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

PRODUCT SPECIFICATION SHEET
BELZONA® 4111

1. PRODUCT NAME
Belzona® 4111
(Magma-Quartz)
All purpose repair system for repairing and resurfacing concrete and stonework damaged by impact, vibration, chemicals and environmental attack. Also for grouting and bonding. Offers outstanding abrasion and chemical resistance.

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

Belzona Polymerics Ltd.,
Claro Road, Harrogate,
HG1 4AY, England.

3. PRODUCT DESCRIPTION
Designed for excellent performance and ease of application. A combination of selected quartz particles and two specifically formulated reactive liquid resins which interlink chemically fusing the quartz particles together. Ideally suited for horizontal surfaces, the system may also be applied on vertical substrates up to 1/4 inch (6 mm) thickness. Having outstanding adhesion, strength, hardness and chemical resistance, this material is ideal for:

Repairing and rebuilding any structure made from concrete, brick, marble, stone, etc.

Lining concrete surfaces subject to chemical attack.

Surfacing and resurfacing areas subject to extreme wear, impact and abrasion.

4. TECHNICAL DATA
Base Component

Appearance	Clear Liquid
Colour	Light amber
Viscosity	5 - 7 poise at 77°F (25°C)
Density	1.13 - 1.15 g/cm^3

Solidifier Component

Appearance	Clear Liquid
Color	Amber
Viscosity	0.5 - 1.5 poise at 77°F (25°C)
Density	0.98 - 1.10 g/cm^3

Aggregate Component

Appearance	Pre-wetted, fine granular powder
Color	Light gray or Beige
Density	2.6 - 2.9 g/cm3

Mixing Ratio
For mixing small quantities the mixing ratio by weight of the component is:-
(Base : Solidifier : Aggregate) 2 : 1 : 30
Mixing ratio by volume
(Base : Solidifier) 2 : 1
Aggregate may be added to desired consistency.

• *Shelf Life:*
All components will have a shelf life of at least 5 years when stored between 32°F (0°C) and 86°F (30°C).

• *Working Life:*
Will vary according to temperature.
At 77°F (25°C), use all mixed materialwithin 30 minutes.

• *Coverage Rates:*
Each 15 kg unit applied at the minimum recommended film thickness of 1/4 inch (6 mm) will cover approximately 12 sq.ft.

• *Volume Capacity:*
The volume capacity of mixed product is 414 cu.ins. (6784 cm^3) per 15 kg unit.

• *Cure Time:*
Will be reduced for thicker sections and extended for thinner applications. At the recommended film thickness of 1/4 inch (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).

• *Abrasion Resistance:*
Taber
When tested in accordance with ASTM D4060 using H10 wheels, 1 kg load, typical loss per 1,000 cycles is
Wet 822 mm^3

• *Adhesion:*
Tensile Shear
The tensile shear adhesion to steel of the polymeric binder, when tested in accordance with ASTM D1002 is typically 2,400 psi (169 kgs/cm^2).

Elcometer

Dry concrete	600 psi (42 kgs/cm^2)*
Wet concrete	425 psi (30 kgs/cm^2)*

** Cohesive failure of substrate*

• *Chemical Resistance:*
This material offers resistance to a broad range of chemicals and will demonstrate excellent resistance for permanent immersion to the following chemical environments.

38% Hydrochloric Acid
50% Sulphuric Acid
Sulphurous Acid
10% Nitric Acid
10% Acetic Acid
10% Lactic Acid
10% Ammonia Solution
Lime Water
20% Potassium Hydroxide
40% Sodium Hydroxide
Diethanolamine
1,1,1, - Trichloroethane
Kerosene
Gasoline
37% Formalin

** For a more detailed description of chemical resistance properties, refer to Product Data Q503.*

CURE TIMES

Temperature	41°F (5°C)	59°F (15°C)	77°F (25°C)	86°F (30°C)
To resist pedestrian traffic	16 hrs	6 hrs	4 hrs	3 hrs
Full mechanical hardness	24 hrs	8 hrs	6 hrs	5 hrs
Machine Hard	2 days	24 hrs	16 hrs	12 hrs
Full chemical resistance	14 days	10 days	5 days	3 days

• *Compressive Strength:*
When tested in accordance with ASTM D695 the compressive strength is typically 13,800 psi (970 kgs/cm^2).

• *Compressive Modulus:*
When tested in accordance with ASTM D695 the compressive modulus is typically 1.65 x 10^4 psi (1160 kgs/cm^2).

• *Electrical Properties:*
Dielectric Strength
Tested to ASTM D149 is typically 142.5 volts/mil (5700 volts/mm).

Loss Tangent
Tested to ASTM D150 is typically 0.038 at 1MHz.

Permittivity:
The permittivity of the material when tested in accordance with ASTM D150 is typically 4.25.

Surface Resistivity
Tested to ASTM D257 is typically 3.98 x 10^{14} ohms.

Volume Resistivity
Tested to ASTM D257 is typically 1.0 x 10^{13} ohm cms.

• *Flexural Strength:*
The flexural strength of the material (binder/aggregate matrix), when tested to ASTM D790 is typically 6,200 psi (436 kgs/cm^2).

The flexural strength of the ploymeric binder when tested to ASTM D570 will be typically 10,000 psi (703 kgs/cm^2).

• *Flexural Modulus:*
When tested in accordance with ASTM D790 the flexural modulus is typically 9 x 10^5 psi (6.3 x 10^4 kgs/cm^2).

• *Heat Distortion Temperature:*
The heat distortion temperature when tested to ASTM D648 is typically 100°F (38°C).

• *Heat Resistance:*
For many typical applications, the product is thermally stable to 300°F (149°C) dry and 140°F (60°C) wet, and down to -40°F (-40°C).

• *Shrinkage:*
The material, when tested in accordance with ASTM C157, will show no measurable shrinkage during cure.

• *Tensile Strength:*
The tensile strength of the material when tested in accordance with ASTM D638 is typically 3,000 psi (211 kgs/cm^2).

• *Thermal Conductivity:*
The thermal conductivity of the material, when tested in accordance with BS 874 or similar test method is typically 1.9 W/M°K.

• *Thermal Expansion:*
Tested to ASTM E228 the coefficient of thermal expansion is typically 28.2ppm/°C.

6. SURFACE PREPARATION AND APPLICATION PROCEDURES
For proper techniques, refer to Belzona® Instructions For Use which is enclosed with each packaged product.

7. AVAILABILITY AND COST
Belzona® 4111 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.
U.K. WRC
GENERAL MOTORS
G.E. NUCLEAR ENERGY
FORD
FLORIDA DEPARTMENT OF TRANSPORT
RHODE ISLAND DEPARTMENT OF TRANSPORT

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