PRODUCT SPECIFICATION SHEET
BELZONA 1511
FN10178

GENERAL INFORMATION

Product Description:
A two component high temperature paste grade system for rebuilding metals damaged by erosion-corrosion.
When cured, the material is durable yet fully machinable. The product has been specifically designed for use with Belzona High Temperature coatings. Also used as a high strength structural adhesive for bonding or for creation of irregular load bearing shims with good electrical insulation characteristics. For use in Original Equipment Manufacture or repair situations.

Application Areas:
Rebuilding erosion-corrosion and/or smoothing welds, etc., prior to application of Belzona High Temperature coatings.

APPLICATION INFORMATION

Working Life
Will vary according to temperature. At 68°F (20°C) the usable life of mixed material is 60 minutes.

Application Methods
Spatula/Applicator

Application Temperature
Application should occur in the following ambient temperature range: 50°F/10°C to 104°F/40°C

Cure Time
Cure times before returning to service will vary depending on the ambient conditions and whether overcoated with a Belzona coating. Consult the Belzona IFU for specific details.

Overcoat Time
The maximum overcoat time is 24 hours.

Volume Capacity
23.4in³ (383cm³)/kg.

Base Component	
Appearance	Paste
Colour	Dark grey
Gel strength at 77°F (25°C)	>120 g/cm QH
Density	2.88 – 2.92 g/cm³

Solidifier Component	
Appearance	Paste
Colour	Light grey
Gel strength at 77°F (25°C)	>30 g/cm QV
Density	1.72 – 1.76 g/cm³

Mixed Properties	
Mixing Ratio by Weight (Base : Solidifier)	5 : 1
Mixed Form	Paste
Slump Resistance	nil at 0.5 inch (1.27 cm)
Mixed Density	2.61 g/cm³
VOC content (ASTM D2369 / EPA ref. 24):	0.06% / 1.66g/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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ABRASION

Taber
Dry sliding abrasion resistance, when determined in accordance with ASTM D4060 using CS17 wheels, will typically result in:

12.8 mm^3 loss per 1000 cycles
(212°F/100°C cure & 68°F/20°C test)

Wet sliding abrasion resistance, when determined in accordance with ASTM D4060 using H10 wheels, will typically result in:

591 mm^3 loss per 1000 cycles
(212°F/100°C cure & 68°F/20°C test)

ADHESION

Cleavage Adhesion
The Cleavage Strength when applied to grit blasted mild steel, as determined in accordance with ASTM D1062, will typically be:

1799 pli / 315 N/mm	(68°F/20°C cure & test)
1342 pli / 235 N/mm	(212°F/100°C cure & 68°F/20°C test)
1228 pli / 215 N/mm	(320°F/160°C cure & 68°F/20°C test)
1108 pli / 194 N/mm	(212°F/100°C cure & test)
588 pli / 103 N/mm	(320°F/160°C cure & test)

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:

5180 psi / 35.7 MPa	(68°F/20°C cure)
5160 psi / 35.6 MPa	(212°F/100°C cure)
4700 psi / 32.4 MPa	(320°F/160°C cure)

Tensile Shear Adhesion
The Tensile Shear Adhesion on grit blasted mild steel, as determined in accordance with ASTM D1002, will typically be:

3060 psi / 21.1 MPa	(68°F/20°C cure & test)
2780 psi / 19.2 MPa	(212°F/100°C cure & 68°F/20°C test)
2980 psi / 20.5 MPa	(320°F/160°C cure & 68°F/20°C test)
2400 psi / 16.5 MPa	(212°F/100°C cure & test)
1700 psi / 11.7 MPa	(320°F/160°C cure & test)

CHEMICAL ANALYSIS

The mixed **Belzona 1511** has been independently analysed for halogens, heavy metals, and other corrosion-causing impurities, with the following typical results:

Analyte	Total Concentration (ppm)
Fluoride	333
Chloride	463
Bromide	ND (<23)
Sulphur	7363
Zinc	24.5
Tin	2.2
Antimony, Arsenic, Bismuth, Cadmium, Lead, Silver, Mercury, Gallium and Indium	ND (<2.0)

Analyte	Leachable Concentration (ppm)
Fluoride	2
Chloride	14
Bromide	ND (<6)
Sulphur (S_1)	49
Sulphur (S_2)	57
Nitrite	2
Nitrate	6

ND : Not Detected

COMPRESSIVE PROPERTIES

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

Maximum Compressive Strength

10,490 psi / 72.3 MPa	(68°F/20°C cure & test)
17,570 psi / 121.2 MPa	(212°F/100°C cure & 68°F/20°C test)
18,980 psi / 130.8 MPa	(320°F/160°C cure & 68°F/20°C test)
10,790 psi / 74.4 MPa	(212°F/100°C cure & test)
7,610 psi / 52.2 MPa	(320°F/160°C cure & test)

Compressive Yield Strength

7690 psi / 53.0 MPa	(68°F/20°C cure & test)
10250 psi / 70.7 MPa	(212°F/100°C cure & 68°F/20°C test)
10590 psi / 73.0 MPa	(320°F/160°C cure & 68°F/20°C test)
6380 psi / 44.0 MPa	(212°F/100°C cure & test)
3040 psi / 20.9 MPa	(320°F/160°C cure & test)

