BELZONA® World leaders in the conservation of man-made resources and the environment

PRODUCT SPECIFICATION SHEET
BELZONA® 1211

1. PRODUCT NAME
Belzona® 1211
(E-Metal)
A rapidly solidifying repair system for emergency and permanent bonding, repairing and rebuilding.

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

Belzona Polymerics Ltd.,
Claro Road, Harrogate,
HG1 4AY, 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. Developed for high speed emergency repairs, the material is quickly machinable.

Applications
Leaking pipes
Leaking tanks
Scored hydraulic rams
Stripped threads
Plastic/metal joints
Holed casings
Bearing seats
Battery terminal posts
Broken insulators
Ducts

4. TECHNICAL DATA
Base Component

Appearance	Paste
Color	Dark gray
Gel strength at 77°F (25°C)	> 150 g/cm HF
Density	2.70 - 2.90 g/cm^3

Solidifier Component

Appearance	Paste
Color	Light gray
Gel strength at 77°F (25°C)	250 g/cm HF
Density	1.57 - 1.63 g/cm^3

Mixed Properties

Mixing Ratio by Weight (Base : Solidifier)	2 : 1
Mixing Ratio by Volume (Base : Solidifier)	1 : 1
Mixed Form	Paste
Peak Exotherm Temperature	185 - 212°F (85 - 100°C)
Time to Peak Exotherm	8 - 10 mins.
Slump Resistance	nil at 0.5 inch (12.5 mm)
Mixed Density	2.15 - 2.27g/cm^3

• *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 4 minutes.

• *Volume Capacity:*
The volume capacity for the material is 27.5 cu.in (450 cm^3) per kg. The unit size is 500g.

• *Cure Time:*
Will be reduced for thicker sections and extended for thinner applications. At a thickness of approximately 1/4 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

• *Adhesion:*
Tensile Shear
The tensile shear adhesion to a grit blasted substrate with a 3 - 4 mil. profile, when tested to ASTM D1002 after 7 days cure at 77°F (25°C), is typically

Mild Steel	2500 psi (176 kgs/cm^2)
Aluminium	1800 psi (127 kgs/cm^2)
Copper	2250 psi (158 kgs/cm^2)
Brass	2500 psi (176 kgs/cm^2)
Galvanized steel	2200 psi (154 kgs/cm^2)
Cupronickel	2500 psi (176 kgs/cm^2)
Stainless steel	2500 psi (176 kgs/cm^2)
Formica	>500 psi (35 kgs/cm^2)*
Polyester/Fiberglass	>700 psi (49 kgs/cm^2)*

** Cohesive failure within substrate*

• *Chemical Resistance:*
The material when allowed to cure for 7 days at 77°F (25°C) prior to immersion, will offer excellent resistance to the following chemicals:

ACIDS
10% hydrochloric (fair)
20% Sulfuric (fair)
Carbonic

BASES
20% Sodium hydroxide (good)
Calcium hydroxide
Lime water

OTHERS
Hydrocarbons
Mineral oils
Inorganic salts

** For a more detailed description of chemical resistance properties, refer to Product Data M501.*

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	25 min.	20 min.	15 min.	10 min.	7 min.	5 min.
Machining and/or light loading	45 min.	30 min.	25 min.	20 min.	15 min.	10 min.
Full mechanical or thermal loading	60 min.	40 min.	35 min.	30 min.	25 min.	20 min.
Immersion in chemicals	48 hrs.	36 hrs.	30 hrs.	24 hrs.	20 hrs.	16 hrs.

• *Compressive Strength:*
The compressive strength of the material, when tested to ASTM D695 after 7 days cure at 77°F (25°C), is typically 8200 psi (577 kgs/cm^2).

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

• *Flexural Strength:*
The flexural strength of the material, when tested to ASTM D790 after 7 days at 77°F (25°C), is typically 8200 psi (577 kgs/cm^2).

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

• *Heat Resistance:*
For many typical applications, the product is thermally stable to 212°F (100°C) dry and 140°F (60°C) wet.

• *Heat Distortion Temperature:*
The heat distortion temperature of the material, when tested to ASTM D648 (264 psi fiber stress) after 7 days cure at 77°F (25°C), is typically 109°F (43°C).

• *Impact Strength:*
Reverse notched impact strength, tested to ASTM D256, is typically 0.73 ft. lbs./in. (40 Jm^{-1}).

• *Shrinkage:*
Shrinkage is typically nil when tested in accordance with DOD-C-24176A method 4.6.12.

• *Thermal Expansion:*
Tested to ASTM E228 the coefficient of thermal expansion is typically 53.3 ppm/°C.

• *Water Uptake:*
When tested for 3 days at 77°F (25°C) water uptake is typically 2.2%.

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® 1211 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
NATO
GENRAL MOTORS
TOYOTA
CHRYSLER
FORD
RJB MINING
LEAD SHEET ASSOCIATION

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