# BELZONA 1321
**FN10025**

# Product Specification Sheet

## 1. PRODUCT NAME
**Belzona® 1321 (Ceramic S-Metal)**
Repair system designed for surfacing metals attacked by erosion-corrosion.

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.

## 2. MANUFACTURER
**Belzona Inc.,**
2000 N.W. 88th Court
Miami, Florida 33172

**Belzona Polymerics Ltd.,**
Claro Road Harrogate,
HG1 4DS, England

## 3. PRODUCT DESCRIPTION
A two component coating system designed to operate under continuous immersion at operating temperatures up to 140°F (60°C). Suitable for design temperatures up to 194°F (90°C) and steaming out up to 410°F (210°C).

Exhibits excellent erosion-corrosion resistance.

Resistant to a broad range of aqueous solutions, hydrocarbons and process chemicals. (Refer to Product Data M508 for more information).

Applications
Centrifugal and turbine pumps.
Heat exchangers, water box ends, division bars and tube sheets.
Butterfly and gate valves.
Propellers.
Kort nozzles.
Pipe elbows.
T-pieces.

## 4. TECHNICAL DATA
Base Component

| | |
|---|---|
| Appearance | Paste |
| Color | Gray |
| Density | 2.60 - 2.80 g/cm³ |

Solidifier Component

| | |
|---|---|
| Appearance | Liquid |
| Color | Blue or Violet |
| Density | 1.00 - 1.08 g/cm³ |

Mixed Properties

| | |
|---|---|
| Mixing Ratio by Weight (Base : Solidifier) | 11 : 1 |
| Mixing Ratio by Volume (Base : Solidifier) | 4 : 1 |
| Mixed Form | Liquid |
| Peak Exotherm Temperature | 158 - 185°F (70 - 85°C) |
| Time to Peak Exotherm | 53 - 63 mins. |
| Slump Resistance | nil at 25 mil (625 microns) |
| Mixed Density | 2,35 - 2.45 g/cm³ |

• ***Shelf Life:***
Separate base and solidifier components will have a 5 year shelf life when stored between 32°F (0°C) and 86°F (30°C).

• ***Working Life:***
Will vary according to temperature. At 77°F (25°C) the usable life of mixed material is 30 minutes.

• ***Coverage Rate:***
Each 1 kg. unit applied at the correct film thickness of 10 - 15 mils. (250 - 375 microns) will cover approximately 11 sq.ft. (1.0 sq.m.).

• ***Volume Capacity:***
The volume capacity of mixed material is 25.7 cu.ins. (425 cm³) per kilogram.

• ***Cure Time:***
Allow to solidify for the times shown in the chart below before subjecting it to the conditions indicated.

## 5. PHYSICAL/MECHANICAL PROPERTIES
Determined after 7 days cure at 77°F (25°C). Post curing the material with heat results in a more highly cross-linked polymer.

For enhanced performance this material may be post-cured by heating to 212°F (100°C) for a period of up to 24 hours. This should be carried out following an initial cure period of 24 hours at ambient temperature.

• ***Abrasion Resistance:***
**Taber**
The Taber abrasion resistance with 1 kg load is typically:

| | |
|---|---|
| H10 Wheels (Wet) | 172 mm³ |
| CS17 Wheels (Dry) | 55 mm³ |

loss per 1000 cycles

• ***Adhesion:***
**Tensile Shear**
When tested in accordance with ASTM D1002, using degreased substrates which have been grit blasted to a 3 - 4 mil. profile give typical values of:

| | |
|---|---|
| Mild steel | 2,900 psi (20.0 MPa) |
| Brass | 2,200 psi (15.17 MPa) |
| Copper | 2,400 psi (16.55 MPa) |
| Stainless steel | 3,000 psi (20.69 MPa) |
| Aluminium | 2,000 psi (13.79 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:
5190 psi (35.78 MPa)

• ***Cathodic Disbondment:***
When tested in accordance with ASTM G8 a rating Class B is obtained.

