BELZONA MARINE METAL

Product Specification Sheet

1. PRODUCT NAME

Belzona® Marine Metal
Engineering grade repair system with extended working life for repairing and rebuilding machinery and equipment.

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 paste grade system based on a silicon steel alloy blended with high molecular weight reactive polymers and oligomers. For ease of application this material has an extended working life. Once cured, the repair is durable and fully machinable.

Applications
Shafts
Hydraulic rams
Bearing housings
Keyways
Engine blocks
Casings
Pipes
Tanks
Flange faces
Bushing fits
Leveling

4. TECHNICAL DATA

Base Component

Appearance	Paste
Color	Dark gray
Gel strength at 77°F (25°C)	175 - 325 g/cm QH
Density	2.80 - 3.00 g/cm³

Solidifier Component

Appearance	Paste
Color	Light gray
Gel strength at 77°F (25°C)	100 - 250 g/cm QV
Density	2.37 - 2.43 g/cm³

Mixed Properties

Mixing Ratio by Weight (Base : Solidifier)	1.2 : 1
Mixing Ratio by Volume (Base : Solidifier)	1 : 1
Mixed Form	Paste
Peak Exotherm Temp.	86 - 113°F (30 - 45°C)
Time to Peak Exotherm	43 - 63 mins.
Slump Resistance	nil at 1.0 inch (2.5 cm)
Mixed Density	2.57- 2.71 g/cm³

• ***Shelf Life:***
Separate base and solidifier components shall 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 35 minutes.

• ***Volume Capacity:***
Each 1 kg unit will cover 23.5 cu.in. (385 cm³).

• ***Cure Time:***
Will be reduced for thicker sections and extended for thinner applications. At a thickness of approximately ¼ in. (6 mm), 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.

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

H10 Wheels (Wet)	1660 mm³
CS17 Wheels (Dry)	55 mm³

loss per 1000 cycles

• ***Adhesion:***
Cleavage
When tested to ASTM D1062 typical values will be:
Mild steel 1250 lbs./in. (22.3 kgs/mm)

Tensile Shear
When tested in accordance with ASTM D1002, using substrates which are degreased and grit blasted to a 3 mil (75 microns) profile, typical values will be :

3300 psi (232 kgs/cm²) -	mild steel
1900 psi (134 kgs/cm²) -	aluminium
2000 psi (141 kgs/cm²) -	copper

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	28 hrs	15 hrs	9 hrs	4¾ hrs	2½ hr	1½ hr
Machining and/or light loading	4 days	2 days	27 hrs	16 hrs	9 hrs	5 hrs
Full mechanical or thermal loading	10 days	5 days	3 days	1½ days	1 day	16 hrs
Immersion in chemicals	24 days	12 days	7 days	4 days	2½ days	1½ days

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Pull Off Adhesion
When tested in accordance with ASTM D 4541/ ISO 4624, the pull off strength from grit blasted steel will be typically:
2180 psi (153kg/cm²) ambient cure

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

carbonic acid
10% hydrochloric acid
10% nitric acid
10% sulfuric acid
20% sodium hydroxide
lime water

For specific chemical resistance data please refer to product data M504.

• ***Compressive Strength:***
When tested in accordance with ASTM D695, typical values obtained will be 12,500 psi (879 kgs/cm²).

• ***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 Strength
Tested to ASTM D419 is typically
149 volts/mil (5960 volts/mm)

Dielectric Constant
Tested to ASTM D150 is typically
8 at 1000Hz
6 at 1 MHz

Dissipation Factor
Tested to ASTM D150 is typically
< 0.0005 at 1 MHz
0.0050 at 1000 HZ

Surface Resistivity
Tested to ASTM D257 is typically
8.7×10^{14} ohm.

Volume Resistivity
Tested to ASTM D257 is typically
6.0×10^{15} ohm cm.

• ***Flexural Strength:***
When tested to ASTM D790, typical values obtained will be 6500 psi (457 kgs/cm²).

• ***Hardness:***
The hardness of the material when tested to ASTM D2240 is typically 87 Shore D.

• ***Heat Resistance:***
For many typical applications, the product is thermally stable to 350°F (175°C) dry and 140°F (60°C) wet.

• ***Heat Distortion Temperature:***
Tested to ASTM D648 (264 psi fiber stress), typical values obtained will be 122°F (50°C).

• ***Impact Strength:***
Izod unnotched is typically 1.0 ft.lb./in. (51 J/m).

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

• ***U.S.D.A. Acceptance:***
The material is authorized by the United States Department of Agriculture (U.S.D.A.) for use in federally inspected meat and poultry plants.

6. SURFACE PREPARATION AND APPLICATION PROCEDURES

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

7. AVAILABILITY AND COST

Belzona® Marine Metal 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 Belzona® 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 recognised 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

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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Repair • Protect • Improve

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