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The invention relates to a plastic transporting container for liquids, in particular high-purity liquids, having a submersion tube which extends from a top wall of the container to the container base. Transporting containers of this type are used for transporting liquids. In particular when used for high-purity liquids, in the case of which contamination by environmental influences has to be avoided, it is necessary, for emptying purposes, to have a submersion tube which extends virtually as far as the container base and, at its top end, is provided with a screw-connection device.

In the case of known transporting containers of the generic type mentioned above, the submersion tube usually consists of a plastic material other than that used for the actual transporting container, which is produced by blow moulding. Such submersion tubes are fastened in the top wall of the container in a sealing manner. The resulting outlay in terms of labour and cost is considerable; moreover, additional quality-assurance measures are necessary.

WO-A-91 06 503, for example, has also disclosed plastic containers for liquids in which the submersion tube, which extends into the vicinity of the base, is integrally formed in the container and is formed in an inner protrusion which runs along a surface line of the container wall. However, for transporting and storing chemicals, stringent requirements in terms of the durability and stability of the containers are imposed for safety reasons.

The object of the invention is thus to design a transporting container of the generic type mentioned in the introduction, such that it can be produced with comparatively low outlay, in particular there is no need for any measures for the subsequent fitting of a submersion tube, and stringent stability requirements are met.



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This object is achieved according to the invention in that the submersion tube, which is integrally formed in the transporting container, is retained in the inner protrusion by stiffening ribs.

The submersion tube is produced as the actual plastic transporting container is produced, with the result that there is no need for any other production and assembly work.

With the same size of production batch, the production of the plastic container is not very much more expensive than that of transporting containers with a submersion tube which has to be fitted separately, although the outlay for fitting the immersion tube separately is done away with. The integral design of the submersion tubes means that a filling-level sensor can easily be fitted.

The reduction in the number of structural components for the transporting container, which is brought about by the integral design of the submersion tube, likewise reduces the production outlay and, at the same time, the possible errors during assembly and handling. Outlay in terms of cleaning is also reduced.

According to the invention, the submersion tube is formed in an inner protrusion, running along a surface line, of the essentially cylindrical container wall of the transporting container and retained by stiffening ribs. The fixed, integral connection of the submersion tube to the container wall secures the submersion tube on the container wall over its entire length, with the result that bending stresses which could occur as a result of movements in liquids in the case of a submersion tube which projects freely into the transporting container are completely avoided. In particular, it is not necessary either to provide a separate fastening at the bottom end of the submersion tube, which projects into the submersion [sic] container, as may be necessary in known transporting containers with submersion tubes which project freely

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into the container interior, at least if the submersion tubes are relatively long.

The transporting container is preferably a hollow body produced by blow moulding.

5 For use for high-purity chemicals, it is expedient for the transporting container to be produced as a hollow body by coextrusion blow moulding, the inner-wall material, which is selected specifically for the chemicals which are to be introduced, coating both
10 the inner wall of the container and the submersion tube, with the result that all the surfaces which come into contact with the product are formed by this inner-wall material.

 Further advantageous configurations of the idea
15 of the invention form the subject matter of further subclaims.

 Exemplary embodiments are described in more detail hereinbelow and are illustrated in the drawing, in which:

20 Figure 1 shows a longitudinal section of a transporting container for liquids,

 Figure 2 shows a plan view of the transporting container according to Figure 1,

25 Figure 3 shows an enlarged partial section along line III-III in Figure 1,

 Figure 4 shows a side view of the transporting container according to Figure 1 in the direction of the arrow IV,

30 Figure 5 shows a modified embodiment of a transporting container in a longitudinal section corresponding to Figure 1, and

 Figure 6 shows an enlarged partial section along line VI-VI in Figure 5.

35 The transporting container which consists entirely of plastic, and is illustrated in Figures 1 - 4, serves for receiving, storing and transporting high-purity liquids. It is produced by blow moulding and consists, for example, of polyethylene (PE).

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An integrally formed submersion tube 1 extends from a top wall 2 of the container to a point located at a small distance above a container base 3. As can be seen, in particular from Figure 3, the submersion tube 1 is formed in an inner protrusion 4, which runs along a surface line of the essentially cylindrical container wall 5. The submersion tube 1 is retained by stiffening ribs 4a.

At its end which opens out in the top wall 2 of the container, the submersion tube 1 is provided with a screw-connection device 6. For this purpose, an internal thread is formed at the top end of the tube, it being possible for a screw-connection device for removal purposes to be screwed into said internal thread. The submersion tube 1 serves as a removal tube for emptying the transporting container.

As shown in Figures 1 and 2, at least one closure opening 7 is provided in the top wall 2 of the container, and this opening may likewise have an internal thread for receiving a screw-action closure. In Figure 2, a chain-dotted line indicates that it is possible for a further closure opening 8 of the same design as the closure opening 7 to be provided in the top wall 2 of the container.

As can be seen from Figures 1 and 4, the submersion tube 1 is widened at the point where it opens out in the region of the top wall 2 of the container, in order to provide sufficient space for the screw-connection device 6. The screw-connection device may be provided with a filling-related mechanical coding device which, during the production of the removal means, precludes a mix-up with the same type of container which contains a different product.

Whereas the transporting container in the case of the embodiment illustrated in Figures 1 - 4 consists entirely of plastic, in a single piece, the design according to Figures 5 and 6 provides that a plastic inner container 8, which is provided with an integrally formed submersion tube 1 and corresponds essentially to

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the design according to Figures 1 and 4, is introduced into a steel outer container 9. The outer container 9 preferably consists of high-grade steel and serves essentially for mechanical reinforcement of the transporting container. In the region where the submersion tube 1 opens out and in the region of the closure 7 (and, if appropriate, of the further closure 8), the cover 10 of said transporting container has in each case one access opening 11 or 12, respectively.

10 For use for high-purity liquids, the single-piece transporting container, which is shown in Figures 1 - 4, or the inner container 8, for the design according to Figures 5 and 6, may be produced by coextrusion blow moulding, an inner-wall material which
15 is selected specifically for the liquid which is to be introduced coating both the inner wall of the container and the submersion tube 1.

The transporting container may be designed in different shapes and sizes. For example, the
20 embodiments illustrated may be designed with a height of approximately 900 mm and a diameter of approximately 600 mm, with the result that they have a gross volume of approximately 200 l.

PATENT CLAIMS

1. Plastic transporting container for liquids, having a submersion tube which extends from a top wall of the container to the container base, the submersion tube (1) being integrally formed in the transporting container, the submersion tube (1) being formed in an inner protrusion (4), and this protrusion (4) running along a surface line of the essentially cylindrical container wall (5) of the transporting container, characterized in that the submersion tube (1) is retained in the protrusion (4) by stiffening ribs (4a).

2. Transporting container according to Claim 1, characterized in that it is a hollow body produced by blow moulding.

3. Transporting container according to Claim 2, characterized in that it is a hollow body produced by coextrusion blow moulding, and in that the inner-wall material coats both the inner wall of the container and the submersion tube (1).

4. Transporting container according to Claim 1, characterized in that, at its end which opens out in the top wall (2) of the container, the submersion tube (1) is provided with a screw-connection device (6).

5. Transporting container according to Claim 1, characterized by a plastic inner container (8) which is provided with the integrally formed submersion tube (1) and is introduced into a steel outer container (9).

6. Transporting container according to Claim 5, characterized in that, in the region where the submersion tube (1) opens out and in the region of at least one closure (7), the cover (10) of the steel outer container (9) has in each case one access opening (11 or 12, respectively).