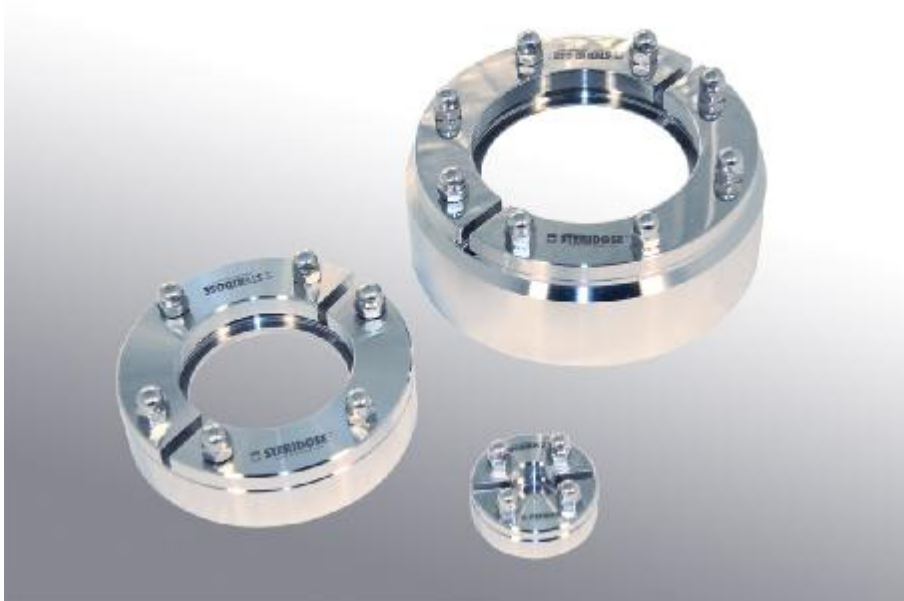


STERIFLANGE®

Welding Guide

Welding the flange into position



This welding guide should be read carefully
before unpacking the Steriflange®

Order No. _____

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1. About the Welding Guide

The welding procedure described in this guide is used for welding flange in to vessels. The guidelines refer only to the technical aspects of welding operations. Please note that all data with regard to welding current, time etc are approximate and may vary in practice. References are made to the Swedish code for pressure vessels, TKN 87. Ensure that the relevant standards for pressure vessels are complied with the vessel.

Roplan ABs liability for possible faults are regulated by ECE 188. This implies that Roplan AB is responsible for faults present in the product at the time of delivery.

Roplan AB is not responsible for faults that occur due to conditions that arise after delivery, for example faulty handling, welding or fitting.

As a step in Roplan ABs quality assurance, each flange is inspected prior to delivery to ensure conformance with regard to size and other requirements of the Roplan ABs drawings. A certificate is enclosed with each delivery.

This procedure ensures that the probability of an original fault is very small. Faults that do occur can normally be traced to incorrect handling, welding or fitting.

Roplan ABs experience is that the greatest risk of a fault occurring is deformation in connection with welding the flange into the gable end of the vessel.

To minimise the risk of faults occurring after delivery from Roplan AB it is essential that this welding guide is studied and that only properly trained and experienced personnel are employed in the welding operations.

For other countries than Sweden, please make sure that the relevant standards for that country are complied with.

The purpose of this manual is to avoid deformation of the Steriflange due to release of tension forces in the gable.

This manual should only be regarded as an aid in the welding work and not override the legal obligations.

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2. General

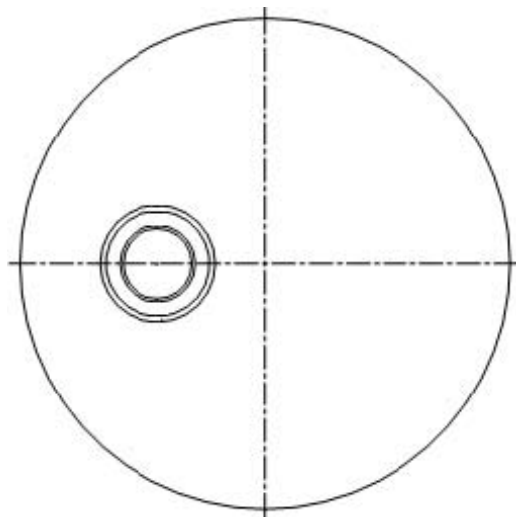
The Steriflange may be welded into the vessel before it's welded together. It can also be welded in an already finished vessel.

