PRODUCT SPECIFICATION SHEET
BELZONA 1161
FN10185

GENERAL INFORMATION

Product Description:
Two component, surface tolerant, paste grade system for repairing and rebuilding machinery and equipment. Based on a silicon steel alloy blended with high molecular weight reactive polymers and oligomers. Ideal for use as a high strength structural bonding adhesive or for the creation of irregular load bearing shims.

Application Areas:
When mixed and applied as detailed in the Belzona Instructions for Use (IFU), the system is ideally suited for application to damp and oil contaminated surfaces. In addition, the material can be applied underwater.

APPLICATION INFORMATION

Application Methods
Plastic applicator and spatula

Application Temperature
Application should ideally occur in the following ambient temperature range: 41°F/5°C to 104°F/40°C

Volume Capacity
The volume capacity of mixed material is 428 cm^3 (26.1 in^3)/kg.

Cure Time
Cure times will vary depending on the ambient conditions and application thickness. Consult the Belzona IFU for specific details.

Working Life
The working life will vary according to temperature. At 68°F/20°C, the usable life of mixed material will typically be 16 minutes, consult the Belzona IFU for specific details.

Base Component

Colour:	Dark Grey
Form:	Paste
Density:	2.80 g/cm^3
Gel Strength (HF paddle):	>150 g/cm

Solidifier Component

Colour:	Light Grey
Form:	Paste
Density:	1.40 g/cm^3
Gel Strength (QV paddle):	90 g/cm

Mixed Properties

Mixing Ratio by Weight (Base : Solidifier)	4 : 1
Mixing Ratio by Volume (Base : Solidifier)	2 : 1
Colour:	Grey
Mixed Form:	Paste
Mixed Density:	2.34 g/cm^3
Slump Resistance:	>0.5 in / >12.7 mm
VOC (ASTM D2369):	0.10 % / 2.39 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.

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ADHESION

Cleavage Adhesion
The Cleavage Adhesion on mild steel substrates, as determined in accordance with ASTM D1062, following a 7 day cure at 68°F/20°C, will typically be:

	Cleavage Adhesion	Failure Mode
Grit Blasted (SSPC-SP10) (ISO 8501-1 Sa2.5)	1810 pli / 317 N/mm	Cohesive
Ground (SSPC-SP11) (ISO 8501-1 St3)	1751 pli / 306 N/mm	Cohesive

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 68°F/20°C, will typically be:

Substrate	Grit Blasted (SSPC-SP10) (ISO 8501-1 Sa2.5)	Ground (SSPC-SP11) (ISO 8501-1 St3)
Clean & Dry	5036 psi / 34.7 MPa	5183 psi / 35.8 MPa
Transformer Oil	3603 psi / 24.9 MPa	4459 psi / 30.8 MPa
Wet	2035 psi / 14.0 MPa	3426 psi / 26.6 MPa
Underwater	1873 psi / 12.9 MPa	2588 psi / 17.9 MPa

Tensile Shear Adhesion
The Tensile Shear Adhesion on mild steel substrates, as determined in accordance with ASTM D1002, following a 7 day cure at 68°F/20°C, will typically be:

Substrate	Grit Blasted (SSPC-SP10) (ISO 8501-1 Sa2.5)	Ground (SSPC-SP11) (ISO 8501-1 St3)
Clean & Dry	3007 psi / 20.7 MPa	2130 psi / 14.7 MPa
Transformer Oil	2735 psi / 18.9 MPa	2256 psi / 15.6 MPa
Wet	2284 psi / 15.8 MPa	1869 psi / 12.9 MPa
Underwater	1982 psi / 13.7 MPa	1574 psi / 10.9 MPa

The Tensile Shear Adhesion on various metal substrates, as determined in accordance with ASTM D1002, following a 7 day cure at 68°F/20°C, will typically be:

Substrate	Grit Blasted (SSPC-SP10) (ISO 8501-1 Sa2.5)	Ground (SSPC-SP11) (ISO 8501-1 St3)
Aluminum	1391 psi / 9.6 MPa	1340 psi / 9.2 MPa
Brass	2122 psi / 14.6 MPa	1849 psi / 12.8 MPa
Copper	1862 psi / 12.8 MPa	1544 psi / 10.6 MPa
Stainless Steel	2187 psi / 15.1 MPa	1685 psi / 11.6 MPa

ABRASION

Taber
When determined in accordance with ASTM D4060 using a 1kg load, the sliding Taber abrasion resistance will typically be:

Dry (CS17 Wheels)
43 mm^3 loss per 1000 cycles (7 day cure at 68°F/20°C)

Wet (H10 Wheels)
712 mm^3 loss per 1000 cycles (7 day cure at 68°F/20°C)

COMPRESSIVE PROPERTIES

When determined in accordance with ASTM D695, typical values will be:

Compressive Strength (Maximum)
9949 psi / 68.6 MPa (24 hour cure at 68°F/20°C)
12007 psi / 82.8 MPa (7 day cure at 68°F/20°C)
15343 psi / 105.8 MPa (7 day post cure at 194°F/90°C)

Compressive Strength (Yield)
7690 psi / 53.0 MPa (24 hour cure at 68°F/20°C)
9459 psi / 65.2 MPa (7 day cure at 68°F/20°C)
10745 psi / 74.1 MPa (7 day post cure at 194°F/90°C)

Compressive Modulus
1.60 x 10^5 psi / 1104 MPa (24 hour cure at 68°F/20°C)
1.79 x 10^5 psi / 1237 MPa (7 day cure at 68°F/20°C)
1.87 x 10^5 psi / 1287 MPa (7 day post cure at 194°F/90°C)

ELECTRICAL PROPERTIES

Dielectric Strength
When tested in accordance with ASTM D149, the dielectric strength will typically be 2.09 kV/mm when tested at 400 V/s.

