APPENDICES 1 to 4

SUPPLIER’S DOCUMENTATION *
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CARBOLINE
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INTERNATIONAL
JOTUN

* also consult paint suppliers’ Internet home pages
May be obsolete days after printing.
Please check PW-Internet for latest edition.

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SUPPLIER'S DOCUMENTATION

provided by

CARBOLINE

APPENDIX 1

Paul Wurth Paint System Types

Paul Wurth S.A. Luxembourg
PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 1/2 grade Medium G

Paint system

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness in µm</th>
<th>Trade name</th>
<th>Description</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>Carbozinc 858/859</td>
<td>Zinc rich Epoxy primer</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>Carboguard 890</td>
<td>Modified Epoxy</td>
<td>Colour chart</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>Carbothane 134 series</td>
<td>Polyurethane</td>
<td>1)</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td></td>
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</tr>
</tbody>
</table>

Repair system for Spray, Brush and Roller

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Hand/Power tool cleaning ST 2/3

Paint system

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<thead>
<tr>
<th>Coat</th>
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</thead>
<tbody>
<tr>
<td>Touch-up</td>
<td>75</td>
<td>Carbomastic 15</td>
<td>Modified mastic Epoxy</td>
<td>Aluminium</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>Carboguard 890</td>
<td>Modified mastic Epoxy</td>
<td>Colour chart</td>
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PAINT SYSTEM FOR MAINTENANCE WORKS for Spray, Brush and Roller (on site)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas.
Hand or Power tool cleaning ST 2/3 is also acceptable.

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<table>
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**Repair system for Spray, Brush and Roller**

**Cleaning before surface preparation**
- Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**
- Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas.
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**Winter system**

If coating is applied in Winter conditions;
- Carbomastic 15 should be replaced by Carbomastic 615 HS.
- Carboguard 890 should be replaced by Carboguard 890 LT.
- Carbothane 134 series remains the same.
PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

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Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Hand/Power tool cleaning ST 2/3

Paint system

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PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas
Hand or Power tool cleaning ST 2/3 is also acceptable.

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**Winter system**

If coating is applied in Winter conditions;

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Carboguard 890 should be replaced by Carboguard 890 LT.
Carbothane 134 series remains the same.

**Repair system**

**Cleaning before surface preparation**

Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**

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PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

Paint system

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<tr>
<th>Coat</th>
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<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
<td>Carbozinc 11</td>
<td>Ethyl Zinc Silicate</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>Thermaline 4700 or Thermaline 4000</td>
<td>Silicone Finish or Inorganic Silicate</td>
<td>Grey</td>
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Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

Paint system

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<td>105</td>
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</table>
PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasvie Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas.

Paint system

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</tbody>
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Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasvie Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas.

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<td>105</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PAINT SYSTEM | Type F,  
PAINT MANUFACTURER | CARBOLINE  
ENVIRONMENT | Not near slag pit(s) and not in coastal area

## PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

**Cleaning before surface preparation**  
Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**  
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

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<thead>
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<tr>
<td>3</td>
<td>60</td>
<td>Carbothane 134 series</td>
<td>Polyurethane</td>
<td>1)</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
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## Repair system

**Cleaning before surface preparation**  
Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**  
Hand/Power tool cleaning ST 2/3

<table>
<thead>
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<td>240</td>
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## PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

**Cleaning before surface preparation**  
Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas
Hand or Power tool cleaning ST 2/3 is also acceptable.

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**Cleaning before surface preparation**
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**Winter system**

If coating is applied in Winter conditions;

- Carbomastic 15 should be replaced by Carbomastic 615 HS.
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- Carbothane 134 series remains the same.
PAINT SYSTEM

Type F,

PAINT MANUFACTURER

CARBOLINE

ENVIRONMENT

In coastal area, but not near slag pit(s)

PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

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Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Hand/Power tool cleaning ST 2/3

Paint system

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PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation

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Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas
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Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas
Hand or Power tool cleaning ST 2/3 is also acceptable.

Paint system

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness en µm</th>
<th>Trade name</th>
<th>Description</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch-up</td>
<td>80</td>
<td>Carbomastic 15</td>
<td>Modified mastic Epoxy</td>
<td>Aluminium</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>Carboguard 890</td>
<td>Modified Epoxy</td>
<td>Colour chart</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td>Carbothane 134 series</td>
<td>Polyurethane</td>
<td>1)</td>
</tr>
<tr>
<td>Total</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Winter system

If coating is applied in Winter conditions;
Carbomastic 15 should be replaced by Carbomastic 615 HS.
Carboguard 890 should be replaced by Carboguard 890 LT.
Carbothane 134 series remains the same.
PAINT SYSTEM FOR NEW WORKS  (in fabrication shop)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2,5 grade Medium G

Paint system

<table>
<thead>
<tr>
<th>Coat</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>175</td>
<td>Phenoline 1205</td>
<td>Novolac Epoxy</td>
<td>Red</td>
</tr>
<tr>
<td>2</td>
<td>175</td>
<td>Phenoline 1205</td>
<td>Novolac Epoxy</td>
<td>Grey</td>
</tr>
<tr>
<td>Total</td>
<td>350</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2,5 grade Medium G

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</tr>
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</table>
PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2.5 grade Medium G.

