

PRODUCT SPECIFICATION SHEET

BELZONA 1523

FN10150



GENERAL INFORMATION

Product Description:

Two component, spray applied, high temperature coating, suitable for continuous immersion in aqueous/hydrocarbon systems up to 284°F/140°C. Also suitable for steaming out up to 482°F/250°C.

Exhibits excellent corrosion resistance at elevated temperatures and is resistant to a wide range of chemicals.

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:

- | | | |
|-----------------------------|---------------------------|-----------------|
| - Absorbers | - Evaporators | - Scrubbers |
| - Boiler Feed Water Systems | - Heat Exchangers | - Separators |
| - Condensate Tanks | - Hot Water Vessels | - Slug Catchers |
| - Condensers | - LP & HP Knock-Out Drums | - Storage Tanks |
| - De-aerators | - Pipework | |

APPLICATION INFORMATION

Application Methods

Heated Airless Spray (single component, plural component, spin spray)

Application Temperature

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

Coverage Rate

Belzona 1523 shall be applied in two coats to give a minimum thickness of 20 mils (500 microns).

At a thickness of 20 mils/500 µm, the theoretical coverage rate will be 2 m²/L.

Cure Time

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

Mixed Properties

Colour:	Light Green or Light Grey
Density:	1.62 g/cm ³
Viscosity (BS 5350-B8):	55-70 Poise (77°F/25°C) & 10-20 Poise (104°F/40°C)
Gel Time (BS 5350-B5):	80-120 minutes (68°F/20°C)
Sag Resistance (BS 5350-B9):	>30 mils/>750 µm
60° Specular Gloss (ASTM D2457):	70 - 80 Gloss Units
VOC content (ASTM D2369 / EPA ref. 24):	1.05% / 16.99 g/L

Mixing Ratio by Weight (Base : Solidifier)	8.0 : 1
Mixing Ratio by Volume (Base : Solidifier)	4.5 : 1

Overcoat Window

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

At 68°F/20°C, the maximum overcoat time will typically be 24 hours.

Working Life

The working life will vary according to the temperature. At 68°F/20°C, the usable life of mixed material will typically be 45 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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ABRASION

Taber

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

14.7 mm³ 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:

835 mm³ 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:

1790 pli / 313 N/mm (68°F/20°C cure & test)
1280 pli / 224 N/mm (212°F/100°C cure & 68°F/20°C test)
550 pli / 97 N/mm (284°F/140°C cure & 68°F/20°C test)
670 pli / 116 N/mm (212°F/100°C cure & test)
310 pli / 54 N/mm (284°F/140°C cure & test)

Pull Off Adhesion

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

4450 psi / 30.7 MPa (68°F/20°C cure)
3780 psi / 26.1 MPa (212°F/100°C cure)
3360 psi / 23.2 MPa (284°F/140°C cure)

Tensile Shear Adhesion

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

2910 psi / 20.1MPa (68°F/20°C cure & test)
2050 psi / 14.1 MPa (212°F/100°C cure & 68°F/20°C test)
1930 psi / 13.3 MPa (284°F/140°C cure & 68°F/20°C test)
1920 psi / 13.2 MPa (212°F/100°C cure & test)
1410 psi / 9.7 MPa (284°F/140°C cure & test)

CHEMICAL ANALYSIS

The mixed **Belzona 1523** has been independently analysed for halogens, heavy metals, and other corrosion-causing impurities in accordance with ASTM E165, ASTM D4327 and ASTM E1479. Typical results are displayed as follows:

Analyte	Total Concentration (ppm)
Fluoride	115
Chloride	434
Bromide	ND (<10)
Sulphur	94
Nitrite	ND (<8)
Nitrate	3
Zinc	5.1
Antimony, Arsenic, Bismuth, Cadmium, Lead, Tin, Silver, Mercury, Gallium and Indium	ND (<5.0)

ND : Not Detected

CHEMICAL RESISTANCE

When tested in accordance with ISO 2812 and ISO 4628, the coating demonstrates excellent resistance to a wide range of chemicals. For full details, see the **Belzona 1523** Chemical Resistance Chart

COMPRESSIVE PROPERTIES

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

	Compressive Strength	Proportional Limit	Youngs Modulus
68°F/20°C cure & test	77.6 MPa 11,258 psi	59.8 MPa 8,675 psi	1,355.2 MPa 1.97 x 10 ⁵ psi
212°F/100°C cure & 68°F/20°C test	155.5 MPa 22,552 psi	78.7 MPa 11,410 psi	1,518.0 MPa 2.20 x 10 ⁵ psi
284°F/140°C cure & 68°F/20°C test	212.4 MPa 30,809 psi	105.6 MPa 15,320 psi	1,527.2 MPa 2.21 x 10 ⁵ psi
212°F/100°C cure & test	88.8 MPa 12,881 psi	41.8 MPa 6,059 psi	1,048.7 MPa 1.52 x 10 ⁵ psi
284°F/140°C cure & test	84.1 MPa 12,200 psi	39.2 MPa 5,688 psi	865.7 MPa 1.26 x 10 ⁵ psi

CORROSION PROTECTION

Cathodic Disbondment

When tested in accordance with ASTM G42 at 194°F/90°C, the average disbondment radius will typically be: 0.197 inch/5.0 mm

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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ELECTRICAL PROPERTIES

