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1. PRODUCT NAME Belzona® 1391

Coating sysytem for high temperature equipment handling water and aqueous solutions.

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 high temperature coating system designed to resist water and pressurised steam up to a temperature of 265°F (130°C) and to exhibit excellent erosion-corrosion resistance at elevated temperatures.

When mixed and applied as detailed in the Instructions for Use leaflet the system is ideally suited for application to: Condensate extraction pumps

Condensate extraction pumps Condensate return tanks Evaporators Heat exchanger barrels Oil/gas and oil/water separators Autoclaves Scrubber units Calorifiers Distillation units

4. TECHNICAL DATA

Base Component	
Appearance	Paste
Color	Gray
Density	2.48 - 2.68 g/cm ³

Solidifier Component

Liquid
Blue or Violet
0.99 - 1.03 g/cm³

Mixed PropertiesMixing Ratio by Weight(Base : Solidifier)13 : 1Mixing Ratio by Volume(Base : Solidifier)5 : 1Mixed FormLiquidSlump Resistancenil at 50 mil
(1.25 mm)Mixed Density2.24 - 2.41 g/cm³

• Limitations of Use:

Belzona® 1391 should not be applied at temperatures below 65°F (18°C).

• Shelf Life:

Separate Base and Solidifier components will have a minimum shelf life of 3 years when stored in their original unopened containers between 32°F (0°C) and 86°F (30°C).

• Working Life:

Will vary according to temperature. At 68°F (20°C) the usable life of mixed material is 35 minutes.

• Coverage Rate:

At operating temperatures up to 212°F (100°C) the **Belzona® 1391** should be applied at a thickness of 24 - 30 mils (600 - 750 microns). To achieve the correct film thickness a practical coverage rate of 5.6 sq.ft. (0.52 sq.m.) per kilogram unit should be obtained.

At operating temperatures between 212 and 265°F (100 - 130°C) the **Belzona® 1391** should be applied at a thickness of 32-40 mils (800 - 1000 microns) and to achieve this thickness a practical coverage rate of 4.2 sq. ft. (0.39 sq. m.) per kilogram unit should be obtained.

• Volume Capacity:

The volume capacity of mixed material is 26.1 cu.ins. (431 cm³) per kilogram.

PRODUCT SPECIFICATION SHEET BELZONA® 1391

• Cure Time:

Allow the applied material to solidify for the times shown in the chart below before subjecting it to the conditions indicated.

* In certain instances it may be advantageous to post cure material prior to putting into service where chemical contact is involved. Refer to Belzona® TKL for specific recommendations.

5. PHYSICAL / MECHANICAL PROPERTIES

Determined after 7 days cure at 68°F (20°C). Post curing the material with heat results in a more highly cross-linked polymer, which gives rise to increased mechanical strength and/or greater retention of strength at elevated temperature. The material may be post cured in service after allowing to cure for the times indicated in the 'hot water immersion' section of the 'Cure Times' table below, or alternatively by allowing to cure for 24 hours at ambient temperature prior to heating to 212°F (100°C) for a period of between 2 and 24 hours.

• Abrasion Resistance: Taber

The sliding abrasion resistance of the material when tested under wet conditions using the Taber Abraser fitted with H10 grinding wheels and 1 kg load is typically: 50 mm³ loss/1000 cycles - ambient cure 39 mm³ loss/1000 cycles - post cure

• Adhesion:

Tensile Shear

When tested in accordance with ASTM D1002, using degreased substrates which have been grit blasted to a 3 - 4 mil. profile, gives typical values of

	51	
	ambient	post cure
Mild steel	3,200 psi	3,100 psi
	(225 kgs/cm ²)	(218 kgs/cm ²)
Stainless steel	2,800 psi	2,700 psi
	(197 kgs/cm ²)	(190 kgs/cm ²)
Copper	2.200 psi	2,300 psi
	(155 kgs/cm ²)	(162 kgs/cm ²)
Aluminum	1,600 psi	1,800 psi
	(112 kgs/cm ²)	(126 kgs/cm ²)

CURE TIMES						
TEMPERATURE	65°F (18°C)	75°F (24°C)	85°F (30°C)	105°F (40°C)		
Movement or use involving no loading or immersion Machining and/or light loading Full mechanical loading or cold water immersion Hot water immersion or chemical contact*	5½ hrs 9 hrs 4 days 7 days	3½ hrs 4½ hrs 2½ days 4 days	2 hrs 3 hrs 2 days 3 days	1½ hrs 2 hrs 1½ days 2 days		

When tested on mild steel at 265°F (130°C) the tensile shear adhesion of the post cured material is typically 1750 psi (123 kgs/cm²).

• Cathodic Disbondment:

When tested in accordance with ASTM G42 (High temperature cathodic disbondment test) no blistering or spontaneous holiday formed after 30 days at 194°F (90°C) with stress potential of 1.5 mV.

• Cavitation Resistance:

The cavitation resistance of the product when tested to a modified version of ASTM G32 using stationary specimens at 20KHz freguency and 50 microns amplitude, typically equates to an average volume loss of 3.3 mm³ after ambient temperature cure and 2.0 mm³ after post cure.

• Chemical Resistance:

Once fully cured, the material will demonstrate excellent resistance to a wide range of chemicals. Refer to Belzona® TKL for specific recommendations.

• Compressive Modulus:

When tested in accordance with ASTM D695, typical values obtained will be: 1.33 x 10⁵ psi (920 N/mm²)

Compressive Strength:

When tested in accordance with ASTM D695, typical values obtained will be 11,400 psi (802 kgs/cm²) - ambient cure 14,400 psi (1013 kgs/cm²) - post cure

• Flexural Modulus:

When tested in accordance with ASTM D790, typical values obtained will be: 8.03 x 10⁵ psi (5540 N/mm²)

• Flexural Strength:

When tested to ASTM D790, typical values obtained will be 8,500 psi (598 kgs/cm²). under either ambient or post cure conditions.

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• Hardness:

The Shore D hardness of the material is typically: 84 - ambient cure

87 - post cure

When tested at elevated temperatures the Shore D hardness of the post cured material is typically as follows:

- 100°C 87
- 140°C 85 180°C - 82
- 200°C 78

• Heat Distortion Temperature:

Tested to ASTM D648 (264 psi fiber stress). typical values obtained will be 118°F (48°C) when cured at 68°F (20°C), 253°F (123°C) when post cured at 212°F (100°C) for 2 hours and 293°F (145°C) when fully post cured.

• Heat Resistance:

The material will resist water and pressurised steam at temperatures up to 265°F (130°C). Above 212°F(100°C) a coating thickness of 32-40 mils (800-1000 microns) is recommended along with insulation of the outer surface of the coated item where practical. The material is thermally stable up to 392°F (200°C) under dry conditions.

• Impact Strength:

Reverse notched Izod impact strength is typically:

0.85 ft.lbs./in (46 J/m) - ambient cure 1.13 ft.lbs./in (61 J/m) - post cure

6. SURFACE PREPARATION AND APPLICATION PROCEDURES

For proper technique, refer to the Belzona® 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® 1391.

7. AVAILABILITY AND COST

Belzona® 1391 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.K. WRC U.S.D.A. NUCLEAR POWER INDUSTRY (DBA Tested)



Belzona® 1391 - Product Specification Sheet (2)

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