

Method for the production of a silo

The invention relates to a method for the production of a silo or tank from an aluminium alloy, which silo or tank is made up of a number of rings joined to one another, each of which rings is made up of a number of ring segments which are provided around their periphery with a joining flange extending perpendicularly to the segment concerned, comprising:

- forming cylinder segments from plates with joining flanges welded to the periphery thereof, which plates and flanges have been produced from an aluminium alloy,
- 10 - combining a number of cylinder segments to give a desired number of cylindrical rings by joining flanges, which have been made on the straight peripheral edges of the segments and engage on one another, to one another by means of a mechanical joining means, such as a rivet, nail or bolt,
- combining a number of rings formed in this way to give a cylindrical tank or
15 silo wall by joining flanges, which have been made on the curved peripheral edges of the sides and which engage on one another, to one another by means of a mechanical compression means, such as a rivet, nail or bolt, and making the said flange joints watertight.

Such a method is disclosed in US Patent US-A 4 718 208. The seams between the said flanges engaging on one another must be made watertight. In order to achieve this it is customary to weld either the flanges of the cylinder segments or the wall sections themselves to one another.

Apart from the fact that this is a time-consuming task, expensive equipment is needed for this. This can be highly disadvantageous, especially if the silo has to be
25 assembled on site.

The aim of the present invention is to provide a method for watertight sealing of a silo or tank which renders welding at the assembly site superfluous.

In order to achieve this sealing mastic is applied in channels formed by two adjoining recesses made in adjoining corners of two flanges engaging on one another, which corners -
30 as seen in the radial direction of the silo - have a position furthest from the centre line of the silo.

Because, according to the method described, the seals are made watertight by means of a sealing mastic, it is no longer necessary to have welding equipment on hand at the

assembly site. All that is needed is a mastic gun, which is appreciably lighter and smaller than welding equipment. The costs of such guns are also orders of magnitude lower than those of welding equipment.

To provide the joint between the flanges of the segments with adequate rigidity,
5 according to the invention the flanges of the segments are preferably joined with the aid of a bolt. Riveting can usually suffice for the mechanical joint between the flanges of rings engaging on one another.

The present invention provides a channel to contain the sealing mastic, which channel is formed by two identical recesses in the flanges which extend over the entire
10 length of the flanges and which are located at the front edge of the free ends of the respective flanges and which channel extends into the engagement surface of the flanges.

By this means it is possible to fit the rings first, before the mastic is applied. Because the mastic is visible, the mastic seam can be checked simply and non-destructively. Should it be necessary to replace the mastic seam, the old mastic can be removed and new mastic
15 applied without moving the rings.

It is pointed out that DE-A 2 434 314 describes a silo made of an aluminium alloy, which silo is made up of a number of cylindrical rings which are provided around their peripheral edges with a flange extending perpendicularly to the rings concerned. The rings are combined to form a cylindrical silo wall by joining flanges engaging on one another to
20 one another by means of a threaded bolt or the like, maximum tensile stresses in the region of the joint faces between the flanges being ensured by the choice of the thickness of the flanges and the threaded bolts. A leak-free seal can be obtained without welding by adding packing in the form of O-rings between those faces of the flanges which are in contact with one another. This packing in the form of O-rings cannot be replaced without dismantling
25 the silo into cylindrical rings. This known silo lacks adjoining recesses filled with sealing mastic and made in adjoining corners of two flanges engaging on one another, which corners - as seen in the radial direction of the silo - have a position furthest from the centre line of the silo. Moreover, the cylindrical rings are not made up of segments joined to one another by vertical seams.

30 The invention will be described in more detail below with reference to the drawings, in which the following is shown:

Fig. 1: perspective view of a silo which consists of rings stacked on top of one another and joined to one another, which rings are formed from cylinder segments.

Fig. 2: cross-section of a coupling between two cylinder segments by means of a joining flange according to the present invention.

Figure 1 shows a silo 1 which is made up of rings 2, formed from cylinder segments 3. The rings are formed by joining several cylinder segments 3 to one another by means of straight joining flanges 4, for example with the aid of bolts 6. The rings are joined to an adjoining ring or other element of the silo by means of the curved joining flanges 5 of the cylinder segments, for example with the aid of rivets 7.

Figure 2 shows a cross-section of a join between two cylinder segments, which join can be either a curved or a straight join. The joining flange 10, which extends essentially at right angles from the wall 8, is attached to the wall 8 by means of a weld seam 12. The adjoining wall 9 is provided with a joining flange 11 in a similar manner via weld seam 13. The two cylinder segments are essentially held in place with respect to one another by the mechanical joining means 17, which, for example, can be a rivet, nail or bolt. Joining flange 10 is provided at its free end with a recess 18 which adjoins a similar recess 19 in the adjoining joining flange 11. Sealing mastic 20 is applied in the channel 14 that is formed by the two recesses 18, 19, in order to make the seam 16 watertight.

Claims

1. Method for the production of a silo or tank from an aluminium alloy, which silo or tank is made up of a number of rings (2) joined to one another, each of which rings is made up of a number of ring segments (3) which are provided around their periphery with a joining flange (4, 5) extending perpendicularly to the segment (3) concerned, comprising:
 - forming cylinder segments (3) from plates with joining flanges (4, 5) welded to the periphery thereof, which plates and flanges have been produced from an aluminium alloy,
 - combining a number of cylinder segments (3) to give a desired number of cylindrical rings (2) by joining flanges (4), which have been made on the straight peripheral edges of the segments (3) and engage on one another, to one another by means of a mechanical joining means (6), such as a rivet, nail or bolt,
 - combining a number of rings (2) formed in this way to give a cylindrical tank or silo wall by joining flanges (5), which have been made on the curved peripheral edges of the sides and which engage on one another, to one another by means of a mechanical compression means (7), such as a rivet, nail or bolt,characterised in that sealing mastic (20) is applied in a channel formed by two adjoining recesses (18, 19) made in adjoining corners of two flanges (4; 5) engaging on one another, which corners - as seen in the radial direction of the silo - have a position furthest from the centre line of the silo (1).
2. Method according to Claim 1, characterised in that a sealing mastic (20) based on silicone is used.
3. Method for the production of a silo or tank according to Claim 1, characterised in that the mechanical joint between the flanges (5) of the rings (2) is formed by rivets.
4. Method for the production of a silo or tank according to Claim 1 or 2, characterised in that the flanges (4) of the segments (3), from which the rings (2) are made up, are mechanically joined by means of bolts.
5. Silo or tank produced according to the method of one of the preceding claims.