It is vital that all other welding on the lower gable end is completed before making a hole for the flange. Examples of such welding that may be required are bottom outlet valves, connection adapters for sensors and sample ports etc.

3. Positioning and Orientation of Steriflange

3.1 Orientation of Steriflange

In order to connect pipe, etc. into the Steriflange, ensure that no other equipment will be in conflict with the assembled parts. Also make sure that there's enough space to mount/dismount the locking ring.



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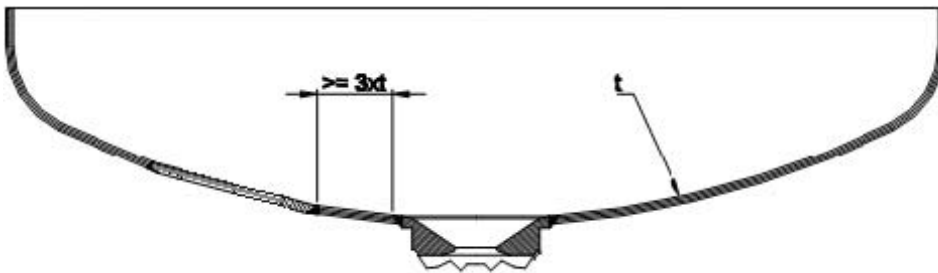
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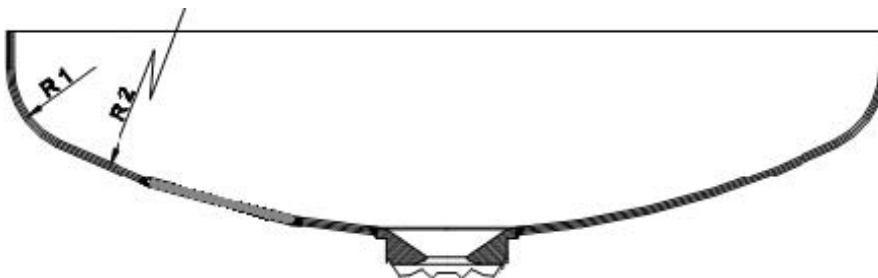
3.2 *Distance between Welds*

The smallest permissible distance between the weld seam of a flange and any other weld is three times the thickness of the material of the gable end, $3 \times t$, according to the 1987 Swedish standards for pressure vessels, TKN 87.



3.3 *Distance from Outer Edge*

The flange must be positioned in such a way that no part of its weld lies outside the large radius $R2$, see figure. Welding inside the small radius $R1$ is not permitted, according to TKN 1987.



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4. Optimum Alignment of Steriflange®

Since the Steriflange shall be welded into a gable. Make sure that it will be welded flush with the inner surface.

5. Making and Preparation of Hole in the Gable

1. Measure the outer diameter of the Steriflange.
2. Mark out the measured diameter on the outside of the lower gable end.
3. Cut a hole with the aid of a plasma cutter, following the marked size on the gable end.
4. Prepare a suitable weld gap between the gable end and the flange by grinding the edge of the hole. This weld groove should be kept as small as possible. The flange can be used as a template.
5. Prepare the hole for welding by grinding a 45° angle, sloping outwards, see the figure below. A straight edge about 2 mm should be left towards the inside of the vessel.