Paint system

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</tr>
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</table>

Total 350

Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2.5 grade Medium G.

Paint system

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</table>

Total 350
PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2,5 grade Medium G

### Paint system

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Repair system

Cleaning before surface preparation
Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
Abrasive Blast cleaning up to Sa 2,5 grade Medium G

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PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

Cleaning before surface preparation
   Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
   Abrasive Blast cleaning up to Sa 2,5 grade Medium G.

Paint system

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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>350</td>
</tr>
</tbody>
</table>

Repair system

Cleaning before surface preparation
   Dedusting – Degreasing – Rinsing – Drying if necessary

Surface preparation
   Abrasive Blast cleaning up to Sa 2 ½ grade Medium G.

Paint system

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness en µm</th>
<th>Trade name</th>
<th>Description</th>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
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<td>350</td>
</tr>
</tbody>
</table>
### PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

**Cleaning before surface preparation**
- Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**
- Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

#### Paint system

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness en µm</th>
<th>Trade name</th>
<th>Description</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
<td>Carbozinc 11</td>
<td>Ethyl Zinc Silicate</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>Thermaline 4700 or Thermaline 4000</td>
<td>Silicone Finish</td>
<td>Grey</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inorganic Silicate</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>105</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Repair system**

**Cleaning before surface preparation**
- Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**
- Abrasive Blast cleaning up to Sa 2 ½ grade Medium G

#### Paint system

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<tr>
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</thead>
<tbody>
<tr>
<td>Touch-up</td>
<td>65</td>
<td>Carbozinc 11</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

**Cleaning before surface preparation**
Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas.

**Paint system**

<table>
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<tr>
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<td>Silicone Finish or Inorganic Silicate</td>
<td>Grey</td>
</tr>
</tbody>
</table>

**Total**: 105

---

**Repair system**

**Cleaning before surface preparation**
Dedusting – Degreasing – Rinsing – Drying if necessary

**Surface preparation**
Abrasive Blast cleaning up to Sa 2 ½ grade Medium G on rust areas, picking off/sand papering on deteriorated but not rusted areas

**Paint system**

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<tr>
<th>Coat</th>
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<td>Thermaline 4700 or Thermaline 4000</td>
<td>Silicone Finish or Inorganic Silicate</td>
<td>Grey</td>
</tr>
</tbody>
</table>

**Total**: 105
Selection & Specification Data

<table>
<thead>
<tr>
<th>Generic Type</th>
<th>Solvent Based Organic Zinc-Rich Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Low VOC organic zinc epoxy steel primer with quick cure-to-topcoat characteristics for in-shop applications and quick turnaround requirements in the field. Carbozinc 858 has very good adhesion and undercutting resistance and is excellent for use as a corrosion resistant primer for a variety of applications.</td>
</tr>
</tbody>
</table>
| Features              | • Meets Class A slip co-efficient and creep testing criteria for use on faying surfaces  
                         • Meets SSPC Paint System 20  
                         • Low temperature cure down to 35°F (2°C)  
                         • Protects against undercutting corrosion  
                         • Available in ASTM D520, Type II zinc version  
                         • May be applied with standard airless or conventional spray equipment  
                         • VOC compliant to current AIM regulations |
| Color                 | Green (0300) |
| Finish                | Matte |
| Primers               | Self Priming |
| Topcoats              | Can be topcoated with Epoxies, Polyurethanes, Acrylics and others as recommended by your Carboline sales representative. |
| Dry Film Thickness    | 3.0-5.0 mils (75-125 microns). Dry film thickness in excess of 8.0 mils (200 microns) per coat is not recommended. |
| Solids Content*       | By Volume: 64% ± 2% |
| Zinc Content          | By Weight: 81% ± 2% in dry film |
| Theoretical Coverage Rate | 1026 ft² (25.2 m²) at 25 microns  
                         342 ft² (8.0 m²) at 75 microns |
| VOC Values            | As Supplied: 2.5 lbs./gal (303 g/l)  
                         Thinned:* 8 oz/gal w/ #2: 2.8 lbs./gal (335 g/l)  
                         8 oz/gal w/ #33: 2.82 lbs./gal (338 g/l) |
| Dry Temp. Resistance  | Continuous: 300°F (149°C)  
                         Non-Continuous: 350°F (177°C) |

Substrates & Surface Preparation

| General               | Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating. |
| Steel                 | SSPC-SP6 with a 1.0-3.0 mil (25-75 micron) surface profile. SSPC-SP2 or SP3 for touch-up. |

