PRODUCT SPECIFICATION SHEET
BELZONA 1391T
FN10034

BELZONA®
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GENERAL INFORMATION

Product Description:
A two component hand applied coating system designed to operate under continuous immersion at operating temperatures up to 266°F (130°C). Suitable for steaming out up to 410°F (210°C). Exhibits excellent erosion-corrosion resistance at elevated temperatures. Resistant to a broad range of aqueous solutions, hydrocarbons and process chemicals. 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.

Application Areas:
When mixed and applied as detailed in the Belzona Instructions for Use (IFU), the system is ideally suited for application to the following:

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

APPLICATION INFORMATION

Working Life
Will vary according to temperature. At 68°F (20°C) the usable life of mixed material is 45 minutes.

Cure Time
Allow the applied material to solidify for the times shown in the Belzona IFU 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 for specific recommendations.*

Limitations of Use
Belzona 1391T should not be applied at temperatures below 50°F (10°C).

Volume Capacity
32.6 cu.in. (535 cm^3)/kg.

Base Component	
Appearance	Paste
Colour	Grey
Density	1.99 - 2.19 g/cm^3
Solidifier Component	
Appearance	Liquid
Colour	Blue or Violet
Density	0.97 - 1.01 g/cm^3
Mixed Properties	
Mixing Ratio by Weight (Base : Solidifier)	8.5 : 1
Mixing Ratio by Volume (Base : Solidifier)	4 : 1
Mixed Form	Liquid
Sag Resistance	nil at 30 mil (0.75 mm)
Mixed Density	1.79 - 1.95 g/cm^3
VOC content (ASTM D2369 / EPA ref. 24)	0.70% / 13.08 g/L

The above application information serves as introductory guide only. For full application details including the recommended application procedure/technique, refer to the Belzona IFU which is enclosed with each packaged product.

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ABRASION

Taber
Dry sliding abrasion resistance, when determined in accordance with ASTM D4060 using CS17 wheels, will typically result in:

31 mm³ loss per 1000 cycles	194°F (90°C) cure

Wet sliding abrasion resistance, when determined in accordance with ASTM D4060 using H10 wheels, will typically result in:

320 mm³ loss per 1000 cycles	68°F (20°C) cure

ADHESION

Tensile Shear
The tensile shear adhesion to grit blasted steel, when tested in accordance with ASTM D1002, is typically:

	Cure temperature
3,200 psi (22.06 MPa)	68°F (20°C)
2,800 psi (19.30 MPa)	212°F (100°C)

	Cure/test temperature
2300 psi (15.86 MPa)	212°F (100°C)

Pull Off Adhesion
When tested in accordance with ASTM D 4541/ISO 4624, the pull off strength from grit blasted steel will be typically:

	Cure temperature
3770 psi (25.99 MPa)	68°F (20°C)
4260 psi (29.51 MPa)	212°F (100°C)

CHEMICAL ANALYSIS

The mixed **Belzona 1391T** has been independently analysed for halogens, heavy metals, and other corrosion-causing impurities in accordance with ASTM E165, ASTM D4327 and ASTM E1479. Typical results are displayed as follows:

Analyte	Total Concentration (ppm)
Fluoride	94
Chloride	482
Bromide	ND (<11)
Sulphur	161
Nitrite	ND (<7)
Nitrate	ND (<7)
Zinc	9.5
Antimony, Arsenic, Bismuth, Cadmium, Lead, Tin, Silver, Mercury, Gallium and Indium	ND (<3.0)

ND : Not Detected

CHEMICAL RESISTANCE

Once fully cured, the material will demonstrate excellent resistance to a wide range of chemicals.

* *For a more detailed description of chemical resistance properties, determined in accordance with ISO 2812-1, please refer to relevant Chemical Resistance chart.*

COMPRESSIVE PROPERTIES

When determined in accordance with ASTM D695, typical values will be:

	Compressive Strength	Proportional Limit	Youngs Modulus
68°F/20°C cure & test	91.6 MPa 13,287 psi	76.5 MPa 11,096 psi	1,488.3 MPa 2.16 x 10⁵ psi
212°F/100°C cure & 68°F/20°C test	221.6 MPa 32,133 psi	192.2 MPa 27,874 psi	2,176.0 MPa 3.16 x 10⁵ psi

CORROSION PROTECTION

Cathodic Disbondment
When tested in accordance with ASTM G42 the disbondment diameter is typically: 0.13 in.(3.3mm) at 194°F (90°C).

