

# PRODUCT SPECIFICATION SHEET

## BELZONA 1591

FN10038



### GENERAL INFORMATION

#### Product Description:

A two-component hand applied high temperature coating system designed to resist water, aqueous solutions and hydrocarbons up to a temperature of 356°F(180°C) Exhibits excellent erosion-corrosion resistance at elevated temperatures. For use in Original Equipment Manufacture or repair situations.

#### 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:

- Condensate extraction pumps
- Heat exchanger barrels
- Scrubber units
- Absorbers
- Condensate return tanks
- Oil/gas and oil/water separators
- Calorifiers
- Regenerators
- Evaporators
- Autoclaves
- Distillation units

### APPLICATION INFORMATION

#### Working Life

Will vary according to temperature. At 68°F (20°C) the usable life of a 1 kg unit of mixed material is 50 minutes.

#### Cure Time

Allow the applied material to solidify for the times shown in the Belzona IFU before subjecting it to the conditions indicated.

*\* In certain instances it may be advantageous to post cure material prior to putting into service where chemical contact is involved. Refer to Belzona for specific recommendations.*

#### Limitations of Use

**Belzona 1591** should not be applied at temperatures below 65°F (18°C). Surface temperature should be above 65°F (18°C) throughout the curing period.

#### Coverage Rate

The **Belzona 1591** should be applied at a thickness of 26-34 mils (650 - 850 microns) but not exceeding 40 mils (1000 microns) and to achieve this thickness a practical coverage rate of 6.35 sq.ft. (0.59 m<sup>2</sup>) per kilogram unit should be obtained.

See Belzona Instructions For Use leaflet for details of application as a 2 coat system.

#### Volume Capacity

31.1 cu.in. (510 cm<sup>3</sup>)/kg.

#### Base Component

Appearance Paste  
Color Brown  
Density 2.01 - 2.11 g/cm<sup>3</sup>

#### Solidifier Component

Appearance Liquid  
Color Clear  
Density 0.93 - 0.95 g/cm<sup>3</sup>

#### Mixed Properties

Mixing Ratio by Weight (Base : Solidifier) 23 : 1  
Mixing Ratio by Volume (Base : Solidifier) 10.5 : 1  
Mixed Form Liquid  
Sag resistance nil at 50 mil (1.25 mm)  
Mixed Density 1.86 - 2.06 g/cm<sup>3</sup>

*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

The Taber abrasion resistance determined in accordance with ASTM D4060 with 1 kg load is typically:  
H10 Wheels (Wet) 973 mm<sup>3</sup> loss per 1000 cycles  
212°F(100°C) post cure

### ADHESION

#### Tensile Shear

When tested in accordance with ASTM D1002, using degreased strips, grit blasted to a 3-4 mil profile, typical values will be:

	Cure/test temperature	Adhesion
Mild steel	212°F (100°C)	1500 psi (10.34 MPa)
	248°F (120°C)	1230 psi (8.48 MPa)
	356°F (180°C)	1070 psi (7.38 MPa)

#### Pull Off Adhesion

When tested in accordance with ASTM D 4541/ ISO 4624, the pull off strength from grit blasted steel will be typically:

4600 psi (31.71 MPa)	<b>Cure Temperature</b> 68°F (20°C)
5500 psi (37.92 MPa)	212°F (100°C)

### CHEMICAL RESISTANCE

Once fully cured, the material will demonstrate excellent resistance to a wide range of chemicals.

\* For a more detailed description of chemical resistance properties, refer to relevant Chemical Resistance chart.

### COMPRESSIVE PROPERTIES

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

<b>Compressive Strength</b>	<b>Cure/test temperature</b>
11550 psi (79.63 MPa)	212°F (100°C)
10240 psi (70.60 MPa)	248°F (120°C)
9320 psi (64.26 MPa)	356°F (180°C)

### ELONGATION & TENSILE PROPERTIES

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

**Elongation**  
0.197%

**Tensile Strength**  
2070 psi (14.28 MPa) at yield  
2273 psi (15.67 MPa) at break

**Young's Modulus**  
1.11x10<sup>6</sup> psi (7686 MPa)

### EXPLOSIVE DECOMPRESSION

When tested to NACE TM 0185, using a seawater/hydrocarbon test fluid, the coating will exhibit no breakdown after a 21 day immersion period at 248°F (120°C) and 70 bar pressure followed by decompression over 15 minutes.

### FLEXURAL PROPERTIES

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

<b>Flexural Strength</b>	<b>Cure/test temperature</b>
6650 psi (45.85 MPa)	212°F (100°C)
6900 psi (47.57 MPa)	248°F (120°C)
4520 psi (31.16 MPa)	356°F (180°C)

### HARDNESS

#### Shore D

When determined in accordance with ASTM D2240, typical values will be:

	<b>Cure/test temperature</b>
87	212°F (100°C)
88	248°F (120°C)
89	356°F (180°C)

#### Barcol

When determined in accordance with ASTM D2583, will typically be:

	<b>Cure/test temperature</b>
93	68°F (20°C)
96	212°F (100°C)
98	302°F (150°C)

#### Koenig Pendulum

When tested to ISO 1522 the Koenig damping time of the ambient cured coating will typically be 126 seconds.

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### HEAT RESISTANCE

#### Heat Distortion Temperature (HDT)

Tested to ASTM D648 (264 psi fiber stress), typical values obtained will be:

	<b>Cure/test temperature</b>
131°F (55°C)	68°F (20°C)
214°F (101°C)	140°F (60°C)
322°F (161°C)	212°F (100°C)
406°F (208°C)	248°F (120°C)
513°F (267°C)	356°F (180°C)

#### Atlas Cell

When tested in accordance with NACE TM 0174 the coating will exhibit no rusting (ASTM D610 rating 10) or blistering (ASTM D714 rating 10) after 6 months immersion in de-ionized water at 203°F (95°C).

#### Steam-out Resistance

Once fully cured the coating will exhibit no blistering, cracking or delamination after 96 hours exposure to pressurised steam at 410°F (210°C).

#### Wet Heat Resistance

The material will resist water and hydrocarbons at temperatures up to 180°C. Cold wall effects should be minimised and above 150°C external surfaces should be insulated. The material is not recommended for dry applications at elevated temperatures.

#### 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).

### THERMAL PROPERTIES

#### 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

#### Thick Film Cracking

When tested in accordance with Section 12 of NACE TM0104, the coating at three times recommended thickness, exhibited no cracking after 12 weeks immersion in seawater at 104°F (40°C).

### SHELF LIFE

Separate Base and Solidifier components will have a minimum shelf life of 3 years when stored in their original unopened containers between 32°F (0°C) and 86°F (30°C).

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### WARRANTY

Belzona guarantees 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 further guarantees that all its products are carefully manufactured to ensure the highest quality possible and tested strictly in accordance with universally recognised 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 1591** 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.

### HEALTH AND SAFETY

Prior to using this material, please consult the relevant Material Safety Data Sheets.

### MANUFACTURER

Belzona Polymerics Ltd.  
Claro Road, Harrogate,  
HG1 4DS, UK

Belzona Inc.  
2000 N.W. 88<sup>th</sup> Court,  
Miami, Florida, USA, 33172

### 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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ISO 9001:2008  
Q 09335  
ISO 14001:2004  
EMS 509612

Manufactured under an ISO 9000  
Registered Quality Management System

