General Overview

This document should be referred to as a guide during inspection of any Powermaster Marine all rubber TBMS seal. This procedure should be used in conjunction with any other inspection standard referenced on the DJ and item Drawing.

TBMS Seal Profile

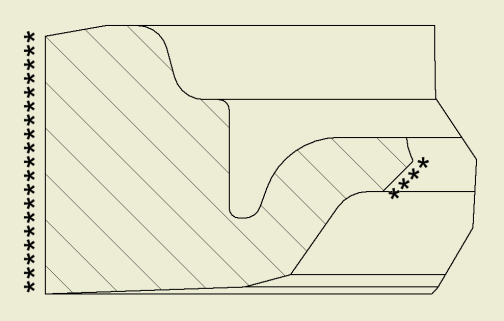

Image 1: Section drawing of Powermaster Marine TBMS seal showing critical sealing areas

Seal and Join Inspection Procedure

Caution: Do not inspect the joins by wrapping around the Ø300mm test mandrel – this will over stress the joins.

Caution: Seals should not be coiled into more than 3 loops at any time. There is a significant risk that the joins will be stressed when un-coiling more than 3 loops.

For TBMS seals supplied to Powermaster Marine, each join should be labelled and inspected and photographed as demonstrated in Figure(s) 1-7

Seals shall be fitted into a housing, Ref: JWC-PD-210070, Rotthe Erde 3.6M Check Housing with a 32mm section

Once the check is complete the seal shall be removed and the next adjacent circumferential length of the seal placed in the mould and the check repeated. This should continue until the entire circumference of the seal has been checked.

Image 2: TBMS Seal fitted into housing JWC-PD-210070

A feeler gauge (0.0015”) should be used along the length of the seal in the housing to search for any gaps between the back of the seal and OD of the housing.

Image 3: Examination with feeler gauge

Smallest feeler gauge (0.0015”)should not be able to fit between seal back and the housing by more than 1-2mm

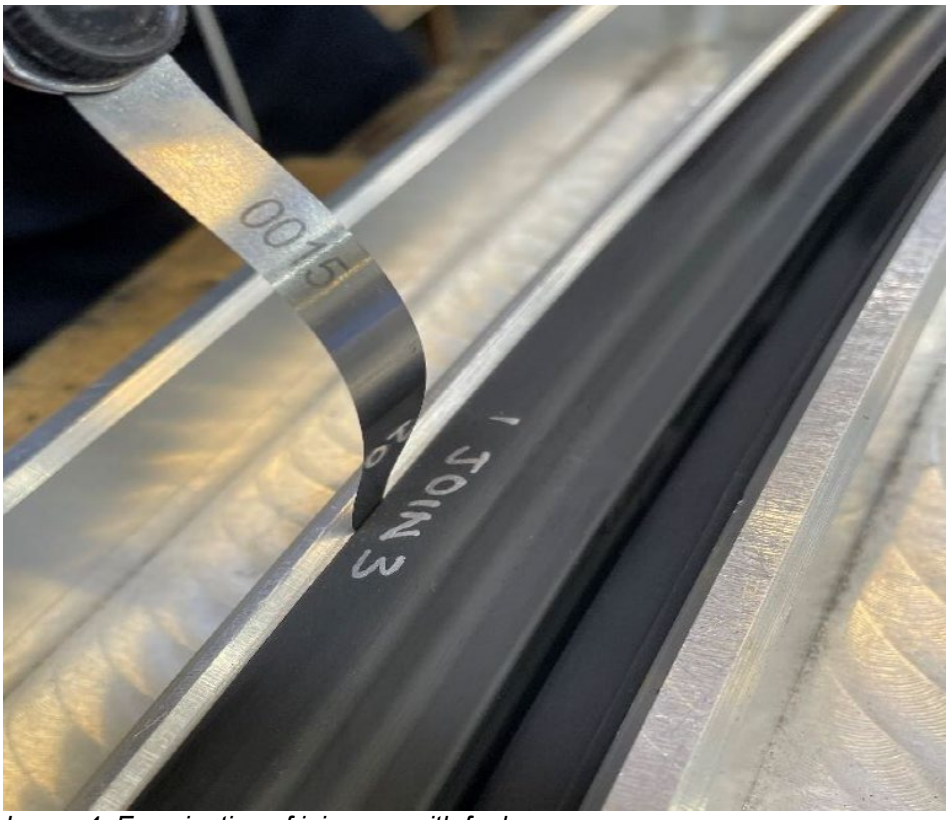

Image 4: Examination of join area with feeler gauge

The seal should be fitted into a 32mm housing and a feeler gauge should be used to inspect for gaps between the seal back and the housing. At no point should the feeler gauge be able to pass between the back of the seal and the housing for more than a couple of mm.

The critical sealing areas are the underside of the seal lip and the seal back (Figure 1) close up photographs should be taken of these areas as demonstrated in Figure
5 and figure 6.

Examples of good joins and the photos that should be taken and recorded with the order

Image 5: Photo of join at seal back

Image 6: Photo of join at seal lip (underside)

Examples of unacceptable join quality both in free state and in housing, Ref: JWC-PD-210070

Image 7 Unacceptable join quality, seal in free state

The previously supplied seals had a clear dip in the back and the lip at the join. Photo taken by the customer

Image 8 Unacceptable join quality, seal fitted in Rothe Erde Housing

When fitted into the housing (without the shaft) the seal back clearly pulled away from the housing. This gap was reduced when the shaft was fitted, however a leak was still found in these locations.