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PRODUCT SPECIFICATION SHEET **BELZONA® 1591**

1. PRODUCT NAME

Belzona® 1591

Coating system for high temperature equipment handling water, aqueous solutions and hydrocarbons.

2. MANUFACTURER

Belzona Inc.

2000 N.W. 88th Court
Miami, Florida 33172

Belzona Polymerics Ltd.,

Claro Road, Harrogate,
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3. PRODUCT DESCRIPTION

A two-component high temperature coating system designed to resist water and pressurised steam up to a temperature of 365°F (185°C) and to exhibit excellent erosion-corrosion resistance at elevated temperatures.

When mixed and applied as detailed in the Instructions for Use leaflet the system is ideally suited for application to:

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

4. TECHNICAL DATA

Base Component

Appearance	Paste
Color	Brown
Density	1.85 - 1.95 g/cm ³

Solidifier Component

Appearance	Liquid
Color	Clear
Density	1.00 - 1.02 g/cm ³

Mixed Properties

Mixing Ratio by Weight (Base : Solidifier)	13 : 1
Mixing Ratio by Volume (Base : Solidifier)	6.8 : 1
Mixed Form	Liquid
Sag	nil at 50 mil (1.25 mm)
Mixed Density	1.75 - 1.95 g/cm ³

• **Limitations of Use:**

Belzona® 1591 should not be applied at temperatures below 65°F (18°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).

• **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.

• **Coverage Rate:**

The **Belzona® 1591** should be applied at a thickness of 32-40 mils (800 - 1000 microns) but not exceeding 48 mils (1200 microns) and to achieve this thickness a practical coverage rate of 5.8 sq. ft. (0.54 sq. m.) per kilogram unit should be obtained.

• **Volume Capacity:**

The volume capacity of mixed material is 33.1 cu.ins. (543 cm³) per kilogram.

• **Cure Time:**

Allow to cure for at least 24 hours above 18°C before putting into service. The system is designed to post cure in service.

This procedure is suitable for applications where operating temperature will be achieved gradually.

Alternatively, allow the coating to harden at ambient temperature as above. Post cure using wet heat (steam) for at least 4 hours at the operating temperature of the equipment or for at least 6 hours at 120°C. *This procedure should be adopted for any application where immediate exposure to a hot aggressive environment will occur.*

NOTE:

Surface temperature should be above 65°F (18°C) throughout the curing period.

5. PHYSICAL / MECHANICAL PROPERTIES

Post curing the material with wet heat results in a more highly cross linked polymer. The material is designed to post cure in service under immersion conditions following cure at temperatures above 18°C for at least 24 hours.

The following test data has been obtained by post curing at the test temperature.

• **Abrasion Resistance:**

Taber

The sliding abrasion resistance of the material when tested under wet conditions using the Taber Abraser fitted with H10 grinding wheels and 1 kg load is typically: 155 mm³ loss/1000 cycles - post cure

• **Adhesion:**

Tensile Shear

When tested in accordance with ASTM D1002, gives typical values of,

Temperature	Adhesion
248°F (120°C)	1800 psi (127 kgs/cm ²)
302°F (150°C)	1250 psi (88 kgs/cm ²)
338°F (170°C)	1000 psi (70 kgs/cm ²)
392°F (200°C)	900 psi (63 kgs/cm ²)

• **Cavitation Resistance:**

The cavitation resistance of the product when tested to a modified version of ASTM G32 using stationary specimens at 20KHz frequency and 36 microns amplitude, typically equates to an average volume loss of 22 mm³ after post cure.

• **Chemical Resistance:**

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

- Methylene Chloride @ 40°C (boiling)
- Methanol @ 60°C
- Crude Oil @ 90°C
- Toluene @ 90°C
- Sea Water @ 185°C
- Distilled Water @ 185°C
- Crude Oil/brine @ 160°C

Refer to Belzona® TKL for specific recommendations.

• Compressive Strength:

When tested in accordance with ASTM D695, typical values obtained will be

Temperature	Compressive Strength
248°F (120°C)	6100 psi (429 kgs/cm ²)
302°F (150°C)	5200 psi (366 kgs/cm ²)
338°F (170°C)	4400 psi (309 kgs/cm ²)
392°F (200°C)	3900 psi (274 kgs/cm ²)

• Flexural Strength:

When tested to ASTM D790, typical values obtained will be

Temperature	Flexural Strength
248°F (120°C)	2600 psi (183 kgs/cm ²)
302°F (150°C)	2000 psi (140 kgs/cm ²)
338°F (170°C)	1700 psi (120 kgs/cm ²)
392°F (200°C)	1800 psi (126 kgs/cm ²)

• Hardness:

When tested at elevated temperatures the Shore D hardness of the post cured material is typically as follows:

212°F (100°C) - 89
302°F (150°C) - 86
392°F (200°C) - 84

• Heat Distortion Temperature:

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

Cure/Postcure Temperature	Distortion Temperature 24 hours	Distortion Temperature Maximum
68°F (20°C)	133°F (55°C)	-
212°F (100°C)	273°F (134°C)	338°F (170°C)
248°F (120°C)	401°F (205°C)	446°F (230°C)
302°F (150°C)	435°F (224°C)	500°F (260°C)
392°F (200°C)	491°F (255°C)	536°F (280°C)

• Heat Resistance:

The material will resist water and pressurised steam at temperatures up to 185°C. The material is not recommended for dry applications at elevated temperatures.

6. SURFACE PREPARATION AND APPLICATION PROCEDURES

For proper technique, refer to the Belzona® Instructions For Use Leaflet which is enclosed with each packaged product.

Badly eroded surfaces may first be rebuilt with **Belzona® 1311** (Ceramic R-Metal) prior to application of **Belzona® 1591**.

7. 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.

8. WARRANTY

Belzona® guarantees this product will meet the performance claims stated herein when material is stored and used as instructed in the Instructions 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 recognized standards (ASTM, ANSI, BS, DIN, etc.). Since Belzona® has no control over the use of the product described herein, no warranty for any application can be given.

9. TECHNICAL SERVICES

Complete technical assistance is available and includes fully trained Technical Consultants, technical service personnel and fully staffed research, development and quality control laboratories.

10. HEALTH AND SAFETY

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

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BS EN ISO 9002 : 1994
Certificate No. Q/09335



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