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

PRODUCT SPECIFICATION SHEET
BELZONA® 4311

1. PRODUCT NAME
Belzona® 4311
(Magma CR1)
The barrier coating for protecting surfaces against the effects of chemical attack.

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

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

3. PRODUCT DESCRIPTION
A high performance, two-component barrier coating with outstanding resistance to a broad range of chemicals, especially acids and alkalis. The system, which isolates concrete and metal substrates from deteriorating chemical environments, is ideally suited for application to:

Acid retaining walls.
Chemical drains and channels.
Chemical transfer and holding areas.
Pump bases.
Pump casings.
Tank pads.
Walkways (with non-slip aggregate incorporated).
Tanks.

4. TECHNICAL DATA
Base Component	
Appearance	Thixotropic liquid
Color	Dark Red or Gray
Gel Strength	70 -120 g/cm^3
Density	1.34 - 1.38 g/cm^3
Solidifier Component	
Appearance	Clear Liquid
Color	Amber
Viscosity	1 - 3 poise at 77°F (25°C)
Density	1.00 - 1.04 g/cm^3
Mixed Tests	
Mixing Ratio by Weight (Base : Solidifier)	5 : 1
Mixing ratio by Volume (Base : Solidifier)	3.8 : 1
Density	1.27 - 1.31 g/cm^3
Sag Resistance	> 30 mil
Time to Peak Exotherm at 68°F (20°C)	30 - 45 minutes
Peak Exotherm Temperature	320 - 374°F (160 - 190°C)
Useable Life at 77°F (25°C)	25 - 40 minutes

Resistance to 98% Sulfuric Acid, percent weight loss, of cured coupon after 7 days immersion at 77°F (25°C) is < 2.0.

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

• *Coverage Rates:*
Each 1.5 kg unit applied at the recommended film thickness of 10 mils (250 microns) will cover approximately 44 - 48 ft² (4 - 4.4m²). Application to rough or irregular surfaces may reduce this coverage by 20 - 25%.

• *Volume Capacity:*
The volume capacity of mixed product is 71 cu.ins. (1160 cm^3) per 1.5 kg unit.

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

Note: Below 59°F (15°C), solidification times will be significantly extended and the resultant chemical resistance capability of the **Belzona® 4311** will be reduced.

For optimum results, **Belzona® 4311** should be forced cured at 180°F (80°C) for 4 hours. This will ensure the very best chemical resistance.

5. PHYSICAL/MECHANICAL PROPERTIES
Determined after 7 days cure at 77°F (25°C).

• *Adhesion:*
Tensile Shear
The tensile shear adhesion shall be tested to ASTM D1002. Surface preparation shall be grit blasting with a profile of 0.003 - 0.004 inch. Typical values obtained will be:

Steel	2900 psi (204 kgs/cm^2)
Copper	2550 psi (179 kgs/cm^2)
Aluminum	2450 psi (172 kgs/cm^2)

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

• *Chemical Resistance:*
The chemical resistance using specimens immersed in all of the following chemicals for at least 52 weeks, is rated excellent.

INORGANIC ACIDS
36% hydrochloric acid
30% hydrofluosilicic acid
10% nitric acid
60% perchloric acid
30% phosphoric acid
98% sulfuric acid
6% sulfurous acid

INORGANIC BASES
30% ammonia solution
40% sodium hydroxide
40% potassium hydroxide
bromide water (saturated)
chlorine water (saturated)

ORGANIC ACIDS
30% citric acid
37% formaldehyde

ORGANIC BASES
methylamine

Continued . . .

CURE TIMES

Temperature	59°F (15°C)	68°F (20°C)	77°F (25°C)	86°F (30°C)
Light pedestrian traffic	16 hrs	12 hrs	8 hrs	6 hrs
Vehicular traffic	48 hrs	36 hrs	24 hrs	20 hrs
Full chemical resistance	14 days	7 days	6 days	5 days

SOLVENTS

amyl acetate
benzene
cellosolve
dibutylphthalate
ester EEP
ethanol
ethylethoxyproprionate
hexane
isobutanol
mesitylene
methyl amyl ketone
n-butanol
petroleum naphtha
skydrol
styrene
toluene
xylene

HALOGENATED COMPOUNDS

carbon tetrachloride
1,1,1 trichloroethane
trichlorethylene
trichlorotrifluoroethane
bromide water (saturated)
chlorine water (saturated)

* *For a more detailed description of chemical resistance properties, refer to Product Data Q502.*

• *Compressive Strength:*

The compressive yield strength of the material when tested to ASTM D695 is typically 14,200 psi (998 kgs/cm^2).

• *Flexural Strength:*

The flexural strength of the material when tested to ASTM D790 is typically 13,000 psi (914 kgs/cm^2).

• *Heat Distortion Temperature:*

The heat distortion temperature (HDT) of the material shall be tested in accordance with ASTM D648, under 264 psi fiber stress. Typical results obtained using different cure schedules will be as follows:

Cure Schedule	HDT Values
77°F (25°C) cure	129°F (54°C)
122°F (50°C) post cure	158°F (70°C)
212°F (100°C) post cure	170°F (77°C)

• *Heat Resistance:*

For many typical applications, the product is thermally stable to 392°F (200°C) dry and 140°F (60°C) wet, and down to -40°F (-40°C).

• *Impact Strength:*

The material, when tested in accordance with ASTM D256 is typically 0.26 ft.lbs./in. (14J/m).

• *Thermal Expansion:*

Tested to ASTM E228 the coefficient of thermal expansion is typically 61.9 ppm/°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® 4311 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.
DEGUSSA
RHODE ISLAND DEPARTMENT OF TRANSPORT
PAPER BOARD INDUSTRIES CORPORATION

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