

PRODUCT SPECIFICATION SHEET

BELZONA 1381

FN10031



GENERAL INFORMATION

Product Description:

A two component system designed to operate under continuous immersion at operating temperatures up to 203°F/95°C. The coating offers excellent erosion resistance combined with negligible wear to spray equipment. Suitable for one or two coat application and can be used to achieve high build films (50mils/1250µm) in one coat without sagging.

Application Areas:

When mixed and applied as detailed in the Belzona Information For Use (IFU), the system is suitable for applications such as:

- | | | |
|----------------------|-------------------|------------------|
| - Chutes and Hoppers | - Pipelining | - Scrubber Units |
| - Girth Welds | - Process Vessels | - Separators |

APPLICATION INFORMATION

Application Methods

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

Application Temperature

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

Coverage Rate

To achieve the minimum system thickness of 20 mils (500 microns), the theoretical coverage rate is 21.5 sq.ft. (2 m²)/litre.

Cure Time

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

Mixed Properties

Colour	Grey or White
Density	1.14 g/cm ³
Viscosity (BS5350-B8)	10 Poise (113°F/45°C)
Sag Resistance (BS 5350-B9)	>50 mils / >1250 µm
Edge Retention (NACE TM0304)	Pass at 0.7mm radius
VOC content (ASTM D2369 / EPA ref. 24)	2.35% / 26.8 g/L

Mix Ratio (Base : Solidifier)

2.5 : 1 (pbv) and (pbw)

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 77°F/25°C, the usable life of mixed material will typically be 40 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

Wet and dry sliding abrasion resistance, when determined in accordance with ASTM D4060 using 1kg load, will typically result in:

Wet (H10 wheels): 4mm³ loss per 1000 cycles
Dry (CS17 wheels): 9mm³ loss per 1000 cycles
(68°F/20°C cure & test)

ADHESION

Tensile Shear

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

3300 psi / 22.8 MPa (68°F/20°C cure & 68°F/20°C test)
2800 psi / 19.3 MPa (212°F/100°C post-cure & 68°F/20°C test)
1900 psi / 13.1 MPa (212°F/100°C post-cure & 194°F/90°C test)

Pull Off Adhesion

The PosiTest Dolly Pull Off Strength as determined in accordance with ASTM D4541 and ISO 4624, will typically be:

Blasted Mild Steel: 4000 psi / 27.6 MPa (68°F/20°C cure & test)
Blasted Mild Steel: 4550 psi / 31.4 MPa (212°F/100°C post-cure & 68°F/20°C test)
Fusion Bonded Epoxy: 3000 psi / 20.7 MPa (68°F/20°C cure & test)

CHEMICAL ANALYSIS

The mixed **Belzona 1381** has been independently analysed for halogens, heavy metals, and other corrosion-causing impurities, with the following typical results:

Analyte	Total Concentration (ppm)
Fluoride	50114
Chloride	594
Bromide	ND (<11)
Sulphur	35
Nitrite	ND (<8)
Nitrate	ND (<8)
Zinc, Antimony, Arsenic, Bismuth, Cadmium, Lead, Tin, Silver, Mercury, Gallium and Indium	ND (<3.0)

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 including; dilute acids, alkalis and hydrocarbons.

COMPRESSIVE PROPERTIES

Compressive Strength

When determined in accordance with ASTM D695, the compressive strength of samples cured at the conditions stated below and tested at 68°F/20°C will typically be:

4915 psi / 34 MPa (68°F/20°C cure)
4250 psi / 29 MPa (212°F/100°C post-cure)

Compressive Modulus

When tested in accordance with ASTM D695, the compressive modulus of samples cured at the conditions stated below and tested at 68°F/20°C will typically be:

0.96 x 10⁵ psi / 662 MPa (68°F/20°C cure)
0.99 x 10⁵ psi / 683 MPa (212°F/100°C post-cure)

CORROSION PROTECTION

Cathodic Disbondment

When tested in accordance with ASTM G95 at 176°F (80°C), the average disbondment radius will typically be 0.161 inch (4.10 mm)

