GENERAL INFORMATION

Product Description:
A two Component System applied by Brush, Injection, or Spray for Protection of Metallic and Non-Metallic Surfaces operating under Immersion Conditions in contact with Aqueous Solutions. Also used as a structural adhesive for bonding or for creation of irregular load bearing shims with good electrical insulation characteristics. For use in Original Equipment Manufacture or repair situations.

Application Areas:
When mixed and applied as detailed in the Belzona Instructions for Use (IFU), the system is ideally suited for application to the following:

- Cooling tower pans
- Submersible pumps
- Effluent tanks and channels
- Marine buoys
- Storage tanks
- Water boxes
- Manholes
- Internal and external pipework
- Steel and concrete piling
- Water inlet screens
- Chemical containment areas
- Sludge digesters
- Buried pipework and structures

APPLICATION INFORMATION

Working Life
Will vary according to temperature. At 68°F (20°C) the usable life of mixed material is 1 hour 45 minutes.

Coverage Rate
The Belzona 5811 should be applied in 2 coats to achieve a minimum thickness of 16 mils (400 microns).
The theoretical coverage rate at 16 mils (400 microns) is 27ft² (2.5m²)/liter.
Refer to the Instructions for Use for practical coverage rate guidelines.

Cure Time
Allow to solidify for the times shown in the Belzona IFU before subjecting it to the conditions indicated.

Base Component
- Appearance: Viscous liquid
- Color: Black, Beige or Grey
- Density: 1.67 - 1.71 g/cm³

Solidifier Component
- Appearance: Clear mobile liquid
- Color: Dark brown
- Density: 1.00 - 1.04 g/cm³

Mixed Properties
- Mixing Ratio by Weight (Base : Solidifier) 5 : 1
- Mixing Ratio by Volume (Base : Solidifier) 3 : 1
- Mixed Density 1.46 - 1.50 g/cm³
- VOC content (ASTM D2369/EPA ref. 24) 2.16%/32.0 g/L

The above application information serves as introductory guide only. For full application details including the recommended application procedure/technique, refer to the Belzona IFU which is enclosed with each packaged product.
ADHESION

Tensile Shear
When tested in accordance with ASTM D1002, using metal substrates, grit blasted to a 3-4 mil (75-100 micron) profile, typical values will be:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>2,470 psi (17.0 MPa)</td>
<td>2,530 psi (17.4 MPa)</td>
<td>2,700 psi (18.6 MPa)</td>
</tr>
<tr>
<td>Brass</td>
<td>2,870 psi (19.8 MPa)</td>
<td>2,920 psi (20.1 MPa)</td>
<td>3,020 psi (20.8 MPa)</td>
</tr>
<tr>
<td>Mild steel</td>
<td>2,840 psi (19.9 MPa)</td>
<td>3,590 psi (24.7 MPa)</td>
<td>3,880 psi (26.7 MPa)</td>
</tr>
<tr>
<td>Copper</td>
<td>2,590 psi (17.8 MPa)</td>
<td>2,280 psi (15.7 MPa)</td>
<td>2,570 psi (17.7 MPa)</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>2,670 psi (18.4 MPa)</td>
<td>3,070 psi (21.2 MPa)</td>
<td>4,080 psi (28.1 MPa)</td>
</tr>
</tbody>
</table>

Pull Off Adhesion
When tested in accordance with ASTM D 4541/ ISO 4624, the pull off strength from grit blasted steel will be typically:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>4,430 psi (30.5 MPa)</td>
<td>4,800 psi (33.1 MPa)</td>
<td></td>
</tr>
</tbody>
</table>

CHEMICAL RESISTANCE

The material will demonstrate excellent resistance to a broad range of chemicals. For a more detailed description of chemical resistance properties, refer to relevant Chemical Resistance chart.

ELECTRICAL PROPERTIES

Dielectric Strength
When tested in accordance with ASTM D149, method A, with voltage rise of 2kV/s, typical values will be: 48.7 kV/mm

Dielectric Constant
When tested in accordance with ASTM D150 typical values obtained will be: 2.82

Surface Resistivity
When tested in accordance with ASTM D257 typical values obtained will be: 4402 Mohm

COMPRRESSIVE STRENGTH

Compressive yield strength
When tested in accordance with ASTM D695, typical values obtained will be:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>6,200 psi (42.7 MPa)</td>
<td>6,600 psi (45.5 MPa)</td>
<td>6,900 psi (47.8 MPa)</td>
</tr>
</tbody>
</table>

FLEXURAL PROPERTIES

Flexural Strength
When tested to ASTM D790 typical values obtained will be:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>4,860 psi (33.5 MPa)</td>
<td>7,190 psi (49.6 MPa)</td>
<td>7,630 psi (52.6 MPa)</td>
</tr>
</tbody>
</table>

