**Advisory Note**

**GEN 7/2**

**Repair of Field Welds on Hot Dip Galvanizing**

December 2013

---

**Introduction**

Ideally, the design and build phase of a structure should allow for only the minimum of on-site rectification works. By minimising or eliminating field work, the risk of early corrosion of steelwork is reduced, especially in medium to high corrosivity zones. However, there are times when field welding is a necessary activity and this Advisory Note provides general information on the repair of hot dip galvanized steel after on-site or field welding has been carried out.

**Weld damage**

When severe damage to the galvanized coating has occurred during welding, protection of the steelwork must be restored. The level and extent of the restoration must be more robust and the repair work completed prior to the article being put in service if the steel will be exposed to severe corrosive conditions in service.

The width of the weld damaged zone will depend on heat input during welding, being greater with a slow process such as oxyacetylene welding than with high speed arc welding. In the manual metal arc welding and oxyacetylene welding of galvanized steel, the weld metal itself will corrode in most atmospheres and the application of a protective coating is essential. Suitable materials for coating the weld metal and adjacent damaged areas of the coating are zinc rich paints, and in some circumstances, zinc metal spraying.

**Repair methods**

In the case of weld repairs, additional surface preparation of the damaged area is usually required to remove any welding slag followed by additional abrasive cleaning of the damaged area. Appropriate coating repair methods in accordance with AS/NZS 4860 - *Hot-dip galvanized (zinc) coatings on fabricated ferrous articles* (*Clause 8: Repair After Galvanizing*) are:

a) Organic zinc rich epoxy paint complying with AS/NZS 3750.9. This is to be applied to the repair areas in two coats. Each coat shall have a minimum dry film thickness of 50μm.

b) Inorganic zinc silicate paint complying to AS/NZS 3750.15. This shall have a minimum dry film thickness of 100μm.

c) Zinc metal spray to ISO 2063 or AS/NZS 2312.

d) Zinc alloy solder stick.

For repair of areas damaged by welding after hot dip galvanizing, the recommended repair method is the use of organic zinc rich epoxy paint. Further information on the surface preparation and appropriate finishes for different service requirements are detailed below.

1. **Surface preparation for all conditions**
   - Power tool clean to Australian Standard 1627.2 Class 3.¹
   - Remove all welding scale, slag and corrosion products.
   - Degrease and remove all surface contaminants.

---

¹ Suitable tools include power wire brush, needle gun, disc sander, angle grinder and/or chipping hammer.
2. Zinc rich paint repair

Decorative finish
a) Apply 2 coats of Galvanite® epoxy zinc rich primer or equivalent to 125 – 150µm DFT.
b) Stipple edges of the painted area to achieve optimum appearance of the repair.
c) If a very close colour match is essential, where the unrepaired galvanizing has a ‘shiny silver’ appearance, apply 1 coat of a ‘silver’ paint with an aluminium pigment over the zinc rich primer for appearance only. Otherwise a more uniform metallic colour match will be achieved over time.

Moderate atmospheric corrosivity zones (C1 – C3)
Apply 2 coats of Galvanite® epoxy zinc rich primer or equivalent to 125 – 150µm DFT.

Severe atmospheric corrosivity zones (C4 – C5)
Apply 2 coats of 2 pack epoxy zinc to AS 3750.9 to 150µm minimum DFT followed by 2 pack epoxy enamel to 150µm DFT.
If a decorative finish is required, follow steps b) and c) from the decorative finish instructions above.

It is important to observe normal good painting practice with respect to weather and application conditions. Apply all paint strictly in accordance with paint manufacturers’ recommendations.

Repaired areas of hot dip galvanized steel are normally considered to be most ‘at risk’ of early corrosion. Repaired areas should therefore receive an earlier maintenance inspection than the remainder of the structure.

Note: Hot dip galvanized steels are welded easily and satisfactorily by all commonly practised welding techniques. Closer control of welding conditions than for uncoated steel is usually necessary but procedures are simple and well established. Chapter 5 of the After Fabrication Hot Dip Galvanizing Reference Guide (published by the GAA) details the procedures of the suitable welding techniques for galvanized steel, including GMA (gas metal arc), carbon arc, GTA (gas tungsten arc), manual arc, and oxyacetylene welding.

An example of poorly repaired handrail in a severe corrosive environment (wastewater treatment plant) where the repaired area has failed well before the main hot dip galvanized rails and posts.

