PRODUCT SPECIFICATION SHEET
BELZONA 5811 (IMMERSION GRADE)
FN10159

GENERAL INFORMATION

Product Description:
A two-component and solvent-free coating system for protecting metallic and non-metallic substrates operating under immersion with chemical resistance to a broad range of aqueous solutions, also used as structural adhesive for bonding or for creating irregular load bearing shims with acceptable electrical insulation characteristics, and for use in Original Equipment Manufacturer (OEM) 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 parts,
- Submersible pumps
- Effluent tanks and channels
- Water inlet screens and boxes
- Chemical containment areas
- Marine buoys
- Storage tanks
- Manholes
- Internal and external piping, pipeline, and pipework
- Buried piping and structures
- Sludge digesters

APPLICATION INFORMATION

Application Methods: Brush, roller, squeegee, injection, airless spray

Application Temperature: The application should ideally occur from 50 °F to 86 °F (10 °C to 30 °C).

Working Life: The working life will vary according to application temperature. The usable life of mixed material will typically be 1 hour and 45 minutes at 68 °F (20 °C). Consult the Belzona IFU for specific details.

Coverage Rate: Belzona 5811 should be applied in 2 coats to achieve a minimum thickness of 16 mil (400 µm). The theoretical coverage rate of Belzona 5811 is 27 ft^2/L (2.5 m^2/L) at 16 mil (400 µm). Refer to the IFU for practical coverage rate guidelines.

Cure Times:
Cure times will vary depending on the ambient conditions. Consult the Belzona IFU for specific details.

Base Component

Appearance	Viscous liquid
Color	Black, beige, grey, green, or red
Viscosity at 70 °F (21 °C)	144.4 P
Density	1.61 – 1.71g/cm^3

Solidifier Component

Appearance	Clear mobile liquid
Color	Dark brown
Viscosity at 70 °F (21 °C)	13.82 P
Density	1.00 -1.04 g/cm^3

Mixed Properties

Mixing Ratio by Weight (Base: Solidifier)	5: 1
Mixing Ratio by Volume (Base: Solidifier)	3: 1
Mixed Form	Viscous liquid
Mixed Viscosity at 70 °F (21 °C)	101.6 P
Mixed Density	1.46 – 1.50 g/cm^3
Sag Resistance	> 20 mil (500 µm)
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.

PRODUCT SPECIFICATION SHEET
BELZONA 5811 (IMMERSION GRADE)
FN10159

ADHESION

Tensile Shear
When tested in accordance with ASTM D1002, the tensile shear of Belzona 5811 applied onto metallic samples abrasive-blasted to an average surface profile of 3 mil (75 µm) and cured under the conditions stated below will typically be:

Aluminum substrate	
2,470 psi (17.0 MPa)	72 °F (22 °C) for 7 days
2,530 psi (17.4 MPa)	72 °F (22 °C) for 28 days
2,700 psi (18.6 MPa)	212 °F (100 °C) for 4 hours
Brass	
2,870 psi (19.8 MPa)	72 °F (22 °C) for 7 days
2,920 psi (20.1 MPa)	72 °F (22 °C) for 28 days
3,020 psi (20.8 MPa)	212 °F (100 °C) for 4 hours
Copper	
2,590 psi (17.8 MPa)	72 °F (22 °C) for 7 days
2,280 psi (15.7 MPa)	72 °F (22 °C) for 28 days
2,570 psi (17.7 MPa)	212°F (100 °C) for 4 hours
Mild Steel	
2,840 psi (19.9 MPa)	72 °F (22 °C) for 7 days
3,590 psi (24.7 MPa)	72 °F (22 °C) for 28 days
3,880 psi (26.7 MPa)	212 °F (100 °C) for 4 hours
Stainless Steel	
2,670 psi (18.4 MPa)	72 °F (22 °C) for 7 days
3,070 psi (21.2 MPa)	72 °F (22 °C) for 28 days
4,080 psi (28.1 MPa)	212 °F (100 °C) for 4 hours

Pull Off Adhesion
When tested in accordance with ASTM D4541/ISO 4624, the pull-off adhesion of Belzona 5811 applied onto metallic samples abrasive-blasted to an average surface profile of 3 mil (75 µm) and cured under the conditions stated below will typically be:

4,430 psi (30.5 MPa)	72 °F (22 °C) for 7 days
4,800 psi (33.1 MPa)	72 °F (22 °C) for 28 days

CHEMICAL ANALYSIS

Belzona 5811 has been independently analyzed for halogens, heavy metals, and other corrosion-causing impurities in accordance with ASTM E165, ASTM D4327, and ASTM E1479. Typical results are displayed as follows:

ANALYTE	TOTAL CONCENTRATION (ppm)
Fluoride	343
Chloride	1,973
Bromide	ND (<11)
Sulfur	12,747
Nitrite	3
Nitrate	5
Arsenic	ND (<3)
Antimony	65.4
Bismuth	3.5
Cadmium, Gallium, Indium, Lead, Mercury, Silver, Tin, Zinc	ND (<3)

ND: Not detected

CHEMICAL RESISTANCE

When fully cured, 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.

COMPRESSIVE PROPERTIES

Compressive Strength
When tested in accordance with ASTM D695, the compressive strength of samples cured under the conditions stated below will typically be:

6,200 psi (42.7 MPa)	72 °F (22 °C) for 7 days
6,600 psi (45.5 MPa)	72 °F (22 °C) for 28 days
6,900 psi (47.6 MPa)	212 °F (100 °C) for 4 hours

CORROSION RESISTANCE

Cathodic Disbondment
When tested in accordance with ASTM G8 - Method B (impressed current system) at 72 °F (22 °C), the equivalent circle diameter (ECD) of cured samples of Belzona 5811 will typically be 0.35 in. (9.0 mm).