Application Equipment

| General Guidelines: | Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results. |
| Spray Application   | The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco. Keep material under mild agitation during application. |
| Conventional Spray  | Agitated pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, 0.070” I.D. fluid tip and appropriate air cap. |
| Airless Spray       | Pump Ratio: 30:1 (min.)*  
                         GPM Output: 3.0 (min.)  
                         Material Hose: 3/8” I.D. (min.)  
                         Tip Size: .017-.023"  
                         Output PSI: 2000-2200  
                         Filter Size: 60 mesh |
| *Teflon packings are recommended and available from the pump manufacturer. |
| Brush               | For small areas and touch-up only. Use medium bristle brush and avoid rebrushing. |
| Roller              | Not recommended |

May 2008 replaces August 2003 (Carbozinc 858)

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carbozinc® are registered trademarks of Carboline Company.
# Mixing & Thinning

**Mixing**

Power mix Part A completely. Then slowly sift in the zinc filler under agitation. Power mix Part B separately and add slowly to the mixture. Pour mixture through a 30 mesh screen. DO NOT MIX PARTIAL KITS.

Tip: Sifting zinc through a window screen will aid in the mixing process by breaking up or catching dry zinc lumps.

<table>
<thead>
<tr>
<th>Ratio</th>
<th>.35 gallons Part A:</th>
<th>1.75 gallons Part A:</th>
<th>1 gallon Part B:</th>
<th>14.6 lbs Zinc Filler:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A</td>
<td>.35 gallons</td>
<td>1.75 gallons</td>
<td>1 gallon</td>
<td>14.6 lbs Zinc Filler:</td>
</tr>
</tbody>
</table>

**Thinning**

Normally not required but may be thinned up to 8 oz/gal (10%) with Thinner #2 or Thinner #76. In hot or windy conditions, may be thinned up to 8 oz/gal with Thinner #33. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

**Pot Life**

4 Hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating loses body and begins to sag.

## Cleanup & Safety

**Cleanup**

Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

**Safety**

Read and follow all caution statements on the product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

**Ventilation**

When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

**Caution**

This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-reinforced tools and wear conductive and non-sparking shoes.

# Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>60°-85°F (16°-29°C)</td>
<td>60°-90°F (16°-32°C)</td>
<td>60°-90°F (16°-32°C)</td>
<td>0-90%</td>
</tr>
<tr>
<td>Minimum</td>
<td>40°F (4°C)</td>
<td>35°F (2°C)</td>
<td>35°F (2°C)</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum</td>
<td>90°F (32°C)</td>
<td>120°F (49°C)</td>
<td>110°F (43°C)</td>
<td>95%</td>
</tr>
</tbody>
</table>

Industry standards are for the substrate temperatures to be 5°F (3°C) above the dew point. This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

## Curing Schedule

Dry to touch at 75°F (24°C) is 30 minutes.

<table>
<thead>
<tr>
<th>Surface Temp. &amp; 50% Relative Humidity</th>
<th>Dry to Handle</th>
<th>Dry to Topcoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°F (2°C)</td>
<td>8 Hours</td>
<td>8 Hours</td>
</tr>
<tr>
<td>50°F (10°C)</td>
<td>5 Hours</td>
<td>5 Hours</td>
</tr>
<tr>
<td>75°F (24°C)</td>
<td>2 Hours</td>
<td>2 Hours</td>
</tr>
<tr>
<td>100°F (32°C)</td>
<td>1 Hour</td>
<td>1 Hour</td>
</tr>
</tbody>
</table>

These times are based on a 3.0 mil (75 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Specific topcoat products can be used in a much shorter re-coat interval. Consult Carboline for recommendations and test results.

**Maximum Recoat:** Unlimited. Must have a clean, dry surface for maximum recoat. Specific topcoat products can be used in a much shorter recoat interval. Consult Carboline for recommendations and test results.

## Packaging, Handling & Storage

<table>
<thead>
<tr>
<th>Shipping Weight (Approximate)</th>
<th>80 Gallon Kit</th>
<th>4.00 Gallon Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A</td>
<td>22 lbs (10 kg)</td>
<td>105 lbs (48 kg)</td>
</tr>
<tr>
<td>Part B</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Flash Point (Setaflash)**

| Part A | 48°F (9°C) |
| Part B | 38°F (3°C) |

| Storage Temperature & Humidity | 40° – 110°F (4° – 43°C), 0-95% Relative Humidity |

**Shelf Life**

Part A: Min. 24 months at 75°F (24°C)

Part B: Min. 24 months at 75°F (24°C)

Zinc Filler: 24 months at 75°F (24°C)

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

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May 2008 replaces August 2003 (Carbozinc 858)
Selection & Specification Data

Generic Type: Organic Zinc-Rich Epoxy

Description: Low VOC organic zinc epoxy steel primer with extremely fast cure-to-topcoat characteristics for in-shop applications and quick turnaround requirements in the field. Carbozinc 859 has less than 3.0 lbs/gallon VOC (thinned) and is used extensively in virtually all industrial markets.

