ring moves in the traditional sealing ring expansion ring extrusion process is completely eradicated.

[0025] Thirdly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, the lining at the port of the metal-plastic composite pipe and the metal reinforcing ring are in contact with the sealing ring, and the technical problems of poor sealing effect or sealing failure and the like caused by loosening and falling of the metal reinforcing ring and the sealing ring due to small frictional resistance between the metal reinforcing ring and the lining in the hoisting, transporting and storing processes of the metal-plastic composite pipe are solved.

[0026] Fourthly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, the technical problems that due to the fact that expansion connection between the metal reinforcing ring and the lining is not tight and contact between the metal reinforcing ring and the lining is not sufficient, the metal reinforcing ring slips, the metal reinforcing ring is poor in reinforcing sealing effect on the metal-plastic composite pipe, or reinforcing sealing fails are effectively solved.

[0027] Fifthly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, the end surface of the metal-plastic composite pipe is effectively sealed by the sealing ring, and the technical problem that the metal pipe and the lining are layered due to water seepage of the end surface of the metal-plastic composite pipe is thoroughly solved.

[0028] Sixthly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, due to the fact that the sealing ring is additionally arranged between the metal-plastic composite pipe and the metal reinforcing ring, contact between the lining of the metal-plastic composite pipe and the metal reinforcing ring is changed into flexible contact, after ring expansion, resilience force generated by the sealing ring enables expansion connection of the metal

reinforcing ring to be firmer, the friction resistance is larger, and the sealing effect is better.

[0029] Seventhly, according to the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, the technical problem that the metal reinforcing ring is loosened and falls off due to elastic retraction of the metal reinforcing ring in the ring expansion process of the metal-plastic composite pipe is solved.

[0030] Eighthly, the fabrication method of the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe is simple in process, simple in required equipment and low in production cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] FIG. 1 is a structural schematic diagram of the first embodiment in the present disclosure;

[0032] FIG. 2 is an enlarged structural schematic diagram of part A in the first embodiment as shown in FIG. 1;

[0033] FIG. 3 is a structural schematic diagram of a sealing ring sleeving on a metal reinforcing ring in the first embodiment as shown in FIG. 1;

[0034] FIG. 4 is a structural schematic diagram of the second embodiment in the present disclosure; and

[0035] FIG. 5 is an enlarged structural schematic diagram of part B in the second embodiment as shown in FIG. 4.

[0036] Reference signs:

[0037] 1, metal reinforcing ring; 1-1, metal reinforcing ring body; 1-2, flanged edge; 2, sealing ring; 3, metal-plastic composite pipe body; 3-1, port; and 3-2, end surface.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0038] The following describes specific embodiments of the present disclosure with reference to the following attached figures. It shall be understood that the embodiments described herein are only intended to illustrate and explain but not to limit the present disclosure.

[0039] Embodiment I

[0040] As shown in FIG. 1 to FIG. 3, a metal-plastic composite pipe in the embodiment is a socket type composite pipe. In the embodiment, the device comprises a metal-plastic composite pipe body 3 having a port 3-1 and an end surface 3-2, a metal reinforcing ring 1, and a sealing ring 2, wherein the metal reinforcing ring 1 comprises a metal reinforcing ring body 1-1 and a flanged edge 1-2 disposed at one end of the metal reinforcing ring body 1-1, the contour shape of the cross section of the metal reinforcing ring 1 is the same as that of the cross section of the sealing ring 2, and the sealing ring 2 is sleeved on the outer wall of the metal reinforcing ring 1 and located between the metal reinforcing ring 1 and the metal-plastic composite pipe body 3.

[0041] In the embodiment, the end surface of the metal-plastic composite pipe body 3 is wrapped with the sealing ring 2, namely, the sealing ring 2 is compressed on the outer end surface and part of the inner circle end surface of the metal-plastic composite pipe body 3 by the metal reinforcing ring 1, the dual-sealing effect is achieved, and the

friction force between the sealing ring 2 and the metal-plastic composite pipe body 3 and between the sealing ring 2 and the metal reinforcing ring 1 can be increased.

[0042] In the embodiment, after installation, no gap exists between the metal-plastic composite pipe body 3 and the metal reinforcing ring 1 through the sealing ring 2, and sealing failure caused by the fact that the gap is filled with gas is avoided.

