

ROUND SEAL

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Technical Field

The present invention concerns a round seal.

Background

10 When cables, pipes or wires are to be lead through an opening in a partition in a sealed way, sometimes a round seal is used having a rectangular through opening for receiving one or more modules. The rectangular through opening may be square. Each one of the modules are to receive a cable, pipe or wire. The round seal has a cylindrical body with a central, through opening and fittings at opposite ends. The body is normally
15 made of a rubber material, allowing compression. By means of screws and nuts, the fittings may be moved closer to each other to compress the body. When compressing a circular body having a rectangular or square central through opening, the corners of the through opening will have an unfavourable form, not giving completely straight corners. Such an unfavourable form will increase the risk of leakage.

20 A round seal of this kind is normally placed directly in an opening in the partition or in a sleeve received in the opening of the partition. The partition could be a deck or bulkhead of a ship, a wall of a cabinet, a technical shelter, a junction box or a machine, or a wall, floor or roof of a building.

25 Summary

According to one aspect of the invention, a round seal is provided comprising a cylindrical body, fittings, screws and nuts. The body is compressible and has a rectangular through opening. Two fittings are placed at opposite ends of the body and the screws goes through openings in the body and the fittings. The nuts are received on
30 the screws. An axial length of the body is larger at the area of the corners of the through opening than at the rest of the body.

Experiments and simulations have shown that by increasing the volume of material at the corners of a rectangular or square opening the body, the material at the corners will move further than if there is no increased volume of material. When
35 modules are received in the through opening of the body, the extra volume of material will increase the contact pressure against said modules. Thus, by means of the extra

volume of material at the corners of the through opening of the body, the deformation inwards in the corners of the opening is increased, thereby increasing the contact pressure against the modules and reducing the risk leakage.

Further objects and advantage of the present invention will be obvious to a
5 person skilled in the art when reading the detailed description below.

Brief Description of the Drawings

The invention will be explained further below by way of example and with reference to the enclosed drawings. In the drawings:

- 10 Fig. 1 shows a round seal;
Fig. 2 shows the round seal of Fig. 1 with modules receive in an opening;
Fig. 3 shows a body of the round seal according to the present invention; and
Fig. 4 shows a body of a round seal according to the prior art.

Detailed Description

As used in this description, the expressions “axial”, “radial” and similar expressions are in view of cables, pipes or wires received in the seal.

- The round seal 1 of Fig. 1 comprises a cylindrical body 2, which body 2 is made of a rubber material or other compressible material. Fittings 3, 4 are provided at
20 opposite ends of the body 2. A number of screws 5 goes through the body 2 and the fittings 3, 4.

- The round seal 1 has a central through opening 7, which has a square form as seen in an end view. In other embodiments the through opening has a rectangular form that is not square. Inside said through opening 7, one or more modules 8 are to be
25 received. Each module 8 is to be placed around a pipe, cable or wire. The axial length of each module normally corresponds with or is a bit smaller than the axial length of the body 2. Possible modules 8 not receiving any pipe, cable or wire, will be closed off, for instance with a blind placed in the centre of the modules 8. In the shown embodiment the modules have a number of peelable layers, which layers are peeled off to adapted an
30 inner diameter of the module 8 to an outer diameter of a pipe, cable or wire received inside the module 8.

- By means of the screws 5 and cooperating nuts 6 the fittings may be moved in direction against each other, whereby the body 2 will be compressed in axial direction. By the compression in axial direction, the body 2 will expand in radial directions both
35 inwards and outwards, sealing off the opening in the wall or the sleeve receiving the

round seal 1. As used in this description the expression “compressible” in view of the body 2, means that the body 2 may be compressed by normal tightening of the screws 5 and nuts 6.

As shown in Fig. 3 the body 2 of the seal has protrusions 9 at the corners of the through opening 7. In the shown embodiment there are protrusions 9 at opposite ends of the body 2. In other embodiments there are only protrusions 9 on one side of the body 2. The protrusions 9 have the form of raised portions of the body 2. The protrusions 9 have a curved shape, with the top of the curve placed at a corner of the through opening 7 of the body 2. Thus, at the corners of the through opening 7, the body 2 will have a larger axial length than the rest of the body 2. The body 2 has a number of through holes 10, which are to receive the screws 5. Said through holes 10 have an axial orientation.

By means of the protrusions 9 the fittings 3, 4 will rest against said protrusions 9 before the screws 5 are tightened by the nuts 6. During compression the fittings 3, 4 will flatten the protrusions 9 to an extent depending on how much the screws are tightened. Due to the protrusions 9 the volume of material is larger at the corners of the through opening 7 of the body 2. Said larger volume of material will give a better and larger connection with the modules 8.

According to prior art the body 11 of a round seal of this kind has no protrusions at corners of a through opening 12. In the same way as the body 2 of the present invention, the body 11 of the prior art has a number of through holes 13, for receiving screws.

The round seal 1 is handled in the same way at mounting independently if it has a body 2 with protrusions 9 or if it has a body 11 without protrusions.

CLAIMS

1. A round seal (1) comprising a cylindrical, compressible body (2), having a rectangular through opening (7), fittings (3, 4), at opposite ends of the body (2), a number of screws (5), going through holes of the body (2) and the fittings (3, 4), and nuts (6), received on the screws (5), characterized in that the body (2) has protrusions (9) at the corners of the through opening (7) on at least one side of the body (2), so that an axial length of the body (2) is larger at the area of the corners of the through opening (7) than at the rest of the body (2), wherein the fittings (3,4) are arranged to flatten the protrusions (9) during compression of the body (2).
2. The round seal (1) of claim 1, wherein the protrusions (9) are arranged on opposite sides of the body (2).
3. The round seal (1) of claim 1 or 2, wherein each protrusion (9) goes all the way from a corner of the through opening (7) to an outer circumference of the body (2).
4. The round seal (1) of any of the claims 1-3, wherein each protrusion (9) has a curved shape, with the top of the curve at the corner of the through opening (7).
5. The round seal (1) of any of the previous claims, wherein one or more modules (8) are received in the through opening (7) of the body (2).
6. The round seal (1) of any of the previous claims, wherein the body (2) is made of a rubber material.
7. The round seal (1) of any of the previous claims, wherein the rectangular opening is square.