Features:
- Meets Class B slip co-efficient and creep testing criteria for use on faying surfaces
- Rapid cure. Dry to recoat in 30 minutes at 75°F (24°C) and 50% relative humidity
- Low temperature cure down to 35°F (2°C)
- Excellent adhesion
- Protects against undercutting corrosion
- Available in ASTM D520, Type II zinc version
- Field proven primer that applies well by spray methods
- Excellent touch-up primer by brush or roll for small areas.
- VOC compliant to current AIM regulations

Color: Green (0300)

Finish: Flat

Primers: Self Priming

Topcoats: Can be topcoated with Epoxies, Polyurethanes, Acrylics and others as recommended by your Carbolene sales representative. Under certain conditions, a mist coat is required to minimize topcoat bubbling.

Dry Film Thickness:
- 3.0-5.0 mils (75-125 microns) Nominal. Dry film thickness may be applied up to 10.0 mils (250 microns) per coat.

Solids Content: By Volume: 66% ± 2%
*Tested in accordance with ASTM D2697

Zinc Content: By Weight: 81% ± 2% in dry film

Theoretical Coverage Rate:
- 1.059 mils ft² (24.0 m²/l) at 25 microns
- 353 ft² at 3.0 mils (8.0 m²/l at 75 microns) Allow for loss in mixing and application.

VOC Values:
- As Supplied: 2.72 lbs./gal (326 g/l)
- Thinned:* 2.72 lbs./gal (326 g/l)
- 13 oz/gal w/#2: 3.12 lbs./gal (374 g/l)
- 13 oz/gal w/#33: 3.15 lbs./gal (378 g/l)
- 13 oz/gal w/#236e: 2.72 lbs./gal (326 g/l)
- 13 oz/gal w/#243e: 2.72 lbs./gal (326 g/l)
These are nominal values.
*Use Thinner #76 for projects requiring non-photochemically reactive solvents.

Dry Temp. Resistance:
- Continuous: 400°F (204°C)
- Non-Continuous: 425°F (218°C)

Substrates & Surface Preparation

General: Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel: SSPC-SP6 minimum with a 1.0-3.0 mil (25-75 micron) nominal surface profile. Carbozinc 859 may be applied over any profile exceeding 1 mil. To achieve specified performance Carbozinc 859 must be applied at thickness to cover the profile by at least 3 mils. Calibrate dry film measurement tools accordingly. SSPC-SP2 or SP3 for touch-up.

Performance Data

<table>
<thead>
<tr>
<th>Test Method</th>
<th>System</th>
<th>Results</th>
<th>Report #</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D4541 Adhesion</td>
<td>A. Carbozinc 859</td>
<td>B. 859 / Polyurethane</td>
<td>C. 859/Epoxy / Polyurethane</td>
</tr>
<tr>
<td>ASTM D522 Flexibility</td>
<td>A. 859</td>
<td>B. 859 / Polyurethane</td>
<td>A. &gt; 6%</td>
</tr>
<tr>
<td>ASTM D2794 Impact</td>
<td>A. 859</td>
<td>B. 859 / polyurethane</td>
<td>Gardner Impact Tester,Direct (intrusion), inch-pounds, over 1/8” steel</td>
</tr>
<tr>
<td>Slip Co. Efficient</td>
<td>Carbozinc 859</td>
<td>A-490 bolt spec; 6 mils dry film maximum, 10% max. thinning</td>
<td>Meets requirements for class B rating</td>
</tr>
<tr>
<td>ASTM D870 Immersion</td>
<td>A. Carbozinc 859/Epoxy/Polyurethane</td>
<td>Salt Water (5% sodium chloride) at 75°F 30 days</td>
<td>A &amp; B had no rusting in the scribe; and no blistering, softening or discoloration with either environment</td>
</tr>
</tbody>
</table>

Performance Data Testing:
- Test reports and additional data available upon written request.

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:
- Spray Application (General): The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco. Keep material under mild agitation during application.
- Conventional Spray: Agitated pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, .070” I.D. fluid tip and appropriate air cap.
- Airless Spray: Pump Ratio: 30:1 (min.)
- Spray GPM Output: 3.0 (min.)
- Material Hose: 3/8” I.D. (min.)
- Tip Size: .017-.023”
- Output PSI: 2000-2200
- Filter Size: 60 mesh
- *Teflon packings are recommended and available from the pump manufacturer.

Brush/Roller: For small areas and touch-up only. Preferred method for large areas is spray application.

June 2009 replaces February 2009

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Mixing & Thinning

Mixing

Power mix Part A completely. Then slowly sifi in the zinc filler under agitation. Power mix Part B separately and add slowly to the mixture. Pour mixture through a 30 mesh screen. DO NOT MIX PARTIAL KITS.

Tip: Sifting zinc through a window screen will aid in mixing process by breaking up or catching dry zinc lumps.

<table>
<thead>
<tr>
<th>Ratio</th>
<th>.80 Gal Kit</th>
<th>4.00 Gal. Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A</td>
<td>.35 gallons</td>
<td>1.77 gallons</td>
</tr>
<tr>
<td>Part B</td>
<td>.20 gallons</td>
<td>1 gallon</td>
</tr>
<tr>
<td>Zinc Filler</td>
<td>14.6 lbs</td>
<td>73 lbs</td>
</tr>
</tbody>
</table>

Thinning

Normally not required but may be thinned up to 13 oz/gal (10%) with Thinner #2 or Thinner #76. In hot or windy conditions, may be thinned up to 13 oz/gal with Thinner #33. Use of thiners other than those supplied by Carbozine may adversely affect product performance and void product warranty, whether expressed or implied.