Compressive Modulus

$1.69x10^5$ psi / 1170 MPa	(68°F/20°C cure & test)
$1.61x10^5$ psi / 1110 MPa	(212°F/100°C cure & 68°F/20°C test)
$1.58x10^5$ psi / 1090 MPa	(320°F/160°C cure & 68°F/20°C test)
$1.29x10^5$ psi / 890 MPa	(212°F/100°C cure & test)
$0.76x10^5$ psi / 520 MPa	(320°F/160°C cure & test)

CORROSION PROTECTION

Salt Spray
When tested in accordance with ASTM B117, the coating will show no signs of failure after 1000 hours continuous exposure.

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Repair • Protect • Improve

ELONGATION & TENSILE PROPERTIES

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

Tensile Strength

4.463 psi / 30.77 MPa	(68°F/20°C cure & test)
6,641 psi / 45.79 MPa	(212°F/100°C cure & 68°F/20°C test)
3,546 psi / 24.45 MPa	(320°F/160°C cure & 68°F/20°C test)
4,702 psi / 32.42 MPa	(212°F/100°C cure & test)
2,174 psi / 14.99 MPa	(320°F/160°C cure & test)

Elongation

0.50 %	(68°F/20°C cure & test)
0.79 %	(212°F/100°C cure & 68°F/20°C test)
0.41 %	(320°F/160°C cure & 68°F/20°C test)
1.06 %	(212°F/100°C cure & test)

Young's Modulus

$1.02x10^6$ psi / 7,066 MPa	(68°F/20°C cure & test)
$1.06x10^6$ psi / 7,297 MPa	(212°F/100°C cure & 68°F/20°C test)
$9.69x10^5$ psi / 6,683 MPa	(320°F/160°C cure & 68°F/20°C test)
$6.69x10^5$ psi / 4,613 MPa	(212°F/100°C cure & test)
$2.06x10^5$ psi / 1,417 MPa	(320°F/160°C cure & test)

FLEXURAL PROPERTIES

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

Flexural Strength

8840 psi / 61.0 MPa	(68°F/20°C cure & test)
9790 psi / 67.5 MPa	(212°F/100°C cure & 68°F/20°C test)
8760 psi / 60.4 MPa	(320°F/160°C cure & 68°F/20°C test)
7640 psi / 52.7 MPa	(212°F/100°C cure & test)
4310 psi / 29.7 MPa	(320°F/160°C cure & test)

Flexural Modulus

$8.56x10^5$ psi / 5900 MPa	(68°F/20°C cure & test)
$6.69x10^5$ psi / 4610 MPa	(212°F/100°C cure & 68°F/20°C test)
$6.99x10^5$ psi / 4820 MPa	(320°F/160°C cure & 68°F/20°C test)
$4.74x10^5$ psi / 3270 MPa	(212°F/100°C cure & test)
$2.42x10^5$ psi / 1670 MPa	(320°F/160°C cure & test)

HARDNESS

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

	68°F/20°C cure	212°F/100°C cure	320°F/160° C cure
Shore D	84	87	89
Barcol 934-1	22	33	40
Barcol 935	80	83	85

HEAT RESISTANCE

Heat Distortion & Glass Transition Temperature (HDT & T_g)
The HDT and T_g when determined in accordance with ASTM D648 and ISO 11357-2 respectively, following a 7 day cure period, will typically be:

Cure temperature	HDT	T_g
68°F/20°C	127°F/53°C	129°F/54°C
212°F/100°C	268°F/131°C	277°F/136°C
284°F/140°C	333°F/167°C	-
320°F/160°C	356°F/180°C	356°F/180°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)	170 °C (338 °F)
Upper temperature limit (wet)	160 °C (320 °F)

Dry Heat Resistance
The indicated degradation temperature in air based on Differential Scanning Calorimetry (DSC) operated in accordance with ISO11357 is typically 410°F (210°C).

Atlas Cell Cold Wall Immersion Test
When tested in accordance with NACE TM0174 procedure A, **Belzona 1511** at a thickness up to 0.5 in. (12mm) and overcoated with **Belzona 1593** system, will result in no rusting (ASTM D610 rating 10) or blistering (ASTM D714 rating 10) after 6 months continuous immersion in water at 302°F/150°C.

IMPACT RESISTANCE

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

Reverse Notched:	3.5 KJ/m²	(68°F/20°C cure & test)
	5.8 KJ/m²	(212°F/100°C cure & 68°F/20°C test)
	3.9 KJ/m²	(320°F/160°C cure & 68°F/20°C test)
Un-notched:	4.1 KJ/m²	(68°F/20°C cure & test)
	6.6 KJ/m²	(212°F/100°C cure & 68°F/20°C test)
	4.4 KJ/m²	(320°F/160°C cure & 68°F/20°C test)

SHELF LIFE

Separate base and solidifier components shall have a shelf life of 5 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 1511 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.

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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