PRODUCT SPECIFICATION SHEET
BELZONA 1983
FN10170

BELZONA®
Repair • Protect • Improve

GENERAL INFORMATION

Product Description:
Belzona 1983 is a high temperature 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 302°F/150°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.

Coverage Rate
Belzona 1983 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)	9.0 - 11.0 poise at 77°F (25°C)
Density	1.14 - 1.18 g/cm³

Solidifier Component

Appearance	Clear Liquid
Colour	Amber
Viscosity (BS 5350-B8)	7.5 - 9.5 poise at 77°F (25°C)
Density	0.97 - 1.01 g/cm³

Mixed Properties

Appearance	Clear Liquid
Colour	Amber
Viscosity (BS 5350-B8)	13.8 - 15.8 poise at 77°F (25°C)
Density	1.09 - 1.13 g/cm³
Time to Peak Exotherm at 68°F (20°C) / 50g	58 - 72 minutes
Peak Exotherm Temperature (50g)	297 - 351°F (147 - 177°C)
VOC content (ASTM D2369 / EPA ref. 24)	0.20% / 2.22 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 30 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.

PRODUCT SPECIFICATION SHEET
BELZONA 1983
FN10170

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:

4290 psi / 29.60 MPa	(68°F/20°C cure & test)
4910 psi / 33.90 MPa	(140°F/60°C cure & 68°F/20°C test)
4140 psi / 28.50 MPa	(212°F/100°C cure & 68°F/20°C test)
4250 psi / 29.30 MPa	(302°F/150°C cure & 68°F/20°C 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)	2550 psi / 17.60 MPa
140°F/60°C (68°F/20°C)	2380 psi / 16.40 MPa
140°F/60°C (140°F/60°C)	2230 psi / 15.40 MPa
212°F/100°C (68°F/20°C)	1740 psi / 12.00 MPa
212°F/100°C (212°F/100°C)	1520 psi / 10.50 MPa
302°F/150°C (68°F/20°C)	1620 psi / 11.20 MPa
302°F/150°C (302°F/150°C)	1080 psi / 7.50 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	194°F/90°C	1847 psi / 12.7 MPa
194°F/90°C	194°F/90°C	2018 psi / 13.9 MPa
248°F/120°C	248°F/120°C	2180 psi / 15.0 MPa
302°F/150°C	302°F/150°C	2047 psi / 14.1 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	194°F/90°C	1072 psi / 7.4 MPa
194°F/90°C	194°F/90°C	647 psi / 4.5 MPa
248°F/120°C	248°F/120°C	1239 psi / 8.5 MPa
302°F/150°C	302°F/150°C	667 psi / 4.6 MPa

CORROSION PROTECTION

Cathodic Disbondment
When tested in accordance with ASTM G42-11 at 140°F/60°C, no coating disbondment was observed.

FLEXURAL PROPERTIES

When determined in accordance with ASTM D790 typical values for the **Belzona 1983 / Belzona 9381** composite will be:

68°F/20°C cure	
Flexural Strength (0° axis - hoop)	76.58 x 10^3 psi / 528 MPa
Flexural Strength (90° axis - axial)	33.65 x 10^3 psi / 232 MPa
302°F/150°C cure	
Flexural Strength (0° axis - hoop)	67.59 x 10^3 psi / 466 MPa
Flexural Strength (90° axis - axial)	23.93 x 10^3 psi / 165 MPa
68°F/20°C cure	
Flexural Modulus (0° axis - hoop)	46.85 x 10^5 psi / 32300 MPa
Flexural Modulus (90° axis - axial)	26.25 x 10^5 psi / 18100 MPa
302°F/150°C cure	
Flexural Modulus (0° axis - hoop)	44.38 x 10^5 psi / 30600 MPa
Flexural Modulus (90° axis - axial)	19.73 x 10^5 psi / 13600 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^2.atm.day.