Flexural Modulus
When tested to ASTM D790 typical values obtained will be:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>2.8 x 10^6 psi (1930 MPa)</td>
<td>3.4 x 10^6 psi (2344 MPa)</td>
<td>3.9 x 10^6 psi (2689 MPa)</td>
</tr>
</tbody>
</table>

HARDNESS

Shore D
When tested to ASTM D2240 the Shore D hardness is typically:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>81</td>
<td>84</td>
<td>87</td>
</tr>
</tbody>
</table>

Koenig Pendulum
When tested to ISO 1522 the Koenig damping time of the coating is typically:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>107 seconds</td>
<td>118 seconds</td>
<td>142 seconds</td>
</tr>
</tbody>
</table>

Barcol
When tested to ASTM D2583 the hardness using a Barcol impressor, Model No. 935 will typically be:

<table>
<thead>
<tr>
<th>Material</th>
<th>7 days at 72°F (22°C)</th>
<th>28 days at 72°F (22°C)</th>
<th>4 hours at 212°F (100°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>71</td>
<td>77</td>
<td>81</td>
</tr>
</tbody>
</table>

HEAT RESISTANCE

Heat Resistance
For many typical applications the material is suitable for continuous immersion in aqueous solutions up to 122°F (50°C). Please consult Belzona TKL for additional advice where immersed applications will operate close to 122°F (50°C).

Dry Heat Resistance
The indicated degradation temperature in air based on Differential Scanning Calorimetry (DSC) operated in accordance with ISO11357 is typically 320 °F (160°C). For many applications, the product is suitable down to -40°F (-40°C)

CORROSION PROTECTION

Cathodic Disbondment
When tested in accordance with ASTM G8 the disbondment diameter is typically: 0.18 in (4.5 mm) at 73°F (23°C)
**WARRANTY**

Belzona guarantees this product will meet the performance claims stated herein when material is stored and used as instructed in the Belzona Information For Use leaflet. Belzona further guarantees that all its products are carefully manufactured to ensure the highest quality possible and tested strictly in accordance with universally recognized standards (ASTM, ANSI, BS, DIN, ISO etc.). Since Belzona has no control over the use of the product described herein, no warranty for any application can be given.

**AVAILABILITY AND COST**

Belzona 5811 is available from a network of Belzona Distributors throughout the world for prompt delivery to the application site. For information, consult the Belzona Distributor in your area.

**HEALTH AND SAFETY**

Prior to using this material, please consult the relevant Safety Data Sheets.

**TECHNICAL SERVICE**

Complete technical assistance is available and includes fully trained Technical Consultants, technical service personnel and fully staffed research, development and quality control laboratories.

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**IMPACT STRENGTH**

The Izod impact strength (notched) of the material when tested in accordance with ASTM D256 is typically:

- 3.71 ft/lb/in² (7.8 KJ/m²) 7 days at 72°F (22°C)
- 2.66 ft/lb/in² (5.6 KJ/m²) 28 days at 72°F (22°C)
- 2.28 ft/lb/in² (4.8 KJ/m²) 4 hours at 212°F (100°C)

**TENSILE PROPERTIES**

When determined in accordance with ASTM D638, typical values will be:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>3250 psi (22.41 MPa)</td>
<td>7 days at 72°F (22°C)</td>
</tr>
<tr>
<td>(Maximum)</td>
<td>4187 psi (28.87 MPa)</td>
<td>28 days at 72°F (22°C)</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>1703 psi (11.71 MPa)</td>
<td>7 days at 72°F (22°C)</td>
</tr>
<tr>
<td>(Yield)</td>
<td>3261 psi (22.48 MPa)</td>
<td>28 days at 72°F (22°C)</td>
</tr>
<tr>
<td>Elongation</td>
<td>1.1%</td>
<td>7 days at 72°F (22°C)</td>
</tr>
<tr>
<td></td>
<td>1.7%</td>
<td>28 days at 72°F (22°C)</td>
</tr>
<tr>
<td>Young's Modulus</td>
<td>2.5 x 10⁶ psi (1724 MPa)</td>
<td>7 days at 72°F (22°C)</td>
</tr>
<tr>
<td></td>
<td>3.4 x 10⁶ psi (2344 MPa)</td>
<td>28 days at 72°F (22°C)</td>
</tr>
</tbody>
</table>

**IMMERSION RESISTANCE**

- **Atlas Cell**
  
  When tested in accordance with NACE TM 0174 the coating will exhibit no rusting (ASTM D610 rating 10) or blistering (ASTM D714 rating 10) after 6 months immersion in de-ionized water at 104°F (40°C) or 4 months at 122°F (50°C).

- **Seawater Immersion**

  When tested in accordance with ISO 2812-2, no blistering, rusting, cracking or delamination was observed after 6 months immersion in seawater at 122°F (50°C).

**SHELF LIFE**

Separate base and solidifier components shall have a shelf life of 5 years from date of manufacture when stored in their original unopened containers between 32°F (0°C) and 86°F (30°C).

Belzona products are manufactured under an ISO 9001 Registered Quality Management System.