

# Belzona 1593

FN10151



## INSTRUCTIONS FOR USE

### 1. TO ENSURE AN EFFECTIVE MOLECULAR WELD

- i) **METALLIC SURFACES - APPLY ONLY TO BLAST CLEANED SURFACES**
- a) Brush away loose contamination and degrease with a rag soaked in **Belzona® 9111** (Cleaner/Degreaser) or any other effective cleaner which does not leave a residue e.g. methyl ethyl ketone (MEK).
- b) Select an abrasive to give the necessary standard of cleanliness and a minimum depth of profile of 3 mils (75 microns). Use only an angular abrasive with low chloride content.
- c) Blast clean the metal surface to achieve the following standard of cleanliness:  
ISO 8501-1 Sa 2½ very thorough blast cleaning  
American Standard near white finish SSPC SP 10  
Swedish Standard Sa 2½ SIS 05 5900
- d) After blasting, metal surfaces should be coated before any oxidation or contamination of the surface takes place.

#### SALT CONTAMINATED SURFACES

The soluble salt contamination of the prepared substrate, immediately prior to application, shall be less than 20mg/m<sup>2</sup> (2µg/cm<sup>2</sup>). Metal surfaces that have been immersed for any periods in salt solutions e.g. sea water, should be blasted to the required standard, left for 24 hours to allow the ingrained salts to sweat to the surface, then washed prior to a further brush blast to remove these. This process may need to be repeated several times to ensure complete removal of the salts. Salt removal aids are commercially available that will assist and speed salt removal. Contact Belzona for best recommendation.

### 2. PIT FILLING

All welds should be prepared to NACE SP0178 Grade C or better. Deep pitting and rough welds should be smoothed out with **Belzona® 1511** mixed, applied and overcoated in accordance with the relevant IFU.

### 3. COMBINING THE REACTIVE COMPONENTS

Transfer the entire contents of the Solidifier container into the Base container. Mix thoroughly together to achieve a uniform material free of any streakiness.

#### 1. MIXING AT LOW TEMPERATURES

To ease mixing when the material temperature is below 50°F (10°C), warm the Base and Solidifier containers until the contents attain a temperature of 68-77°F (20-25°C).

#### 2. WORKING LIFE

From the commencement of mixing, **Belzona® 1593** must be used within the times shown below:

Temperature	50°F(10°C)	68°F(20°C)	86°F(30°C)	104°F(40°C)
Use all material within	90 min.	45 min.	35 min.	25 min.

#### 3. MIXING SMALL QUANTITIES

For mixing small quantities of **Belzona® 1593** use:  
11 parts Base to 1 part Solidifier by weight  
5.6 parts Base to 1 part Solidifier by volume

#### 4. VOLUME CAPACITY OF MIXED BELZONA® 1593

33.7 cu.in. (552 cm<sup>3</sup>) per kg.

### 4. APPLYING BELZONA® 1593

#### FOR BEST RESULTS

##### Do not apply when:

- i) The temperature is below 50°F (10°C), above 104°F (40°C) or the relative humidity is above 85%.
- ii) The substrate temperature is less than 5°F (3°C) above dewpoint.
- iii) Rain, snow, fog or mist is present.
- iv) There is moisture on the metal surface or is likely to be deposited by subsequent condensation.
- v) The working environment is likely to be contaminated by oil/grease from adjacent equipment or smoke from kerosene heaters or tobacco smoking.

#### 4.1 COVERAGE RATES

Recommended number of coats	2
Target thickness 1 <sup>st</sup> coat	15 mils (375 microns)
Target thickness 2 <sup>nd</sup> coat	15 mils (375 microns)
Minimum total DFT	20 mils (500 microns)
Maximum DFT (2 coats)	40 mils (1000 microns)
Maximum system DFT in stripe coat or repair areas	60 mils (1500 microns)
Theoretical coverage rate 1 <sup>st</sup> coat	15.8 sq.ft (1.47 m <sup>2</sup> )/kg
Theoretical coverage rate 2 <sup>nd</sup> coat	15.8 sq.ft (1.47 m <sup>2</sup> )/kg
Theoretical coverage rate to achieve minimum recommended system thickness	11.8 sq.ft. (1.1 m <sup>2</sup> )/kg

#### 4.2 PRACTICAL COVERAGE RATES

Appropriate loss factors must be applied to the above coverage rates. In practice, many factors influence the actual coverage rate achieved. On rough surfaces such as pitted steel the practical coverage rate will be reduced. Application at low temperatures will also reduce practical coverage rates further.