Carbozine Thinner #236E may also be used to thin this product to minimize HAP and VOC emissions. Consult Carbozine Technical Service for guidance.

Pot Life

4 Hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating loses body and begins to sag.

Cleanup & Safety

Cleanup

Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety

Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation

When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>60°F-85°F (16°C-29°C)</td>
<td>60°F-90°F (16°C-32°C)</td>
<td>60°F-90°F (16°C-32°C)</td>
<td>0-90%</td>
</tr>
<tr>
<td>Minimum</td>
<td>40°F (4°C)</td>
<td>35°F (2°C)</td>
<td>35°F (2°C)</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum</td>
<td>90°F (32°C)</td>
<td>120°F (49°C)</td>
<td>110°F (43°C)</td>
<td>95%</td>
</tr>
</tbody>
</table>

Industry standards are for the substrate temperatures to be 5°F (3°C) above the dew point. This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

<table>
<thead>
<tr>
<th>Surface Temp. &amp; 50% Relative Humidity</th>
<th>Dry to Handle</th>
<th>Dry to Topcoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°F (2°C)</td>
<td>8 Hours</td>
<td>6 Hours</td>
</tr>
<tr>
<td>50°F (10°C)</td>
<td>5 Hours</td>
<td>2 Hours</td>
</tr>
<tr>
<td>75°F (24°C)</td>
<td>2 Hours</td>
<td>30 Minutes</td>
</tr>
<tr>
<td>100°F (32°C)</td>
<td>1 Hour</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

These times are based on a 3.0 mil (75 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Specific topcoat products can be used in a much shorter re-coat interval. Consult Carbozine for recommendations and test results.

Maximum Recoat: Unlimited. Must have a clean, dry surface for topcoating. “Loose” chalk or salts must be removed in accordance with applicable regulations.

Packaging, Handling & Storage

<table>
<thead>
<tr>
<th>Shipping Weight (Approximate)</th>
<th>80 Gallon Kit</th>
<th>4.00 Gallon Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Weight (Approximate)</td>
<td>22 lbs (10 kg)</td>
<td>105 lbs (48 kg)</td>
</tr>
<tr>
<td>Flash Point (Setaflash)</td>
<td>Part A:  49°F (9°C)</td>
<td>Part B:  38°F (3°C)</td>
</tr>
<tr>
<td></td>
<td>Zinc Filler: NA</td>
<td></td>
</tr>
<tr>
<td>Storage (General)</td>
<td>Store Indoors.</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature &amp; Humidity</td>
<td>40° – 110°F (4° - 43°C)</td>
<td>0-95% Relative Humidity</td>
</tr>
<tr>
<td>Shelf Life</td>
<td>Part A: Min. 36 months at 75°F (24°C)</td>
<td>Part B: Min. 24 months at 75°F (24°C)</td>
</tr>
<tr>
<td></td>
<td>Part C: 24 months at 75°F (24°C)</td>
<td></td>
</tr>
</tbody>
</table>

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.
## Selection & Specification Data

### Generic Type
Cycloaliphatic Amine Epoxy

### Description
Highly chemical resistant epoxy mastic coating with exceptionally versatile uses in all industrial markets. Self-priming and suitable for application over most existing coatings, and tightly adherent to rust. Carboguard 890 serves as stand-alone system for a variety of chemical environments. Carboguard 890 is also designed for various immersion conditions.

### Features
- Excellent chemical resistance
- Surface tolerant characteristics
- Conventional and low-temperature versions
- Self-priming and primer/finish capabilities
- Very good abrasion resistance
- VOC compliant to current AIM regulations
- Suitable for use in USDA inspected facilities

### Color
Refer to Carboiline Color Guide. Certain colors may require multiple coats for hiding. Note: The low temperature formulation will cause most colors to yellow or discolor more than normal in a short period of time. (Epoxies lose gloss, discolor and chalk in sunlight exposure.)

### Finish
Gloss

### Primers
Self-priming. May be applied over inorganic zinc primers and other tightly adhering coatings. A mist coat may be required to minimize bubbling over inorganic zinc primers.

### Topcoats
Acrylics, Epoxies, Polyurethanes

### Dry Film Thickness
- 4.0-6.0 mils (100-150 microns) per coat
- 6.0-8.5 mils (150-200 microns) over light rust and for uniform gloss over inorganic zincs.
- Don’t exceed 10 mils (250 microns) in a single coat. Excessive film thickness over inorganic zincs may increase damage during shipping or erection.

