Common Problems
Loss of pumping efficiency caused by:
- Leakage due to wear.
- Leakage due to bi-metallic corrosion.

Set-up
All work should be carried out in strict accordance with the relevant Belzona® Instructions For Use.
Belzona® product selection should be made on the basis of the extent and cause of the damage and the operating conditions of the equipment.

Where forming techniques are employed, shim new wearing rings and bushes on to the rotating element of the pump, in order to ensure concentricity and correct alignment of the repair.

Alternatively, “dummy” wearing rings and bushes can be manufactured with internal diameters giving “push fit” location on to rotating parts (fig. 1).

Fig. 1

Preparation
a) Forming Technique
Mount all forming parts (wearing rings/bushes) on to the rotating element of the pump, together with the shaft bearings (fig. 1). Apply two coats of Belzona® 9411 to the entire surface of this assembly.
Thoroughly roughen the wearing ring/bush locations by either grit blasting to Swedish Standard S2½ (near white metal finish) with a minimum profile of 3 mils (75 microns) using an angular grit, or by rough grinding.
Where equipment is operating in an aggressive corrosive solution e.g. salt water, please refer to Section 1 of the Belzona® Instructions For Use.

b) Machining Techniques
Undercut the location areas by a minimum of 1/16 in. (1.6 mm) below the deepest area of damage, leaving a rough thread pattern over the surface.

Application
Mix the selected Belzona® material.

a) Forming Wearing Ring/Bush Locations
Wet out all prepared surfaces, including all forming surfaces, by applying a thin film of Belzona® material, taking care to push the material well into roughened profiles.

Apply a further layer of Belzona® material on to the wearing ring/bush seatings allowing the material to form a peak along the centre line (fig. 3).

Immediately lower the rotating element of the pump into position (correct height and alignment will be ensured by the correctly mounted and positioned bearings) and remove all excess Belzona® material which exudes from beneath the forming surfaces.

Allow the Belzona® material to fully cure before removing the formers and dressing the repair.

Normally, the bottom half casing is repaired first then the top half casing. When positioning the top half casing, shims must be placed either on the split flange or under the bearings in order to account for any gaskets which will be present on final assembly.

b) Rebuilding Wearing Ring/Bush Locations using Machining Techniques
Using a suitable applicator, apply mixed Belzona® material in a thin film, pushing it well into the rough thread pattern.

Apply further layers of Belzona® material in excess to give a machining allowance of a minimum 1/8 in. (3 mm).
Allow to cure before machining down.

Machining Recommendations
Surface cutting speed 150 ft/min (45 m/min)
Maximum Feed rate - for roughing 25 thou/rev (1 mm/rev)
- for finishing 10 thou/rev (0.25 mm/rev)

Tool Carbide tipped
Top rake 3°
Side clearance 3°
Front clearance 3°
Comments Cut dry
c) Bonding of Wear Resistant Rings and Sleeves
Where new casing wearing ring seats are to be bonded in position, apply mixed Belzona® material to the prepared surfaces and bring them together, ensuring correct position, and that any excess material exuded is removed immediately.

After the specified curing period, peg the inserted ring and machine to achieve correct alignment and tolerance (fig. 2).
BELZONA KNOW-HOW FOR REFORMING/RESEATING WEAR RINGS, BUSHES, BEARINGS, AND GLAND HOUSINGS

Belzona® Technical Comparison:

<table>
<thead>
<tr>
<th>Product</th>
<th>Consistency</th>
<th>Erosion/Corrosion Resistance</th>
<th>Working Life at 60°F (15°C)</th>
<th>Full Mechanical Cure at 60°F (15°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belzona® 1111</td>
<td>Paste</td>
<td>Good</td>
<td>25 minutes</td>
<td>36 hours</td>
</tr>
<tr>
<td>Belzona® 1121</td>
<td>Paste</td>
<td>Medium</td>
<td>60 minutes</td>
<td>72 hours</td>
</tr>
<tr>
<td>Belzona® 1311</td>
<td>Paste</td>
<td>Very Good</td>
<td>25 minutes</td>
<td>36 hours</td>
</tr>
</tbody>
</table>

Belzona® System Selector:

<table>
<thead>
<tr>
<th>Main System Requirement</th>
<th>Belzona® 1111</th>
<th>Belzona® 1121</th>
<th>Belzona® 1311</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebuilding using machining techniques</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large areas requiring extended working time</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Reseating using forming techniques where maximum erosion-corrosion resistance is required</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Recommended Equipment:

Mixing and application tools are included in each pack of Belzona®. Prior to carrying out the repair, however, it is important that all other necessary tools and equipment are available on site. Every situation will be somewhat different, but the basic requirements could include those shown to the right.

- Grit Blasting Equipment
- Grinding / Rotary File Equipment
- Machining Equipment with Carbide Tipped Tools
- New Casing Wearing Rings
- Dummy Wearing Rings/Bushes
- Belzona® 9111
- Belzona® 9411
- Suitable Protective Clothing/Equipment
- Shaped Applicator
- Hardened Steel Inserts

For more complete technical information, please refer to the appropriate Belzona Product Specification Sheet. For detailed instructions on surface preparation, mixing and curing, please refer to the appropriate Belzona Instructions For Use. Comprehensive Health and Safety Information is provided with the product. For more information, please contact your local Belzona representative.

The technical data contained herein is based on the results of long term tests carried out in our laboratories and to the best of our knowledge is true and accurate on the date of publication. It is however subject to change without prior notice and the user should contact Belzona to verify the technical data is correct before specifying or ordering. No guarantee of accuracy is given or implied. We assume no responsibility for rates of coverage, performance or injury resulting from use. Liability, if any, is limited to the replacement of products. No other warranty or guarantee of any kind is made by Belzona, express or implied, whether statutory, by operation of law or otherwise, including merchantability or fitness for a particular purpose.

Nothing in the foregoing statement shall exclude or limit any liability of Belzona to the extent such liability cannot by law be excluded or limited.

Copyright © 2011 Belzona International Limited.

www.belzona.com