HARDNESS

Shore D
When determined in accordance with ISO 868, the typical Shore D hardness value for the **Belzona 1983 / Belzona 9381** composite will be:

91	(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 (302°F/150°C)
Barcol 934-1	30	57
Barcol 935	87	93

PRODUCT SPECIFICATION SHEET
BELZONA 1983
FN10170

BELZONA® Repair • Protect • Improve

HEAT RESISTANCE

The glass transition temperature (Tg) when determined in accordance with ISO 11357, typical values for the **Belzona 1983** cured resin will be:

Cure temperature	Tg
41°F/5°C	99°F/37°C
50°F/10°C	115°F/46°C
68°F/20°C	133°F/56°C
86°F/30°C	145°F/63°C
122°F/50°C	189°F/87°C
158°F/70°C	228°F/109°C
194°F/90°C	262°F/128°C
230°F/110°C	306°F/152°C
266°F/130°C	325°F/163°C
302°F/150°C	370°F/188°C

Service temperature
When used as a composite repair system the maximum service temperature is 302°F/150°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	22.0 KJ/m²	16.9 KJ/m²
	224.0 J/m	218.4 J/m
302°F/150°C cure & 68°F/20°C test	7.9 KJ/m²	2.5 KJ/m²
	80.0 J/m	32.9 J/m

SHEAR PROPERTIES

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

Unreinforced (**Belzona 1983** resin-only)

2.88 x 10^5 psi / 1983 MPa (68°F/20°C cure & test)
3.15 x 10^5 psi / 2171 MPa (302°F/150°C cure & 68°F/20°C test)

Reinforced (**Belzona 1983 / Belzona 9381**)

10.02 x 10^5 psi / 6910 MPa (68°F/20°C cure & test)
10.44 x 10^5 psi / 7200 MPa (302°F/150°C cure & 68°F/20°C test)

TENSILE PROPERTIES

When determined in accordance with ASTM D3039 typical values for the **Belzona 1983 / Belzona 9381** composite will be:

68°F/20°C cure
Tensile Strength (0° axis - hoop) 65.70 x 10^3 psi / 453 Mpa
Tensile Strength (90° axis- axial) 20.16 x 10^3 psi / 139 Mpa

302°F/150°C cure
Tensile Strength (0° axis - hoop) 66.86 x 10^3 psi / 461 Mpa
Tensile Strength (90° axis- axial) 15.81 x 10^3 psi / 109 Mpa

68°F/20°C cure
Poisson's Ratio (0° axis - hoop) 0.26
Poisson's Ratio (90° axis - axial) 0.24

302°F/150°C cure
Poisson's Ratio (0° axis - hoop) 0.25
Poisson's Ratio (90° axis - axial) 0.14

68°F/20°C cure
Young's Modulus (0° axis - hoop) 52.50 x 10^5 psi / 36.2 GPa
Young's Modulus (90° axis - axial) 23.64 x 10^5 psi / 16.3 GPa

302°F/150°C cure
Young's Modulus (0° axis - hoop) 53.52 x 10^5 psi / 36.9 GPa
Young's Modulus (90° axis - axial) 23.06 x 10^5 psi / 15.9 GPa

68°F/20°C cure
Strain to Failure (0° axis - hoop) 1.29 %
Strain to Failure (90° axis - axial) 1.22 %

302°F/150°C cure
Strain to Failure (0° axis - hoop) 1.28 %
Strain to Failure (90° axis - axial) 0.72 %

THERMAL PROPERTIES

When determined in accordance with ISO 11359, typical values for the **Belzona 1983 / Belzona 9381** composite will be:

68°F/20°C cure
Coefficient of Thermal Expansion (0° axis - hoop) 9.40 x 10^{-6} mm/mm°C
Coefficient of Thermal Expansion (90° axis - axial) 17.48 x 10^{-6} mm/mm°C

302°F/150°C cure
Coefficient of Thermal Expansion (0° axis - hoop) 5.19 x 10^{-6} mm/mm°C
Coefficient of Thermal Expansion (90° axis - axial) 8.74 x 10^{-6} 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).

PRODUCT SPECIFICATION SHEET
BELZONA 1983
FN10170

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 1983 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 60th 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.

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