### Solids Content
- By Volume (890): 75% ± 2%
- Theoretical Coverage Rate: 890: 2000 ft² at 10 mils (5.0 m²/l at 250 microns)
- 890 LT: 1250 ft² at 5 mils (6.0 m²/l at 125 microns)
- 890: 241 ft² at 5 mils (3.0 m²/l at 125 microns)
- 890 LT: 257 ft² at 5 mils (2.2 m²/l at 125 microns)
- Allow for loss in mixing and application

### VOC Values
- As supplied: 7oz/gal=2.0lbs/gal (250g/l)
- Thinned with #2*: 1oz/gal=2.0lbs/gal (250g/l)
- Thinned with #33*: 1oz/gal=1.0lbs/gal (250g/l)

*Use Thinner #76 up to 8 oz/gal for 890 and 16 oz/gal for 890 LT where non-photochemically reactive solvents are required.

### Performance Data

<table>
<thead>
<tr>
<th>Test Method</th>
<th>System</th>
<th>Results</th>
<th>Report #</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D3359</td>
<td>Blasted Steel 1 ct. 890</td>
<td>5A</td>
<td>0270</td>
</tr>
<tr>
<td>ASTM D4060 Abra</td>
<td>Blasted Steel 1 ct. Epoxy Pr. 1 ct. 890</td>
<td>85 mg. loss after 1000 cycles, CS17 wheel, 1000 gm. load</td>
<td>02411</td>
</tr>
<tr>
<td>ASTM B117 Salt Fog</td>
<td>Blasted Steel 2 cts. 890</td>
<td>No effect</td>
<td>02594</td>
</tr>
<tr>
<td>ASTM B117 Salt Fog</td>
<td>Blasted Steel 1 ct. IOZ 1 ct 890</td>
<td>No effect on plane, no rust in scribe, 1/16&quot; undercutting at scribe after 2000 hours</td>
<td>L40-42.45.05</td>
</tr>
<tr>
<td>ASTM D1735 Water Fog</td>
<td>Blasted Steel 1 ct. Epoxy Pr. 1 ct. 890</td>
<td>No blistering, rusting or delamination after 2800 hours</td>
<td>08564</td>
</tr>
<tr>
<td>ASTM D3363 Pencil Hardness</td>
<td>Blasted 2 cts. 890</td>
<td>Greater than 8H</td>
<td>02775</td>
</tr>
<tr>
<td>ASTM D2486 Scrub Resistance</td>
<td>Blasted Steel 1 ct. 890</td>
<td>93% gloss retained after 10,000 cycles w/ liquid scrub medium</td>
<td>03142</td>
</tr>
<tr>
<td>ASTM E84 Flame and Smoke</td>
<td>2 cts. 890</td>
<td>5 Flame 5 Smoke Class A</td>
<td>03110</td>
</tr>
</tbody>
</table>

Test reports and additional data available upon written request.

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Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

### General Guidelines

#### Equipment Guidelines

- **Spray Application (General)**
  - This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss, and Graco.
  - Conventional Spray: Pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, .070” I.D. fluid tip and appropriate air cap.
  - Airless Spray: Pump Ratio: 30:1 (min.)*
  - GPM Output: 3.0 (min.)
  - Material Hose: 3/8” I.D. (min.)
  - Tip Size: 0.17”-0.21”
  - Output PSI: 2100-2300
  - Filter Size: 60 mesh
  - *Teflon packings are recommended and available from the pump manufacturer.

- **Brush & Roller (General)**
  - Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adhesion. Avoiding excessive rolling or brushing. For best results, tie-in within 10 minutes at 75°F (24°C).
  - **Brush**
    - Use a medium bristle brush.
  - **Roller**
    - Use a short-nap synthetic roller cover with phenolic core.

### Mixing & Thinning

#### Mixing

- Power mix separately, then combine and power mix.
- **Ratio**
  - 890 and 890 LT: 1:1 Ratio (A to B)
  - **Thinning**
    - Spray: Up to 13 oz/gal (10%) w/ #2
    - Brush: Up to 16 oz/gal (12%) w/ #33
    - Roller: Up to 16 oz/gal (12%) w/ #33
  - Thinner #33 can be used for spray in hot/windy conditions. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.
  - *See VOC values for thinning limits.

#### Pot Life

- 890: 3 Hours at 75°F (24°C)
- 890 LT: 2 Hours at 75°F (24°C)
- Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures.

### Cleanup & Safety

#### Cleanup

- Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

#### Safety

- Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective screens on face, hands, and all exposed areas.

