PRODUCT SPECIFICATION SHEET
BELZONA 1984
FN10228

BELZONA®
Repair • Protect • Improve

GENERAL INFORMATION

Product Description:
Belzona 1984 is a surface tolerant resin system specifically designed for damp and underwater application and for use with **Belzona 9381** reinforcing fabric in the SuperWrap II composite repair system. The system can be applied at a minimum temperature of 5°C/41°F and has a maximum service temperature of 50°C/122°F.

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, Roller, Rubber Squeegee.

Application Temperature
Ensure a minimum cure temperature of 5°C/41°F.

Coverage Rate
Belzona 1984 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)	17 Poise at 25°C (77°F)
Density	1.16 - 1.20 g/cm³

Solidifier Component

Appearance	Clear Liquid
Colour	Dark Amber
Viscosity (BS 5350-B8)	13 Poise at 25°C (77°F)
Density	0.99 - 1.03 g/cm³

Mixed Properties

Appearance	Clear Liquid
Colour	Amber
Viscosity (BS 5350-B8)	13 Poise at 25°C (77°F)
Density	1.01 - 1.14 g/cm³
Time to Peak Exotherm at 20°C (68°F)/ 50g	100 minutes
Peak Exotherm Temperature (50g)	127°C (261°F)
VOC content (ASTM D2369 / EPA ref. 24)	0.36% / 3.99 g/L

Mix Ratio
1.6 : 1 (PBV) and 1.9 : 1 (PBW)

Working Life
The working life will vary according to the temperature. At 20°C/68°F, the working life of mixed material will typically be 1 hour. 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 mild steel, as determined in accordance with ASTM D4541 and ISO 4624, following a 7 day cure at 20°C/68°F will typically be:

Ground (SSPC-SP11) (ISO 8501-1 St3)	Pull Off Adhesion
Clean & Dry	4,397 psi / 30.31 MPa
Underwater (3.5% Salt Solution)	2,935 psi / 20.24 MPa

Tensile Shear Adhesion
The Tensile Shear Adhesion on mild steel, as determined in accordance with EN 1465, following a 7 day cure at 20°C/68°F will typically be:

Ground (SSPC-SP11) (ISO 8501-1 St3)	Tensile Shear Adhesion
Clean & Dry	1,362 psi / 9.39 MPa
Underwater (Deionised Water)	1,430 psi / 9.86 MPa
Underwater (3.5% Salt Solution)	1,286 psi / 8.87 MPa

Tensile Shear Adhesion (Immersion)
The Tensile Shear Adhesion on mild steel, as determined in accordance with EN 1465 measured after 1,000 hours immersion in water at the below temperature and tested at 20°C/68°F will typically be:

Application/Cure temperature	Immersion temperature	Tensile Shear Adhesion
20°C/68°F	40°C/104°F	1,885 psi / 13.0 MPa
20°C/68°F	50°C/122°F	1,481 psi / 10.21 MPa

CORROSION PROTECTION

Cathodic Disbondment
When tested in accordance with ASTM G8 at 23°C/73°F, no coating disbondment was observed.

FLEXURAL PROPERTIES

When determined in accordance with ASTM D790 typical values for the **Belzona 1984 / Belzona 9381** composite will be:

20°C/68°F cure
Flexural Strength (0° axis - hoop) 81.08 x 10^3 psi / 559 MPa
Flexural Strength (90° axis - axial) 47.86 x 10^3 psi / 330 MPa

20°C/68°F cure
Flexural Modulus (0° axis - hoop) 56.37 x 10^5 psi / 38863 MPa
Flexural Modulus (90° axis - axial) 30.42 x 10^5 psi / 20973 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

When determined in accordance with ISO 868 and ASTM D2583, the typical Shore D and Barcol hardness value for the **Belzona 1984 / Belzona 9381** composite following a 7 day cure will be:

Cure temperature	Shore D	Barcol 935-1
5°C/41°F	80	73
10°C/50°F	80	79
20°C/68°F	82	80
40°C/104°F	82	81
50°C/122°F	83	82

HEAT RESISTANCE

The Heat Distortion (HDT) and Glass Transition Temperature (Tg) when determined in accordance with ASTM D648 and ISO 11357 respectively, typical values for the **Belzona 1984** cured resin will be:

Cure temperature	HDT	Tg
5°C/41°F	31°C/88°F	35°C/95°F
10°C/50°F	38°C/100°F	41°C/106°F
20°C/68°F	47°C/117°F	50°C/122°F
30°C/86°F	58°C/136°F	62°C/144°F
40°C/104°F	67°C/153°F	73°C/163°F
50°C/122°F	74°C/165°F	81°C/178°F

Service temperature
When used as a composite repair system the maximum service temperature is 50°C/122°F. Once fully cured the system is suitable down to -60°C (-76°F).

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TENSILE PROPERTIES

When determined in accordance with ASTM D3039 typical values for the **Belzona 1984 / Belzona 9381** composite will be:

20°C/68°F cure	
Tensile Strength (0° axis - hoop)	71.07 x 10^3 psi / 490 MPa
Tensile Strength (90° axis- axial)	21.90 x 10^3 psi / 151 MPa
20°C/68°F cure	
Poisson's Ratio (0° axis - hoop)	0.304
Poisson's Ratio (90° axis - axial)	0.097
20°C/68°F cure	
Young's Modulus (0° axis - hoop)	48.30 x 10^5 psi / 33.3 GPa
Young's Modulus (90° axis - axial)	36.84 x 10^5 psi / 25.4 GPa
20°C/68°F cure	
Strain to Failure (0° axis - hoop)	1.40 %
Strain to Failure (90° axis - axial)	0.70 %

THERMAL PROPERTIES

When determined in accordance with ISO 11359, typical values for the **Belzona 1984 / Belzona 9381** composite will be:

20°C/68°F cure	
Coefficient of Thermal Expansion (0° axis - hoop)	10.00 x 10^{-6} mm/mm°C
Coefficient of Thermal Expansion (90° axis - axial)	**28**.00 x 10^{-6} mm/mm°C

SHEAR PROPERTIES

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

Unreinforced (**Belzona 1984** resin-only)

3.74 x 10^5 psi / 2,579 MPa (20°C/68°F cure & test)

Reinforced (**Belzona 1984 / Belzona 9381**)

19.09 x 10^5 psi / 13,165 MPa (20°C/68°F cure & test)

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 5°C (41°F) and 30°C (86°F).

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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 1984 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