

# PRODUCT SPECIFICATION SHEET

## BELZONA 1981

FN10168



### GENERAL INFORMATION

#### Product Description:

**Belzona 1981** is a low temperature, fast curing resin system for use with **Belzona 9381** reinforcing fabric in the SuperWrap II composite repair system. The system can be applied at a minimum temperature of 41°F/5°C and has a maximum service temperature of up to 140°F/60°C. The SuperWrap II composite repair system is suitable for thin-wall and through-wall defects on Class 1 water systems, Class 2 safety critical systems, Class 3 hydrocarbon systems and storage tank walls. It complies with ASME PCC2 Article 4.1 and ISO 24817.

#### 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:

- Pipelines and piping of various geometries
- Pipework including flanges, valves, nozzles and instrumentation
- Tanks side walls and roofs
- Support pads, saddles and attachments
- Existing repairs on pipes including metallic plates, clamps or patches
- Pressure vessels

### APPLICATION INFORMATION

#### Application Methods

Applicator, Brush, Roller, Rubber Squeegee.

#### Application Temperature

Ensure a minimum cure temperature of 41°F/5°C. Application temperatures above 68°F/20°C should be avoided due to the reactive nature of the resin.

#### Coverage Rate

**Belzona 1981** resin shall be applied to fully saturate the **Belzona 9381** fabric as indicated by translucency of glass fibres on the composite fabric. Consult the Belzona IFU for specific coverage rate details.

#### Cure Time

Cure times will vary depending on the ambient conditions; consult the Belzona IFU for specific details.

#### Base Component

Appearance	Clear Liquid
Colour	Colourless
Viscosity (BS 5350-B8)	14.5 - 16.5 poise at 77°F (25°C)
Density	1.16 - 1.20 g/cm <sup>3</sup>

#### Solidifier Component

Appearance	Clear Liquid
Colour	Blue
Viscosity (BS 5350-B8)	1.0 - 2.0 poise at 77°F (25°C)
Density	1.01 - 1.05 g/cm <sup>3</sup>

#### Mixed Properties

Appearance	Clear Liquid
Colour	Blue
Viscosity (BS 5350-B8)	7.4 - 9.4 poise at 77°F (25°C)
Density	1.12 - 1.16 g/cm <sup>3</sup>
Time to Peak Exotherm at 68°F (20°C)	12 - 26 minutes
Peak Exotherm Temperature	392 - 446°F (200 - 230°C)
VOC content (ASTM D2369 / EPA ref. 24)	0.32% / 3.63 g/L

#### Mix Ratio

2.5 : 1 (PBV) and 2.9 : 1 (PBW)

#### Working Life

The working life will vary according to the temperature. At 68°F/20°C, the working life of mixed material will typically be 18 minutes. Consult the Belzona IFU for specific details.

*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.*

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### ADHESION

#### Pull Off Adhesion

The PosiTest Dolly Pull Off Strength on 10mm thick grit blasted mild steel, as determined in accordance with ASTM D4541 and ISO 4624, will typically be:

5520 psi / 38.1 MPa (68°F/20°C cure & test)

#### Tensile Shear Adhesion

The Tensile Shear Adhesion on grit blasted mild steel, as determined in accordance with EN 1465, will typically be:

Cure (Test) temperature	Tensile Shear Adhesion
68°F/20°C (68°F/20°C)	2241 psi / 15.5 MPa
140°F/60°C (68°F/20°C)	1856 psi / 12.8 MPa
140°F/60°C (140°F/60°C)	1972 psi / 13.6 MPa

#### Tensile Shear Adhesion (Immersion) - Grit Blasted (SSPC-SP10)

The Tensile Shear Adhesion on grit blasted mild steel, as determined in accordance with EN 1465 measured after 1000 hours immersion in water at the below temperature and tested at 68°F/20°C will typically be:

Cure temperature	Immersion temperature	Tensile Shear Adhesion
68°F/20°C	140°F/60°C	2133 psi / 14.7 MPa
104°F/40°C	104°F/40°C	2246 psi / 15.5 MPa
140°F/60°C	140°F/60°C	2293 psi / 15.8 MPa

#### Tensile Shear Adhesion (Immersion) - Power-tool clean (SSPC-SP11)

The Tensile Shear Adhesion on SSPC-SP11 prepared mild steel, as determined in accordance with EN 1465 measured after 1000 hours immersion in water at the below temperature and tested at 68°F/20°C will typically be:

Cure temperature	Immersion temperature	Tensile Shear Adhesion
68°F/20°C	140°F/60°C	823 psi / 5.7 MPa
140°F/60°C	140°F/60°C	684 psi / 4.7 MPa

### CORROSION PROTECTION

#### Cathodic Disbondment

When tested in accordance with ASTM G8-96 at 74°F/23°C, no coating disbondment was observed.