Salt Spray

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

ELECTRICAL PROPERTIES

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

Dielectric strength 37.0 kV/mm

ELONGATION & TENSILE PROPERTIES

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

Tensile Strength

3,870 psi / 26.68 MPa (68°F/20°C cure & 68°F/20°C test)
2,889 psi / 19.92 MPa (212°F/100°C post-cure & 68°F/20°C test)
2,373 psi / 16.36 MPa (212°F/100°C post-cure & 194°F/90°C test)

Elongation

2.19 % (68°F/20°C cure & 68°F/20°C test)
1.30 % (212°F/100°C post-cure & 68°F/20°C test)
5.18 % (212°F/100°C post-cure & 194°F/90°C test)

Young's Modulus

2.40x10⁵ psi / 1,652 MPa (68°F/20°C cure & 68°F/20°C test)
2.56x10⁵ psi / 1,766 MPa (212°F/100°C post-cure & 68°F/20°C test)
5.63x10⁴ psi / 388 MPa (212°F/100°C post-cure & 194°F/90°C test)

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EXPLOSIVE DECOMPRESSION

When tested in accordance with NACE TM0185 using a seawater/hydrocarbon mixture (50:50 v/v kerosene/toluene) over-pressured with gas media comprising of 45% H₂S, 15% N₂ and 40% CH₄, the coating exhibits no breakdown after a 28 day immersion period at 183 °F/84 °C and 40 bar followed by decompression over 10 minutes.

FLEXURAL PROPERTIES

When determined in accordance with the relevant test method typical values will be:

Flexural Strength (ASTM D790)

6335 psi / 44.0 MPa (68°F/20°C cure & 68°F/20°C test)
 5945 psi / 41.0 MPa (212°F/100°C post-cure & 68°F/20°C test)
 5450 psi / 37.5 MPa (212°F/100°C post-cure & 194°F/90°C test)

Flexural Modulus (ASTM D790)

2.12x10⁵ psi / 1465 MPa (68°F/20°C cure & 68°F/20°C test)
 2.00x10⁵ psi / 1377 MPa (212°F/100°C post-cure & 68°F/20°C test)
 1.48x10⁵ psi / 1020 MPa (212°F/100°C post-cure & 194°F/90°C test)

Mandrel Flexibility (NACE RP0394)

Pass at 2.5°/pipe diameter (68°F/20°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:

	Ambient cure (68°F/20°C)	Post cure (212°F/100°C)
Shore D	63	75
Barcol 935	56	69

Koenig Pendulum

When tested to ISO 1522 the Koenig damping time of the coating will typically be :

102 seconds ambient cure
 110 seconds post cure

HEAT RESISTANCE

Heat Distortion Temperature (HDT)

The HDT when determined in accordance with ASTM D648 will typically be:

Cure temperature	HDT
68°F/20°C	113°F/45°C
212°F/100°C	252°F/122°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 203°F (95°C).

Immersion Resistance

Suitable for service at temperatures up to 203°F (95°C) but refer to chemical resistance data for chemical contact limitations.

Dry Heat Resistance

The coating will exhibit no significant degradation when exposed to dry heat at temperatures up to 392°F (200°C) and down to -40°F (-40°C).

Steam-out Resistance

Once fully cured the coating will exhibit no blistering, cracking or delamination after 96 hours exposure to pressurised steam at 338°F (170°C).

IMPACT RESISTANCE

Izod Pendulum

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

2.64 KJ/m² (68°F/20°C cure & 68°F/20°C test)
 3.44 KJ/m² (212°F/100°C post-cure & 68°F/20°C test)

Falling Weight

The direct falling weight impact resistance when determined in accordance with ASTM D2794 will typically be:

0.34 kg.m / 30 in.lbs (68°F/20°C cure & 68°F/20°C test)
 0.31 kg.m / 27 in.lbs (212°F/100°C post-cure & 68°F/20°C test)

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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 0.287 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 1381 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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