#### Ventilation

- When used as a tank lining or in enclosed areas, through-air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

#### Caution

- This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

### Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>60°F-85°F (16°C-29°C)</td>
<td>60°F-85°F (16°C-29°C)</td>
<td>60°F-90°F (16°C-32°C)</td>
<td>0-80%</td>
</tr>
<tr>
<td>Minimum</td>
<td>50°F (10°C)</td>
<td>50°F (10°C)</td>
<td>50°F (10°C)</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum</td>
<td>90°F (32°C)</td>
<td>125°F (52°C)</td>
<td>110°F (43°C)</td>
<td>80%</td>
</tr>
</tbody>
</table>

### Curing Schedule

<table>
<thead>
<tr>
<th>Surface Temp. &amp; 50% Relative Humidity</th>
<th>Dry to Touch</th>
<th>Dry to Handle</th>
<th>Dry to Recoat &amp; Topcoat w/ Others</th>
<th>Final Cure General Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°F (2°C)</td>
<td>5 Hours</td>
<td>18 Hours</td>
<td>20 Hours</td>
<td>7 Days</td>
</tr>
<tr>
<td>40°F (4°C)</td>
<td>4.5 Hours</td>
<td>15.5 Hours</td>
<td>16 Hours</td>
<td>5 Days</td>
</tr>
<tr>
<td>50°F (10°C)</td>
<td>3 Hours</td>
<td>6.5 Hours</td>
<td>12 Hours</td>
<td>3 Days</td>
</tr>
<tr>
<td>60°F (16°C)</td>
<td>2 Hours</td>
<td>5 Hours</td>
<td>8 Hours</td>
<td>2 Days</td>
</tr>
<tr>
<td>75°F (24°C)</td>
<td>1.5 Hours</td>
<td>4 Hours</td>
<td>24 Hours</td>
<td></td>
</tr>
<tr>
<td>90°F (32°C)</td>
<td>1 Hour</td>
<td>1.5 Hours</td>
<td>2 Hours</td>
<td>16 Hours</td>
</tr>
</tbody>
</table>

Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, cause discoloration and may result in a surface haze. Any haze or blur must be removed by water washing before recoating. During high humidity conditions, it is recommended that the application be done while temperatures are increasing. Maximum recoat/topcoat times are 30 days for epoxy and 90 days for polyurethanes at 75°F (24°C). If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. 890 LT applied below 50°F (10°C) may temporarily soften as temperatures rise to 60°F (16°C). This is a normal condition and will not affect performance.

### Packaging, Handling & Storage

#### Shipping Weight

- 2 Gallon Kit: 29 lbs (13 kg)
- 10 Gallon Kit: 145 lbs (66 kg)

#### Flash Point (Setaflash)

- 89°F (32°C) for Part A; 890 & 890 LT: 73°F (23°C) for Part B; 890 & 890 LT

#### Storage Temperature & Humidity

- 40°-110°F (4°-43°C) Store indoors.
- 0-100% Relative Humidity

#### Shelf Life: 890 & 890 LT

- Part A: Min. 36 months at 75°F (24°C)
- 890 Part B: Min. 15 months at 75°F (24°C)
- 890 LT Part B: Min. 15 months at 75°F (24°C)

*Sheelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

### Carboguard 890 & 890 LT

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April 2007 replaces February 2007

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Selection & Specification Data

Generic Type: Two component, acrylic, aliphatic polyurethane.

Description: Carbothane 134 HB is a fast dry, high gloss, high build, two component polyurethane coating. Carbothane 134 HB exhibits excellent dry times and handling characteristics. This coating has outstanding hardness, adhesion and resistance to: impact, marring, abrasion, chemicals and staining. Typical applications include structural steel, tanks, equipment or others as typically found in both industrial and architectural projects. Not recommended for continuous immersion service.

Features:
- VOC compliant – 3.3 pounds per gallon as supplied
- Fast Dry – 6-8 hours to handle at 75°F
- High build, high gloss
- Excellent abrasion resistance
- Application by conventional, airless spray, HVLP or electrostatic
- Excellent chemical resistance
- Meets SSPC Paint Spec 36; Level 3

Color: Available in a wide variety of colors

Finish: High Gloss

Primers: Use over epoxy, zinc rich epoxy or as recommended by Carboline

Dry Film Thickness: 3 – 5 mils per coat (75-125 microns).

Solids Content: By Volume: 54% ± 2%

Theoretical Coverage Rate per Gallon:
- 288 ft² at 3 mils (75 microns)
- 216 ft² at 4 mils (100 microns)
- 173 ft² at 5 mils (125 microns)

Mixing and application losses will vary and must be taken into consideration when estimating job requirements.

VOC Values:
- As supplied: 3.3 lbs/gal (395 g/l)
- Thinned: 6 oz/gal with #25: 3.5 lbs/gal (419 g/l)

These are nominal values.

Ratio By Volume:
- 4:1 Ratio
  - 4 parts Carbothane 134 HB Part A
  - 1 part Carbothane 134 HB Part B (Urethane Converter 8800)

Pot Life: 2 hours at 75°F (24°C) unthinned

Pot life decreases at higher temperatures. Pot life ends when coating becomes too viscous to use. This product is moisture sensitive. Avoid moisture contamination.

Dry Temp. Resistance:
- Continuous: 200°F (93°C)
- Non-Continuous: 250°F (121°C)

Discoloration is observed above 180°F (82°C).

Substrates & Surface Preparation

General: Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel: Prime with appropriate primer.

Primed Surfaces: Remove any oil or grease from the surface to be coated with Thinner #2 or Carboline Surface Cleaner #3 (Refer to Data Sheet) in accordance with SSPC-SP1.