### FLEXURAL PROPERTIES

When determined in accordance with ASTM D790 (68°F/20°C cure & 68°F/20°C test), typical values for the **Belzona 1981 / Belzona 9381** composite will be

**Flexural Strength (0° axis - hoop)** 95.48 x 10<sup>3</sup> psi / 658 MPa  
**Flexural Strength (90° axis - axial)** 24.05 x 10<sup>3</sup> psi / 166 MPa

**Flexural Modulus (0° axis - hoop)** 55.07 x 10<sup>5</sup> psi / 37977 MPa  
**Flexural Modulus (90° axis - axial)** 20.66 x 10<sup>5</sup> psi / 14247 MPa

### GAS PERMEABILITY

#### Carbon Dioxide Permeability

When applied at a thickness of 5.4 mm and tested in accordance with ASTM D1434-82 at 23°C (73°F), **Belzona SuperWrap II System (Belzona 1981 resin)** would typically achieve:

6.7 ml/m<sup>2</sup>.atm.day.

### HARDNESS

#### Shore D

When determined in accordance with ISO 868, the typical Shore D hardness value for the **Belzona 1981 / Belzona 9381** composite will be:

90 (68°F/20°C cure & test)

#### Barcol Hardness

The Barcol hardness, when determined in accordance with ASTM D2583, will typically be:

	Ambient cure (68°F/20°C)	Post cure (140°F/60°C)
<b>Barcol 934-1</b>	35	53
<b>Barcol 935</b>	87	92

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### HEAT RESISTANCE

The glass transition temperature (T<sub>g</sub>) when determined in accordance with ISO 11357, typical values for the **Belzona 1981** cured resin will be:

Cure temperature	T <sub>g</sub>
41°F/5°C	102°F/39°C
50°F/10°C	109°F/43°C
68°F/20°C	127°F/53°C
104°F/40°C	165°F/74°C
140°F/60°C	194°F/90°C

#### Service temperature

When used as a composite repair system the maximum service temperature is 140°F (60°C). Once fully cured the system is suitable down to -76°F (-60°C).

### IMPACT RESISTANCE

#### Izod Pendulum

Izod impact strength, when determined in accordance with ASTM D256, will typically be:

	Reversed notched Izod Impact Strength	Un-notched Izod Impact Strength
68°F/20°C cure & test	13.5 KJ/m <sup>2</sup>	12.5 KJ/m <sup>2</sup>
140°F/60°C cure & 68°F/20°C test	21.3 KJ/m <sup>2</sup>	236.4 J/m

### SHEAR PROPERTIES

When determined in accordance with ASTM D5379, typical shear modulus value will be:

Unreinforced (**Belzona 1981** resin-only)

3.99 x 10<sup>5</sup> psi / 2751 MPa (68°F/20°C cure & test)

Reinforced (**Belzona 1981 / Belzona 9381**)

11.35 x 10<sup>5</sup> psi / 7830 MPa (68°F/20°C cure & test)

### TENSILE PROPERTIES

When determined in accordance with ASTM D3039 (68°F/20°C cure & 68°F/20°C test), typical values for the **Belzona 1981 / Belzona 9381** composite will be:

Tensile Strength (0° axis - hoop)	75.98 x 10 <sup>3</sup> psi / 524 Mpa
Tensile Strength (90° axis - axial)	18.27 x 10 <sup>3</sup> psi / 126 Mpa
Poisson's Ratio (0° axis - hoop)	0.26
Poisson's Ratio (90° axis - axial)	0.27
Young's Modulus (0° axis - hoop)	56.26 x 10 <sup>5</sup> psi / 38800 MPa
Young's Modulus (90° axis - axial)	26.54 x 10 <sup>5</sup> psi / 18300 MPa
Strain to Failure (0° axis - hoop)	1.37 %
Strain to Failure (90° axis - axial)	0.81 %

### THERMAL PROPERTIES

When determined in accordance with ISO 11359, typical values of the **Belzona 1981 / Belzona 9381** composite will be:

Coefficient of Thermal Expansion (0° axis - hoop)	9.44 x 10 <sup>-6</sup> mm/mm°C
Coefficient of Thermal Expansion (90° axis - axial)	12.96 x 10 <sup>-6</sup> mm/mm°C

### SHELF LIFE

Separate base and solidifier components shall have a shelf life of 3 years from date of manufacture when stored in their original unopened containers between 41°F (5°C) and 86°F (30°C).

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### WARRANTY

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 ensures that all its products are carefully manufactured to ensure the highest quality possible and are 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 1981** 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.

### MANUFACTURER / SUPPLIER

Belzona Limited,  
Claro Road, Harrogate,  
HG1 4DS, UK

Belzona Inc.  
14300 NW 60<sup>th</sup> Ave,  
Miami Lakes, FL, 33014, USA

### 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.

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.

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