[0043] In the embodiment, due to the fact that the sealing ring 2 is of deformability, after the sealing ring 2 is compressed, the end surface of the sealing ring 2 forms a protruding semi-circular ring body, the protruding semi-circular ring body protrudes out of the end surface of the metal reinforcing ring 1, and the sealing performance is improved.

[0044] In the embodiment, the cross section of the flanged edge 1-2 is a straight edge perpendicular to the cross section of the metal reinforcing ring body 1-1. The metal reinforcing ring 1 is bent once to form the flanged edge, namely, the overall longitudinal cross section of the metal reinforcing ring 1 is in an L-like shape so as to be matched with the shape of the end surface of the metal-plastic composite pipe body 3.

[0045] In the embodiment, the height of the flanged edge 1-2 at the outer end of the metal reinforcing ring 1 is consistent with the wall thickness of the end surface 3-2 of the metal-plastic composite pipe. In other embodiments, the height of the flanged edge 1-2 at the outer end of the metal reinforcing ring 1 may be not consistent with the wall thickness of the end surface 3-2 of the metal-plastic composite pipe. Actually, the end surface of the flanged edge 1-2 and the excircle end surface of the end surface 3-2 of the metal-plastic composite pipe are located on the same face as much as possible. If the end part of the excircle of the end surface 3-2 of the metal-plastic composite pipe is provided with a chamfer, the end surface of the flanged edge 1-2 is flush with the end part of the chamfer as much as possible.

[0046] In the embodiment, the width of the metal reinforcing ring body 1-1 is larger than or equal to 5 mm, and the thickness of the metal reinforcing ring body 1-1 is larger than or equal to 0.5 mm. The width and the thickness of the metal reinforcing ring body 1-1 are adjusted in cooperation with the wall thickness and the inner diameter of the metal-plastic composite pipe body 3, and the width and the thickness of the metal reinforcing ring body 1-1 are increased when the wall thickness and the inner diameter of the metal-plastic composite pipe body 3 are large.

[0047] In the embodiment, the metal reinforcing ring 1 is preferentially a stainless steel reinforcing ring. In other embodiments, the metal reinforcing ring 1 can also be made of materials which are not prone to rusting and easy to fold.

[0048] In the embodiment, the sealing ring 2 is made of rubber and is preferably made of a material with high hardness, high elasticity and high friction force, and a grain structure for increasing the friction force can be additionally arranged on the surface of the sealing ring 2.

[0049] In the embodiment, a fabrication method of the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe specifically comprising the following steps:

[0050] S1, fabricating a metal reinforcing ring 1; measuring the inner diameter of the metal-plastic composite pipe, calculating the perimeter of the stainless steel reinforcing

ring which is 7 mm smaller than the inner diameter of the metal-plastic composite pipe, cutting a stainless steel band by taking the calculated perimeter as the length, the width of the stainless steel band being 60 mm, and the thickness of the stainless steel band being 1.4 mm; then flanging and rolling the cut stainless steel band by a flanging and rolling machine; welding the stainless steel ring after edge rolling by a welding machine, and polishing a weld joint;

[0051] S2, coating the outer wall of the stainless steel reinforcing ring with flexible glue, then sleeving the stainless steel reinforcing ring on the sealing ring 2, after the glue is solidified, tightly attaching the sealing ring 2 to the outer wall of the stainless steel reinforcing ring, and finally sleeving the stainless steel reinforcing ring sleeved with the sealing ring 2 in a port 3-1 of the metal-plastic composite pipe, and tightly attaching the flanged edge of the stainless steel reinforcing ring to the end surface 3-2 of the metal-plastic composite pipe; or sleeving the sealing ring 2 in the port 3-1 of the metal-plastic composite pipe, tightly attaching the sealing ring 2 to the port 3-1 of the metal-plastic composite pipe, and then sleeving the stainless steel reinforcing ring coated with the glue on the sealing ring 2; and

[0052] S3, finally propping a flanged edge at one end of the metal reinforcing ring against by an extrusion equipment mold to longitudinally extrude the metal reinforcing ring into the metal-plastic composite pipe, and extruding the metal reinforcing ring inwards by a mold tool ring while the metal reinforcing ring is extruded radically, so that the metal reinforcing ring is tightly attached to the inner wall of the port 3-1 of the metal-plastic composite pipe, and the sealing ring 2 is tightly wrapped between the metal reinforcing ring and the metal-plastic composite pipe.

