

WELDING RECOMMENDATION

NEUMO BioControl® & BioConnect®- block flanges



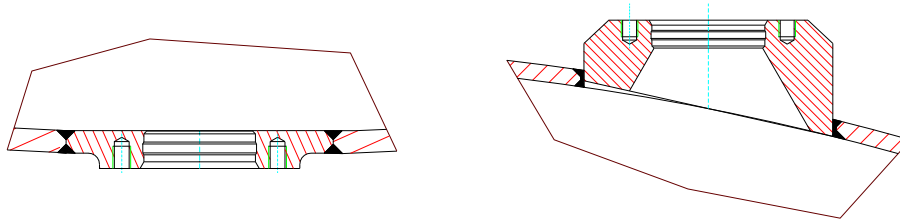
Fig. 1: BioControl® block flange with weld collar



Fig. 2: BioControl® solid block flange



Fig. 3: BioControl® solid block flange, high design



REMARK

Welding block flanges without a weld collar into bases/sheets is critical in terms of the flatness of the flat/sealing surfaces. The distortion caused by the heat of welding makes it particularly difficult to seal internal sealing systems. The absence of a weld collar also causes conical shrinkage of the inner diameter.

The aim is to shift the welding heat into an elastic range and to keep the block flange stable with suitable coolants. Typically, the weld collar is prefabricated with a diameter of +30-40 mm to the block flange. In the case of solid block flanges (Figs. 2 and 3), acceptable dimensional accuracy of the inner bores, flat surfaces, and sealing grooves can be achieved even without a weld collar. The welding recommendation described below applies equally to all designs. For statically loaded connections (< 10,000 load cycles/service life according to DIN 18 800 T1 1990) or with $\kappa \geq +0.5$, a partial connection as shown in Fig. 1 should be agreed with the user in order to introduce less welding heat into the connection.

RESULTS

After welding, dimensional deviations of +0.1–0.3 mm were measured for the inner bore and a deviation of < 0.05–0.1 mm from the original dimensions was measured for the flat surface relative to the inner diameter.

WELDING RECOMMENDATION

Preparation:

Sheet thickness 8–15 mm

Welded collar connection dimension \cong sheet thickness

Seam preparation according to DIN EN 22 553

Full connection with DV seam or D-HV seam – web height 2 mm, weld gap 1.5–2 mm

The block flange to be welded is clamped between two cooling plates/flanges made of high-strength material (e.g., AL F28-32, s] 20 mm). Before installation, the cooling plates must be coated with thermal paste on the contact surfaces. The center of the block flange must be flooded with running water without pressure. A small amount of water is sufficient for this. The cooling flange is sealed against the block flange by means of an O-ring. With low static water pressure and flat flange surfaces, the thermal paste is sufficient as a sealant.

The diameter of the cooling flange must be brought to within approx. 10 mm of the weld on the flat side (inside of the container). The flat surface of the block flange with threaded connections should be cooled over its entire diameter. Water cooling is required throughout the entire welding process.

PROCESS TIG-MANUAL WELDING

- a) First, the block flange is secured by alternating tack welding (Fig. 4).

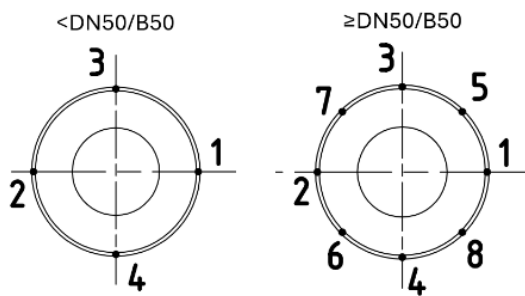


Fig. 4: Tack welding

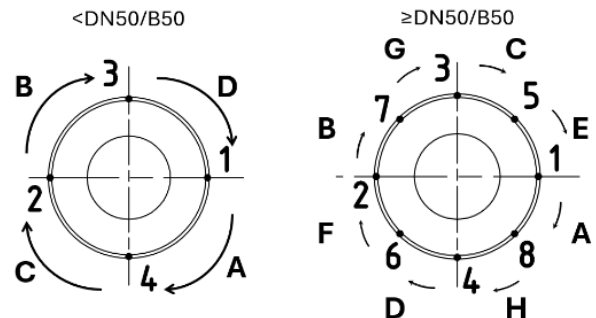


Fig. 5: Root layer

- b) Next, a root layer is pre-welded alternately using the pilgrim step method (Fig. 5). Continuous cooling must be ensured during this process.
- c) After closing the root layer, the fill / cover pass is completed on both sides using the pilgrim step method (Fig. 5). The opposite side of the welding zone is continuously cooled during the welding process.
- d) For material thickness > 8 mm, additional layers may be necessary. Here too, each layer is additionally cooled on the opposite side during the welding process.

NOTES

- ◆ When welding material 1.4435 BN2 Delta Ferrite < 3%, due to the high tendency to crack, especially when setting short tack welds with a length < 5 mm, care must be taken to ensure that these tack welds are ground down before overlay welding.
- ◆ When grinding the weld seams, care must be taken to ensure that little heat is applied. In our experience, excessive grinding heat can release stress from the weld seam, which can cause additional distortion of up to 0.5 mm.
- ◆ Attempts to weld using the WP keyhole process, single-layer 8 mm in the I-joint, or to create the connection with s= 12 mm using three-layer welding, produced negative results due to conical distortion and significantly greater dimensional deviations.
- ◆ The aforementioned welding method transfers the shrinkage stress of the welded joint to the sheet metal area and the weld metal itself. Therefore, in individual cases, there is a possibility that the surrounding sheet metal will warp and dent in the area of the weld.
- ◆ The welded block flanges must not be reworked or polished. The marking is located on the circumference of the block flange. The flat surface of the block flange with threaded connections serves as a metal stop for the counter flange. Mechanical reworking may prevent the O-ring from being pressed in correctly.
- ◆ No warranty claims can be asserted against NEUMO GmbH + Co. KG if these welding instructions are derived from and applied by welders who do not belong to NEUMO GmbH + Co. KG. However, the use of the welding recommendation and the findings mentioned in the preliminary remarks is optional.