6. Welding (TIG), tack welding the Steriflange

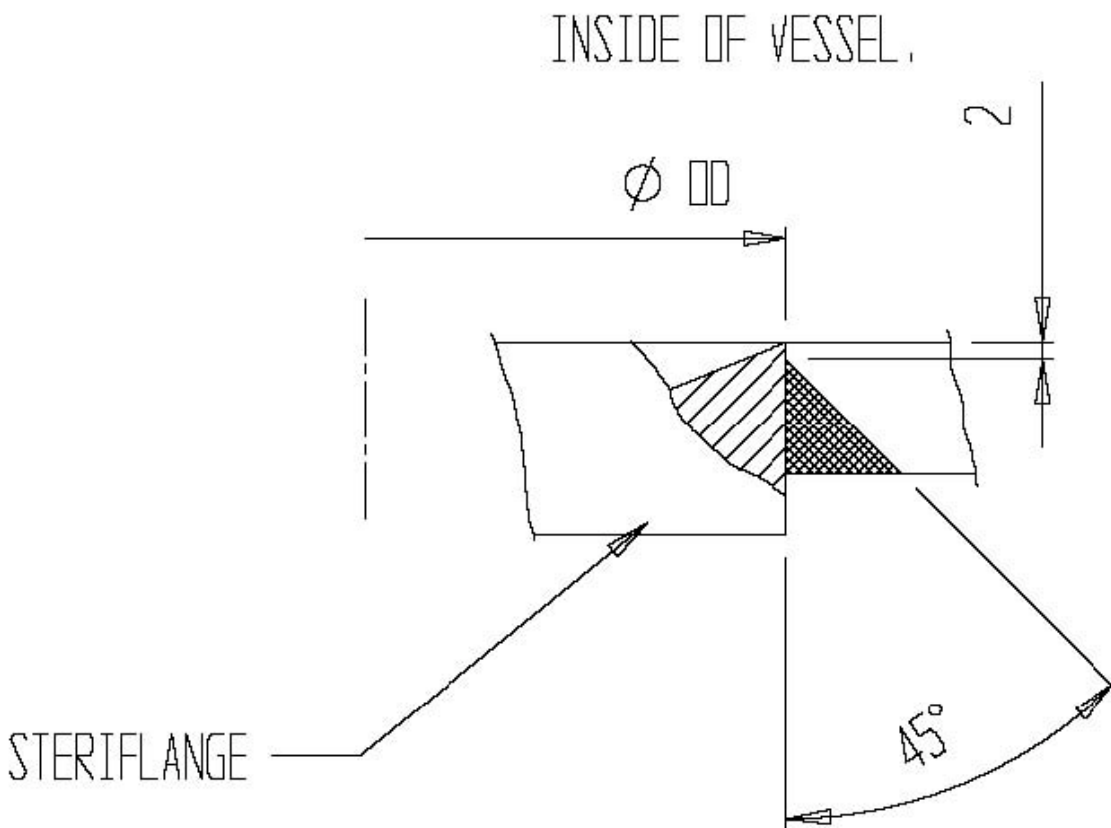
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IMPORTANT !

Allow the gable and the flange to cool slowly on completion of welding.
No cooling medium, other than air has to be used.

1. Check that stamped charge number on the Steriflange is identical to the number on certificate.
2. Position the flange in the hole so that the inner surface is flush with the inner gable surface.
3. Tack weld the flange with a TIG welder at two points on the inside, (point 1 and point 2 in the figure below). The correct filler depends on the material in the gable and flange. For a gable and flange of 316L filler Avesta 316L (SKR), 316L-Si/SKR-Si or similar is recommended.

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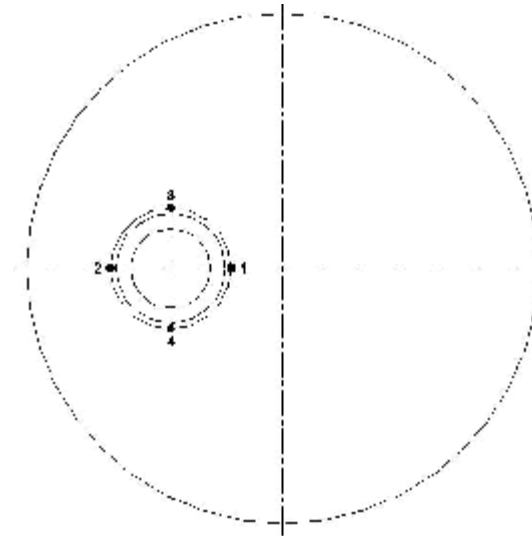
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4. Check how the flange is fitted, it must lie flush with the inside of the lower gable end.
5. Tack weld the flange at two more points from the inside (3 and 4 in accordance with the below figure).