**CURE TIMES**

| TEMPERATURE | 41°F (5°C) | 50°F (10°C) | 59°F (15°C) | 68°F (20°C) | 77°F (25°C) | 86°F (30°C) |
|---|---|---|---|---|---|---|
| Movement or use involving no loading or immersion | 12 hrs | 8 hrs | 5½ hrs | 4 hrs | 3½ hrs | 2 hrs |
| Machining and/or light loading | 18 hrs | 12 hrs | 9 hrs | 6 hrs | 4½ hrs | 3 hrs |
| Full mechanical/thermal loading or water immersion | 7 days | 3 days | 2 days | 1½ days | 24 hrs | 18 hrs |
| Chemical contact | 10 days | 5 days | 3 days | 2 days | 1½ days | 1 day |

• ***Chemical Resistance:***
Once fully cured, the material will demonstrate excellent resistance to the following chemicals;

carbonic acid
10% hydrobromic acid
20% hydrochloric acid
10% nitric acid
20% nitrous acid
5% phosphoric acid
10% sulfuric acid
Citric acid
10% ammonia solution
lime water
40% potassium hydroxide
40% sodium hydroxide
propanol
butanol
ethylene glycol
diethanolamine
methylamine (25% in water)
hydrocarbons
mineral oils
inorganic salts

*For specific chemical resistance data please refer to product data M508.*

• ***Compressive Strength:***
When tested in accordance with ASTM D695, typical values obtained will be 13,000 psi . (89.63 MPa).

• ***Corrosion Resistance:***
Once fully cured, will show no visible signs of corrosion after 5,000 hours exposure in the ASTM B117-73 salt spray cabinet.

• ***Electrical Properties:***
**Dielectric Constant**
Tested to ASTM D150 is typically 12 at 1000Hz.
Tested to ASTM D150 is typically 8 at 1MHz.

**Dielectric Strength**
Tested to ASTM D149 is typically 33 volts/mil (1320 volts/mm).

**Dissipation Factor**
Tested to ASTM D150 is typically < 0.0005 at 1000 Hz.
Tested to ASTM D150 is typically < 0.0005 at 1 MHz.

**Surface Resistivity**
Tested to ASTM D257 is typically $6.7 \times 10^{13}$ ohm.

**Volume Resistivity**
Tested to ASTM D257 is typically $3.3 \times 10^{13}$ ohm cm.

• ***Flexural Strength:***
When tested to ASTM D790, typical values obtained will be 10,000 psi (68.95MPa).

• ***Flexural Modulus:***
When tested to ASTM D790, typical values obtained will be $8.50 \times 10^{5}$ psi (5860 MPa).

• ***Hardness:***
**Shore D**
The hardness of the material when tested to ASTM D2240 is typically 80.

**Barcol**
Tested to ASTM D2583 the Barcol hardness will typically be:
89 - ambient cure
91 - post cure.

• ***Heat Distortion Temperature:***
Tested to ASTM D648 (264 psi fiber stress), typical values obtained will be
117°F (47°C) ambient cure
189°F (87°C) post cure

• ***Heat Resistance:***
The material is stable under dry conditions to continuous exposure to temperatures up to 392°F (200°C). Designed to operate under continuous immersion at operating temperatures up to 140°F (60°C). Suitable for design temperatures up to 194°F (90°C) and steaming out up to 410°F (210°C).

• ***Impact Strength:***
Reverse notched impact strength is typically 0.93 ft. lb/in,. or 50 J/m.

• ***Shrinkage:***
0.0% minimum
0.005% maximum

• ***Thermal Expansion:***
Tested to ASTM E228 the coefficient of thermal expansion is typically 38.4 ppm/°C.

•***VOC:***
When measured in accordance with ASTM D 2369 the VOC content of the mixed product is typically 0.91% (22g/litre).

## 6. SURFACE PREPARATION AND APPLICATION PROCEDURES

For proper technique, refer to the 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® 1321.**

## 7. AVAILABILITY AND COST

**Belzona® 1321** 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.

## 11. APPROVALS/ ACCEPTANCES

U.S.D.A.
ABS
NATO
GENERAL MOTORS
TOYOTA
FORD
YORK INTERNATIONAL
RUSSIAN REGISTER OF SHIPPING
KOREAN REGISTER OF SHIPPING
CHINA CLASSIFICATION SOCIETY
BUREAU VERITAS

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