ELECTRICAL PROPERTIES

When tested in accordance with ASTM D149, method A, with voltage rise of 2kV/s, typical value will be:

Dielectric strength	25.0 kV/mm

ELONGATION & TENSILE PROPERTIES

When determined in accordance with ASTM D638, typical values will be:

	Cure temperature
Tensile Strength	
4,487 psi (30.94 MPa)	68°F (20°C)
Elongation	
0.61%	68°F (20°C)
Young's Modulus	
8.94x10⁵ psi (6,164 MPa)	68°F (20°C)

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EXPLOSIVE DECOMPRESSION

No coating breakdown was exhibited upon inspecting after the following testing:

Explosive Decompression (NACE TM0185)		
	Test 1	Test 2
Test duration	21 days	7 days
Temperature	248°F (120°C)	203°F (95°C)
Pressure	1,015 psi (70 bar)	3,000 psi (207 bar)
Gas Phase	10% CO_2, 90% CH_4	5% H_2S, 8% CO_2, 87% CH_4
Liquid Phase	50% Crude Oil, 50% Saltwater	40.2% MEG, 13.4% Heavy Diesel, 46.4% Formation Water
Decompression Rate	68 psi/min (4.7 bar/min)	1,000 psi/min (69 bar/min)

FLEXURAL PROPERTIES

The flexural strength, when determined in accordance with ASTM D790, will typically be:

	Cure temperature
5,700 psi (39.3 MPa)	68°F (20°C)
7,100 psi (48.95 MPa)	212°F (100°C)

FOOD CONTACT

Direct Food Contact (FDA)
Meets extraction requirements as set out in 21 CFR 175.300 (paragraph c) for a broad range of food types in Conditions of Use A, B, C, and D (paragraph d).
Please contact Belzona for more comprehensive data.

Incidental Food Contact (USDA)
USDA compliant as an Incidental food contact surface.

HARDNESS

Shore D
When determined in accordance with ASTM D2240, typical values will be:

	Cure temperature
80	68°F (20°C)
86	212°F (100°C)

	Cure/test temperature
79	212°F (100°C)

Barcol Hardness
The Barcol hardness, when determined in accordance with ASTM D2583, will typically be:

	Ambient cure (68°F/20°C)	Post cure (212°F/100°C)
Barcol 934-1	12	30
Barcol 935	85	93

Koenig Pendulum
When tested to ISO 1522 the Koenig damping time of the coating will typically be:

166 seconds	68°F (20°C)

HEAT RESISTANCE

Heat Distortion Temperature (HDT)
Tested to ASTM D648 (264 psi fibre stress), typical values obtained will be:

	Cure temperature
127°F (53°C)	68°F (20°C)
284°F (140°C)	212°F (100°C)

Atlas Cell Cold Wall Immersion Test
When tested in accordance with NACE TM 0174 procedure A, the coating will exhibit no blistering or rusting (ASTM D714 rating 10; ASTM D610 rating 10) after 6 months immersion in water at 266°F (130°C).

Immersion Resistance
Suitable for service at temperatures up to 266°F (130°C) but refer to chemical resistance data for chemical contact limitations.

Steam-out Resistance
Once fully cured the coating will exhibit no blistering, cracking or delamination after 96 hours exposure to pressurized steam at 410°F (210°C).

Dry Heat Resistance
The indicated degradation temperature in air based on Differential Scanning Calorimetry (DSC) operated in accordance with ISO11357 is typically 482°F (250°C).

IMPACT RESISTANCE

Izod Pendulum
Izod impact strength, when determined in accordance with ASTM D256, will typically be:

	Reversed notched Izod Impact Strength	Un-notched Izod Impact Strength
68°F/20°C cure & test	3.7 KJ/m^2 39.5 J/m	4.3 KJ/m^2 54.8 J/m
212°F/100°C cure & 68°F/20°C test	3.8 KJ/m^2 41.8 J/m	4.4 KJ/m^2 56.7 J/m

THERMAL PROPERTIES

Thermal Conductivity
When tested in accordance with ASTM E1461-13 at a temperature of 100°C (212°F), the thermal conductivity will typically be 0.478 W/m·K.

Low Temperature Thermal Shock
Coated steel panels will exhibit no blistering, cracking or delamination after multiple cycles of rapid cooling from 212°F to -76°F (100°C to -60°C).

Thermal Cycling
When tested in accordance with section 9 of NACE TM0304, the coating passed after 252 cycles between +140°F and -22°F (+60°C and -30°C).

THICK FILM CRACKING

Thick Film Cracking
When tested in accordance with Section 12 of NACE TM0104, the coating at three times recommended thickness, exhibited no cracking after 12 weeks immersion in seawater at 104°F (40°C).

SHELF LIFE

Separate base and solidifier components shall have a shelf life of 3 years from date of manufacture when stored in their original unopened containers between 41°F (5°C) and 86°F (30°C).

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WARRANTY

This product will meet the performance claims stated herein when material is stored and used as instructed in the Belzona Information For Use leaflet. Belzona ensures that all its products are carefully manufactured to ensure the highest quality possible and are tested strictly in accordance with universally recognized standards (ASTM, ANSI, BS, DIN, ISO, etc.). Since Belzona has no control over the use of the product described herein, no warranty for any application can be given.

AVAILABILITY AND COST

Belzona 1391T 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.

HEALTH AND SAFETY

Prior to using this material, please consult the relevant Safety Data Sheets.

MANUFACTURER / SUPPLIER

Belzona Limited,
Claro Road, Harrogate,
HG1 4DS, UK

Belzona Inc.
14300 NW 60th Ave,
Miami Lakes, FL, 33014, USA

TECHNICAL SERVICE

Complete technical assistance is available and includes fully trained Technical Consultants, technical service personnel and fully staffed research, development and quality control laboratories.

Belzona products are manufactured under an ISO 9001 Registered Quality Management System