[0053] Embodiment II

[0054] As shown in FIG. 4 and FIG. 5, the metal-plastic composite pipe in the embodiment is a straight pipe type composite pipe. Sealing devices are arranged at the two ends of the straight pipe type composite pipe.

[0055] The foregoing descriptions are merely exemplary embodiments of the present disclosure, but are not limitation of the present disclosure in any form. The foregoing descriptions are merely exemplary embodiments of the present disclosure, but are not intended to limit the present disclosure. Therefore, without departing from the content of the technical scheme of the present disclosure, any simple modification, equivalent change and modification of the above embodiments according to the technical essence of the present disclosure should fall within the protection scope of the technical scheme of the present disclosure.

WHAT IS CLAIMED IS:

1. An end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe, comprising a metal-plastic composite pipe body having an end surface and a port, a metal reinforcing ring, and a sealing ring, wherein the metal reinforcing ring comprises a metal reinforcing ring body and a flanged edge disposed at one end of the metal reinforcing ring body, and the sealing ring is compressed between the metal reinforcing ring and the metal-plastic composite pipe body; the sealing ring is tightly attached to an outer wall of the metal reinforcing ring, and the sealing ring is tightly attached to the metal-plastic composite pipe body; and the metal reinforcing ring does not make contact with the metal-plastic composite pipe body.

2. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to claim 1, wherein the cross section of the flanged edge is a straight edge perpendicular to the cross section of the metal reinforcing ring body.

3. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to claim 1 or 2, wherein the height of the flanged edge at the outer end of the metal reinforcing ring is consistent with the wall thickness of the end surface of the metal-plastic composite pipe.

4. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to claim 1 or 2, wherein the width of the long edge of the cross section of the sealing ring is smaller than or equal to the width of the metal reinforcing ring body, and the width of the short edge of the cross section of the sealing ring is equal to the width of the flanged edge at one end of the metal reinforcing ring.

5. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to claim 3, wherein the width of the long edge of the cross section of the sealing ring is smaller than or equal to the width of the metal reinforcing ring body, and the width of the short edge of the cross section of the sealing ring is equal to the width of the flanged edge at one end of the metal reinforcing ring.

6. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to claim 4, wherein the width of the metal reinforcing ring body is larger than or equal to 5 mm, and the thickness of the metal reinforcing ring body is larger than or equal to 0.5 mm.

7. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to one of claims 1 to 6, wherein the sealing ring is a rubber sealing ring.

8. The end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to one of claims 1 to 6, wherein the metal reinforcing ring is a stainless steel reinforcing ring.

9. A fabrication method of the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to one of claims 1 to 8, specifically comprising the following steps:

S1, fabricating a metal reinforcing ring;

S2, sleeving the sealing ring on a stainless steel reinforcing ring, tightly attaching the sealing ring to the outer wall of the stainless steel reinforcing ring, and then sleeving

the stainless steel reinforcing ring in a port of a metal-plastic composite pipe; or firstly sleeving the sealing ring in the port of the metal-plastic composite pipe, and then sleeving the stainless steel reinforcing ring on the inner wall of the sealing ring; and

S3, finally propping a flanged edge at one end of the metal reinforcing ring against by an extrusion equipment mold to longitudinally extrude the metal reinforcing ring into the metal-plastic composite pipe, and extruding the metal reinforcing ring inwards by a mold tool ring while the metal reinforcing ring is extruded radically, so that the metal reinforcing ring is tightly attached to the inner wall of the port of the metal-plastic composite pipe, and the sealing ring is tightly wrapped between the metal reinforcing ring and the metal-plastic composite pipe.

10. The fabrication method of the end surface and port dual-reinforcing dual-sealing device for a metal-plastic composite pipe according to claim 9, wherein a fabrication method of the metal reinforcing ring comprises the following steps:

- firstly, stainless steel band length cutting;
- secondly, edge flanging and edge rolling;
- thirdly, welding; and
- fourthly, welding seam polishing.