ELECTRICAL PROPERTIES

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

Dielectric Constant
When tested in accordance with ASTM D150, typical values of dielectric constant will be 2.82.

Surface Resistivity
When tested in accordance with ASTM D257, typical values of surface resistivity will be 4.4 x 10^9 Ω/sq.

FLEXIBILITY

When tested in accordance with NACE SP0394 Section H4.2 “The Mandrel Bend”, coated pipe bands conditioned at 0 °F (-18 °C) and bent over a 2” mandrel for 1 hour showed no cracks, tears, or disbonding of the coating.

PRODUCT SPECIFICATION SHEET
BELZONA 5811 (IMMERSION GRADE)
FN10159

FLEXURAL PROPERTIES

Flexural Strength
When tested in accordance with ASTM D790, the flexural strength of samples cured under the conditions stated below will typically be:

4,860 psi (33.5 MPa)	72 °F (22 °C) for 7 days
7,190 psi (49.6 MPa)	72 °F (22 °C) for 28 days
7,630 psi (52.6 MPa)	212 °F (100 °C) for 4 hours

Flexural Modulus
When tested in accordance with ASTM D790, the flexural modulus of samples cured under the conditions stated below will typically be:

2.8 x 10^5 psi (1.9 GPa)	72 °F (22 °C) for 7 days
3.4 x 10^5 psi (2.3 GPa)	72 °F (22 °C) for 28 days
3.9 x 10^5 psi (2.7 GPa)	212 °F (100 °C) for 4 hours

HARDNESS

Barcol
When tested in accordance with ASTM D2583 and using a Barcol impressor Model No. 935, the hardness of samples cured under the conditions stated below will typically be:

71	72 °F (22 °C) for 7 days
77	72 °F (22 °C) for 28 days
81	212 °F (100 °C) for 4 hours

Koenig Pendulum
When tested in accordance with ISO 1522, the Koenig damping time of samples cured under the conditions stated below will typically be:

107 s	72 °F (22 °C) for 7 days
118 s	72 °F (22 °C) for 28 days
142 s	212 °F (100 °C) for 4 hours

Shore D
When tested in accordance with ASTM D2240, the Shore D hardness of samples cured under the conditions stated below will typically be:

81	72 °F (22 °C) for 7 days
84	72 °F (22 °C) for 28 days
87	212 °F (100 °C) for 4 hours

HEAT RESISTANCE

Glass Transition Temperature (T_g)
When tested to ISO 11357-2, T_g of samples cured at 72 °F (22 °C) for 7 days will typically be:

113 °F (45 °C)

Atlas Cell Cold-Wall Immersion Test
When tested in accordance with NACE TM 0174-Procedure A, the coating will exhibit no rusting (ASTM D610 rating 10) or blistering (ASTM D714 rating 10) after 6-month immersion in de-ionized water at 104 °F (40 °C).

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

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

Dry Heat Resistance
The indicated degradation temperature in air based on Differential Scanning Calorimetry (DSC) operated in accordance with ISO 11357 is typically 320 °F (160 °C). The material will typically be stable under dry conditions at low temperatures down to -40 °F (-40 °C).

IMPACT RESISTANCE

Izod Pendulum
When tested in accordance with ASTM D256, the impact (un-notched) resistance of samples cured under the conditions stated below will typically be:

3.71 ft-lb/in^2 (7.8 kJ/m^2)	72 °F (22 °C) for 7 days
2.66 ft-lb/in^2 (5.6 kJ/m^2)	72 °F (22 °C) for 28 days
2.28 ft-lb/in^2 (4.8 kJ/m^2)	212 °F (100 °C) for 4 hours

SHEAR PROPERTIES

When determined in accordance with ASTM D5379, typical V-notched shear values of samples cured and tested at temperatures stated below will be:

Temp. (Cure/Test)	Shear Strength	Shear Modulus
72 °F (22 °C)	2,650 psi (18.3 MPa)	1.3 x 10^5 psi (896 MPa)
122 °F (50 °C)	2,030 psi (14.0 MPa)	1.0 x 10^4 psi (69.0 MPa)

PRODUCT SPECIFICATION SHEET
BELZONA 5811 (IMMERSION GRADE)
FN10159

TENSILE PROPERTIES

When determined in accordance with ASTM D638, typical values of samples cured and tested at temperatures stated below will be:

Temp. (Cure/Test)	Ultimate Tensile Strength	Young's Modulus	Elongation	Poisson's Ratio
72 °F (22 °C)	3,730 psi (25.7 MPa)	4.1 x 10^5 psi (2.8 GPa)	1.37%	0.19
122 °F (50 °C)	472 psi (3.75 MPa)	4.51 x 10^4 psi (311 MPa)	1.96%	0.20

APPROVALS

American Bureau of Shipping

Belzona 5811 holds "Product Type Approval" by ABS under certificate numbers 22-2219786-PDA and 22-2219786-PDA-DUP.

Contact Belzona for more details on these approvals or any other approvals or certifications not stated herein.

SHELF LIFE

Separate base and solidifier components shall have a shelf life of five (5) years from date of manufacture when stored in their original unopened containers between 41 °F (5 °C) and 86 °F (30 °C).

PRODUCT SPECIFICATION SHEET
BELZONA 5811 (IMMERSION GRADE)
FN10159

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 (IFU) 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 Material Safety Data Sheets.

MANUFACTURER/SUPPLIER

Belzona Polymerics Limited
Claro Road
Harrogate HG1 4DS
United Kingdom

Belzona, Inc.
14300 NW 60th Ave,
Miami Lakes, FL, 33014, USA

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.

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