When tested in accordance with ASTM D149, method A, with voltage rise of 2kV/s, typical value will be:
Dielectric strength 31.1 kV/mm

ELONGATION & TENSILE PROPERTIES

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

Tensile Strength
 4,940 psi / 34.06 MPa (68°F/20°C cure & test)
 4,221 psi / 29.10 MPa (212°F/100°C cure & 68°F/20°C test)
 4,910 psi / 33.85 MPa (284°F/140°C cure & 68°F/20°C test)
 3,429 psi / 23.64 MPa (212°F/100°C cure & test)
 3,320 psi / 22.89 MPa (284°F/140°C cure & test)

Elongation
 0.90 % (68°F/20°C cure & test)
 0.75 % (212°F/100°C cure & 68°F/20°C test)
 0.67 % (284°F/140°C cure & 68°F/20°C test)
 0.94 % (212°F/100°C cure & test)

Young's Modulus
 7.04x10⁵ psi / 4,855 MPa (68°F/20°C cure & test)
 6.41x10⁵ psi / 4,418 MPa (212°F/100°C cure & 68°F/20°C test)
 7.18x10⁵ psi / 4,947 MPa (284°F/140°C cure & 68°F/20°C test)
 4.61x10⁵ psi / 3,176 MPa (212°F/100°C cure & test)
 1.96x10⁵ psi / 1,354 MPa (284°F/140°C cure & test)

EXPLOSIVE DECOMPRESSION

When tested in accordance with NACE TM0185 using a seawater/crude oil test fluid over-pressured with 10% carbon dioxide/90% methane, the coating exhibits no breakdown after a 21 day immersion period at 248°F/120°C and 70 bar pressure followed by rapid decompression over 15 minutes.

FLEXURAL PROPERTIES

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

Flexural Strength
 5900 psi / 40.7 MPa (68°F/20°C cure & test)
 8070 psi / 55.7 MPa (212°F/100°C cure & 68°F/20°C test)
 6410 psi / 44.2 MPa (284°F/140°C cure & 68°F/20°C test)
 3950 psi / 27.2 MPa (212°F/100°C cure & test)
 3840 psi / 26.5 MPa (284°F/140°C cure & test)

Flexural Modulus
 5.55x10⁵ psi / 3830 MPa (68°F/20°C cure & test)
 6.20x10⁵ psi / 4280 MPa (212°F/100°C cure & 68°F/20°C test)
 6.08x10⁵ psi / 4190 MPa (284°F/140°C cure & 68°F/20°C test)
 3.18x10⁵ psi / 2190 MPa (212°F/100°C cure & test)
 2.86x10⁵ psi / 1970 MPa (284°F/140°C cure & test)

HARDNESS

Shore D & Barcol 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	284°F/140°C cure
Shore D	84	85	86
Barcol 934-1	24	42	43
Barcol 935	81	83	86

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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	115°F/46°C	153°F/67°C
212°F/100°C	311°F/155°C	282°F/139°C
284°F/140°C	385°F/196°C	311°F/155°C

Atlas Cell Cold Wall Immersion Test

When tested in accordance with NACE TM 0174 procedure A, the coating will exhibit no blistering or rusting (ASTM D714 rating 10; ASTM D610 rating 10) after 6 months immersion in water at 284°F (140°C).

Electrochemical Impedance Spectroscopy (EIS)

The EIS results ($\log_{10}|Z|_{0.1\text{Hz}}$) determined in accordance with ISO 16773 following Atlas cell testing at 284°F (140°C) will be typically:

a) Unexposed:	10.9 $\Omega\cdot\text{cm}^2$
b) Liquid Phase:	11.0 $\Omega\cdot\text{cm}^2$
c) Vapor Phase:	10.9 $\Omega\cdot\text{cm}^2$

Immersion Resistance

Suitable for service at temperatures up to 284°F (140°C) but refer to chemical resistance data for chemical contact limitations.

Steam-out Resistance

The coating will exhibit no failure after 96 hours exposure to pressurized steam at 482°F/250°C

Dry Heat Resistance

The indicated degradation temperature in air based on Differential Scanning Calorimetry (DSC) operated in accordance with ISO11357 is typically 428°F (220°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	5.9 KJ/m ² 62.8 J/m	5.5 KJ/m ² 70.2 J/m
212°F/100°C cure & 68°F/20°C test	4.5 KJ/m ² 49.0 J/m	5.1 KJ/m ² 64.9 J/m
284°F/140°C cure & 68°F/20°C test	4.4 KJ/m ² 47.4 J/m	4.9 KJ/m ² 62.0 J/m

THERMAL PROPERTIES

Thermal Conductivity

When tested in accordance with ASTM E1461-13 at a temperature of 100°C (212°F), the thermal conductivity will typically be 0.448 W/m-K.

Thermal cycling

When tested in accordance with NACE TM0304 the coating exhibited no cracking after 252 cycles between +140°F and -22°F (+60°C and -30°C).

Low Temperature Thermal Shock

Coated steel panels will exhibit no blistering, cracking or delamination after multiple cycles of rapid cooling from 212°F (100°C) to -76°F (-60°C).

THICK FILM CRACKING RESISTANCE

When tested in accordance with NACE TM0104 no cracking was experienced when applied at three times recommended thickness and exposed for 12 weeks in sea water at 104°F (40°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 1523 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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