6. Turn over the gable and place it on a flat bench. Seal it between the bench and gable end with the aid of tape etc. Fill the gable end with argon gas. It will normally take about 3 or 4 minutes to replace the air with the inert argon gas. Keep a certain gas flowing during the welding.
7. Tack weld the flange from the outside. The sequence 5-16 as shown in the figure below is followed.

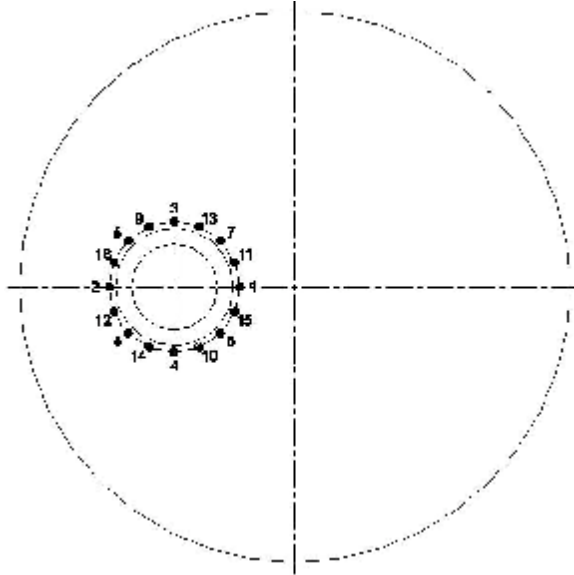
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7. Final Welding

IMPORTANT !

Allow the gable and the flange to cool slowly on completion of welding.
No cooling medium, other than air has to be used.

The final welding starts nearest to the centre of the gable. It should be welded continuously from point 1 to point 2 (along path A as shown in the figure below). A 1,0 mm wire and welding current should be used when welding a 5 mm thick gable. The filler material should be the same as that used previously.

Welding should be done without interruption. The second half of the circle from point 1 to point 2 but along path B is now welded. Otherwise the same as above.

The welding is finished with the same procedure as above from point 1 to point 2 (but along path A), from 1 to 2 (along path B), from 1 to 2 (along path A), from 1 to 2 (along path B)..... until the weld ditch is filled.

The gable should be inverted again and welded from the inside to even out the weld joint. A TIG qualified welder must be used throughout for welding.

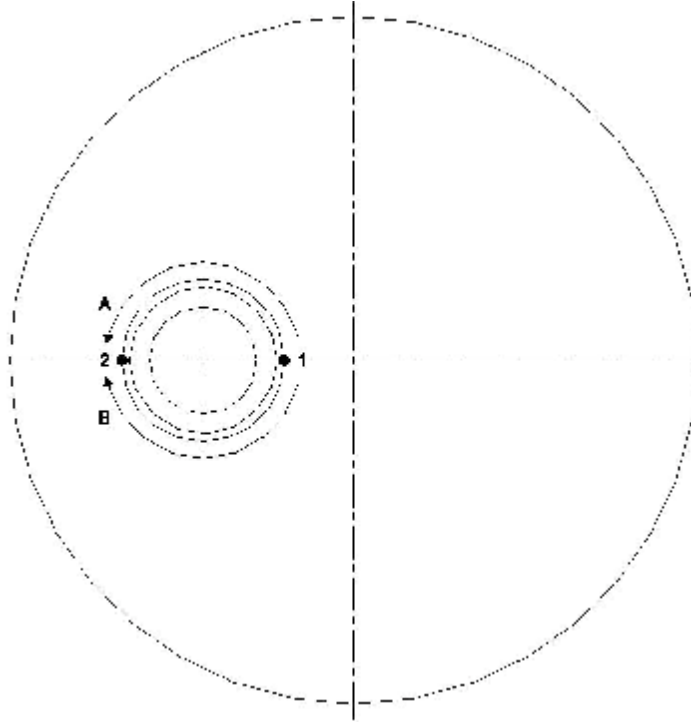
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8. After Welding

1. Allow the gable and the flange to cool slowly on completion of welding. No cooling medium, other than air has to be used.
2. Grind and polish the inside and outside of the weld to the required finish.

Steriflange® is a registered trademark.

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