Dielectric Constant
When tested in accordance with ASTM D150, the dielectric constant will typically be 4.721 when tested at 1 V and 1 kHz.

Dissipation Factor
When tested in accordance with ASTM D150, the dissipation factor will typically be 0.015 when tested at 1 V and 1 kHz.

Surface Resistivity
When tested in accordance with ASTM D257, the surface resistivity will typically be 9.25 x 10^{15} Ω when tested at 500 V DC.

Volume Resistivity
When tested in accordance with ASTM D257, the volume resistivity will typically be 1.62 x 10^{16} Ωcm when tested at 500 V DC.

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BELZONA®
Repair • Protect • Improve

ELONGATION & TENSILE PROPERTIES

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

Tensile Strength (Maximum)

4,463 psi / 30.77 MPa	(24 hour cure at 68°F/20°C)
4,139 psi / 28.54 MPa	(7 day cure at 68°F/20°C)
6,588 psi / 45.42 MPa	(7 day post cure at 194°F/90°C)

Tensile Strength (Yield)

1,384 psi / 9.54 MPa	(24 hour cure at 68°F/20°C)
1,933 psi / 13.33 MPa	(7 day cure at 68°F/20°C)
2,107 psi / 14.53 MPa	(7 day post cure at 194°F/90°C)

Elongation

0.71 %	(24 hour cure at 68°F/20°C)
0.47 %	(7 day cure at 68°F/20°C)
1.01 %	(7 day post cure at 194°F/90°C)

Young's Modulus

9.31 x 10^5 psi / 6,417 MPa	(24 hour cure at 68°F/20°C)
1.06 x 10^6 psi / 7,292 MPa	(7 day cure at 68°F/20°C)
1.08 x 10^6 psi / 7,452 MPa	(7 day post cure at 194°F/90°C)

FLEXURAL PROPERTIES

When determined in accordance with ASTM D790, typical values will be:

Flexural Strength (Maximum)

8793 psi / 60.6 MPa	(24 hour cure at 68°F/20°C)
9361 psi / 64.6 MPa	(7 day cure at 68°F/20°C)
10785 psi / 76.4 MPa	(7 day post cure at 194°F/90°C)

Flexural Strength (Yield)

4434 psi / 30.6 MPa	(24 hour cure at 68°F/20°C)
5571 psi / 38.4 MPa	(7 day cure at 68°F/20°C)
6554 psi / 45.2 MPa	(7 day post cure at 194°F/90°C)

Flexural Modulus

7.28 x 10^5 psi / 5019 MPa	(24 hour cure at 68°F/20°C)
8.45 x 10^5 psi / 5826 MPa	(7 day cure at 68°F/20°C)
8.11 x 10^5 psi / 5594 MPa	(7 day post cure at 194°F/90°C)

GAS PERMEABILITY

Carbon Dioxide Permeability
When applied at a thickness of 5.5 mm and tested in accordance with ASTM D1434-82 at 23°C (73°F), **Belzona 1161** would typically achieve:

11 ml/m^2.atm.day.

HARDNESS

Shore D & Barcol Hardness
The Shore D and Barcol hardness, when determined in accordance with ASTM D2240 and ASTM D2583 respectively, will typically be:

	Shore D	Barcol 934-1	Barcol 935
24 hour cure at 68°F/20°C	83	12	81
7 day cure at 68°F/20°C	84	20	83
7 day post cure at 194°F/90°C	87	22	86

HEAT RESISTANCE

Heat Distortion (HDT)
The HDT when determined in accordance with ASTM D648, will typically be:

Cure	HDT
24hrs at 68°F/20°C	104°F/40°C
7 days at 68°F/20°C	117°F/47°C
7 day post cure at 194°F/90°C	154°F/68°C

Service Temperature Limits
For many typical applications, the product will be suitable for use at the following service temperatures:

Type of Service	Temperature
Lower temperature limit	-40 °C (-40 °F)
Upper temperature limit (dry)	55 °C (131 °F)
Upper temperature limit (wet)	50 °C (122 °F)

Dry Heat Resistance
The indicated degradation temperature in air based on Differential Scanning Calorimetry (DSC) operated in accordance with ISO 11357 is typically 401°F/208°C.

IMPACT RESISTANCE

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

Notched:	3.99 KJ/m^2	(7 day cure at 68°F/20°C)
	6.34 KJ/m^2	(7 day post cure at 194°F/90°C)
Un-notched:	4.98 KJ/m^2	(7 day cure at 68°F/20°C)
	7.70 KJ/m^2	(7 day post cure at 194°F/90°C)

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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).

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 1161 will be 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.

MANUFACTURER / SUPPLIER

Belzona Limited,
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HG1 4DS, UK

Belzona Inc.
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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