#### 4.3 APPLICATION

- a) Apply the **Belzona® 1593** directly on to the prepared surface with a stiff bristled brush or with the plastic applicator provided.
- b) As soon as possible after application of the first coat, apply a further coat of **Belzona® 1593** as in (a) above.

#### 4.4 OVERCOAT TIMES

The **Belzona® 1593** can be overcoated as soon as it is firm enough to do so. At 68°F (20°C) it will be possible to walk on the coating after 6-8 hours, but if access can be gained without walking on the first coat, overcoating can take place after as little as 3-4 hours. The maximum overcoat time is dependent on both temperature and humidity as set out below. After this time the surface must be grit blasted to achieve a frosted appearance with a minimum surface profile of 40 microns.

Temperature	<50% Relative Humidity	>50% Relative Humidity
Up to 68°F (20°C)	24 hours	24 hours
Up to 86°F (30°C)	24 hours	18 hours
Up to 104°F (40°C)	18 hours	8 hours

#### 4.5 REPAIRS

Within the overcoat window, any misses, pinholes or mechanical damage can be repaired by application of a further coat direct to the **Belzona® 1593** surface. Outside of the overcoat window the surface of the **Belzona® 1593** must be grit blasted or abraded to produce a frosted appearance free of all gloss before coating. A profile of 1.5 mils (40 microns) should be aimed for.

#### 4.6 INSPECTION

- Immediately after application of each unit, visually inspect for pinholes and misses. Where detected, these should be immediately brushed out.
- Once the application is complete and the coating is dimensionally stable, carry out a thorough visual inspection to confirm freedom from pinholes and misses, and to identify any possible mechanical damage.
- Spark testing in accordance with NACE SP0188 can be carried out to confirm coating continuity. A voltage of 3kV is recommended to confirm that a minimum coating thickness of 20 mil (500 microns) has been achieved.

#### 4.7 COLOUR

**Belzona® 1593** is available in different colours to facilitate application and to prevent misses. These colours are for identification only and there will be some variation between batches. In service the colour of the applied product may change.

#### 4.8 CLEANING

Mixing tools should be cleaned immediately after use with **Belzona® 9111** or any other effective solvent e.g. Methyl ethyl ketone (MEK). Application tools should be cleaned using a suitable solvent such as **Belzona® 9121**, MEK, acetone or cellulose thinners.

### 5. COMPLETION OF THE MOLECULAR REACTION

The coating should be allowed to cure as follows:

Ambient temperature	Time until inspection	Time until full service	Time until post-cure (if required)	
			Dry	Wet
50°F (10°C)	42 hrs	10 days	42 hrs	4 days
68°F (20°C)	20 hrs	72 hrs	20 hrs	40 hrs
86°F (30°C)	8 hrs	30 hrs	8 hrs	14 hrs
104°F (40°C)	4 hrs	9 hrs	4 hrs	7 hrs

Coated equipment can be transported after the material has achieved the 'inspection' level of cure.

Post-cure will generally be unnecessary as, in most circumstances, the coating will cure sufficiently at ambient temperature with full cure achieved in service. However, post-cure may be necessary (see table above) or desirable to facilitate faster cure and quicker return to service (see below).

#### 5.1 POST-CURE

If post-cure is necessary or desirable, the coating should be heated to between 122°F (50°C) and 212°F (100°C) for a minimum of 1 hour.

The coating should be allowed to cure as detailed in the above table prior to a dry (e.g. hot air) or wet (e.g. steam and liquid media) post-cure. Wet post-cure can typically be achieved during return to service, provided that the temperature ramp rate does not exceed 54°F (30°C) per hour.

##### 5.1.1 POST-CURE FOR CHEMICAL CONTACT

Post-cure requirements for optimal chemical resistance will vary depending on service conditions. For general guidance please refer to the Chemical Resistance Chart (CRC). For specific applications please contact your Belzona representative to discuss requirements.

### HEALTH & SAFETY INFORMATION

Please read and make sure you understand the relevant Safety Data Sheets.

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