An example of well repaired handrail in a severe corrosive environment (marine).
Technical Data

Galvanite

**Product description**
Galvanite is a single pack, zinc-rich primer for repair of damaged or degraded galvanized surfaces or as a zinc primer for properly prepared steel surfaces.

**Recommended use**
General purpose primer for repair of welding or other damage to galvanized surfaces. May also be used as a zinc-rich primer for steel surfaces.

**Film thickness and spreading rate**

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film thickness, dry (µm)</td>
<td>30</td>
<td>75</td>
<td>40</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>55</td>
<td>135</td>
<td>70</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>18.3</td>
<td>7.3</td>
<td>13.8</td>
</tr>
</tbody>
</table>

**Physical properties**
- **Colour**: Light metallic grey. Weathers to a galvanized appearance
- **Solids (vol %)***: 55 ± 2
- **Flash point**: 25ºC ± 2 (Setaflash)
- **Abrasion resistance**: Good
- **Chemical resistance**: Good
- **Flexibility**: Good

*Measured according to ISO 3233:1998 (E)

**Surface preparation**
All surfaces should be clean, dry and free from contamination. The surface should be assessed and treated in accordance with ISO 8504.

**Other surfaces**
The coating may be used on other substrates. Please contact your local Jotun office for more information.

**Condition during application**
The temperature of the substrate should be minimum 5°C and at least 3°C above the dew point of the air, temperature and relative humidity measured in the vicinity of the substrate. Good ventilation is required in confined areas to ensure correct drying.

**Application methods**
- **Spray**: Conventional or airless spray may be used for larger areas.
- **Brush**: Recommended
- **Roller**: Recommended

**Application data**
- **Thinner/Cleaner**: Jotun Thinner No. 7
- **Guiding data airless spray**: Pressure at nozzle 5-10MPa (700-1400 psi)
- **Nozzle tip**: 0.38-0.53 mm(0.015-.021")
- **Spray angle**: 40-80°
- **Filter**: Check to ensure that filters are clean
**Drying time**

Drying times are generally related to air circulation, temperature, film thickness and number of coats, and will be affected correspondingly. The figures given in the table are typical with:

* Good ventilation (Outdoor exposure or free circulation of air)
* Typical film thickness
* One coat on top of inert substrate

<table>
<thead>
<tr>
<th>Substrate temperature</th>
<th>5°C</th>
<th>10°C</th>
<th>23°C</th>
<th>40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface dry</td>
<td>2 h</td>
<td>1 h</td>
<td>30 min</td>
<td>7 min</td>
</tr>
<tr>
<td>Through dry</td>
<td>8 h</td>
<td>4 h</td>
<td>2 h</td>
<td>45 min</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>48 h</td>
<td>24 h</td>
<td>16 h</td>
<td>6 h</td>
</tr>
</tbody>
</table>

The given data must be considered as guidelines only. The actual drying time/times before recoating may be shorter or longer, depending on film thickness, ventilation, humidity, underlying paint system, requirement for early handling and mechanical strength etc. A complete system can be described on a system sheet, where all parameters and special conditions could be included.

**Typical paint system**

Galvanite 2 x 40 micron (Dry Film Thickness)

Other systems may be specified, depending on area of use

**Storage**

The product must be stored in accordance with national regulations. Storage conditions are to keep the containers in a dry, cool, well ventilated space and away from source of heat and ignition. Containers must be kept tightly closed.

**Handling**

Handle with care. Stir well before use.

**Packing size**

4 litres in a 5 litre container.

**Health and safety**

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not breathe or inhale mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

For detailed information on the health and safety hazards and precautions for use of this product, we refer to the Material Safety Data Sheet.

**DISCLAIMER**

The information in this data sheet is given to the best of our knowledge based on laboratory testing and practical experience. However, as the product can be used under conditions beyond our control, we can only guarantee the quality of the product itself. We also reserve the right to change the given data without notice. Minor product variations may be implemented in order to comply with local requirements.

If there is any inconsistency in the text the English (UK) version will prevail.

Jotun is a World Wide company with factories, sales offices and stocks in more than 50 countries. For your nearest local Jotun address please contact the nearest regional office or visit our website at www.jotun.com

ISSUED 26 NOVEMBER 2010 BY JOTUN
THIS DATA SHEET SUPERSEDES THOSE PREVIOUSLY ISSUED