Curing Schedule

<table>
<thead>
<tr>
<th>Ambient, Material &amp; Surface Temperature</th>
<th>Dry to Touch or Assemble</th>
<th>Dry to Handle or Assemble</th>
<th>Dry to Full Cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>75°F (24°C)</td>
<td>60-90 minutes</td>
<td>6-8 hours</td>
<td>7-14 days</td>
</tr>
</tbody>
</table>

These times are based on a 4.0 mil (100 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Note: Product may be force cured.


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Carbothane® 134 HB

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

- **Spray Application (General)**: The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

- **Conventional Spray**: Pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, .070” I.D. fluid tip and appropriate air cap.

- **Airless Spray**: Pump Ratio: 30:1 (min.)
  GPM Output: 3.0 (min.)
  Material Hose: 3/8” I.D. (min.)
  Tip Size: .011-.015”
  Output PSI: 2500-2800
  Filter: 60 mesh
  Teflon packings are recommended and available from the pump manufacturer.

- **Touch Up**: Respray or brush. Brushing recommended only for touchup of small areas. Use natural bristle brush applying with full strokes.

Mixing & Thinning

Mixing: For plural component application follow the equipment manufacturer’s instructions. For batch mixing, power mix Part A separately, then combine and power mix thoroughly in the following proportions:

**THIS PRODUCT IS MOISTURE SENSITIVE. AVOID MOISTURE CONTAMINATION. DO NOT MIX PARTIAL KITS.**

<table>
<thead>
<tr>
<th>Ratio</th>
<th>4:1 Ratio (A to Converter)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Gallon Kit</td>
</tr>
<tr>
<td>134 HB Part A</td>
<td>.8 gallons</td>
</tr>
<tr>
<td>(in 1 gallon can)</td>
<td>(in 5 gallon can)</td>
</tr>
<tr>
<td>Urethane Converter 8800</td>
<td>25.6 fluid ozs</td>
</tr>
</tbody>
</table>

Thinning: Normally not required. May be thinned up to 6 oz/gal (5%) with #25 Thinner or #97 used when applying 134 HB in very hot conditions. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life: 2 hours at 75°F (24°C).

Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>60°-85°F (16°-29°C)</td>
<td>60°-85°F (16°-29°C)</td>
<td>60°-85°F (16°-29°C)</td>
<td>40-60%</td>
</tr>
<tr>
<td>Minimum</td>
<td>50°F (10°C)</td>
<td>35°F (2°C)</td>
<td>35°F (2°C)</td>
<td>10%</td>
</tr>
<tr>
<td>Maximum</td>
<td>130°F (54°C)</td>
<td>120°F (50°C)</td>
<td>95°F (35°C)</td>
<td>80%</td>
</tr>
</tbody>
</table>

Industry standards are for substrate temperatures to be 5°F (3°C) above the dew point. Caution: This product is moisture sensitive in the liquid stage and until fully cured. Protect from high humidity, dew and direct moisture contact until fully cured. Application and/or curing in humidities above maximum, or exposure to moisture from rain or dew may result in loss of gloss and/or micropopping of the product.

Cleanup & Safety

Cleanup: Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety: Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation: When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

Caution: This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Packaging, Handling & Storage

<table>
<thead>
<tr>
<th>Shipping Weight</th>
<th>1 Gallon Kit</th>
<th>5 Gallon Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>134 HB Part A</td>
<td>15 lbs. (6 kg)</td>
<td>58 lbs. (22 kg)</td>
</tr>
<tr>
<td>Thinner #25</td>
<td>8 lbs. (4 kg)</td>
<td>41 lbs. (19 kg)</td>
</tr>
<tr>
<td>Thinner #97</td>
<td>8 lbs. (4 kg)</td>
<td>41 lbs. (19 kg)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flash Point (Setaflash)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A: 58°F (14°C)</td>
</tr>
<tr>
<td>Part B (Urethane Converter 8800): 28°F (-2°C)</td>
</tr>
<tr>
<td>Thinner #25: 90°F (32°C)</td>
</tr>
</tbody>
</table>

Storage (General): Store Indoors.

Storage Temperature & Humidity: 40° - 110°F (4-43°C) 0-80% Relative Humidity

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

Packaging, Handling & Storage

<table>
<thead>
<tr>
<th>Shelf Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A: Min. 36 months at 75°F (24°C)</td>
</tr>
<tr>
<td>Urethane Converter: Min. 24 months at 75°F (24°C)</td>
</tr>
</tbody>
</table>

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

Carbothane® 134 HB

350 Halley Industrial Court, St. Louis, MO 63144-1599
314/644-1000 314/644-4617 (fax) www.carboilnc.com
### Selection & Specification Data

**Generic Type**
Modified aluminum epoxy mastic

**Description**
Aluminum-pigmented, low-stress, high-solids mastic with outstanding performance properties and proven field history. Carbomastic 15 was the pioneer mastic coating in a number of industrial markets and today still provides unmatched levels of barrier protection and corrosion resistance over existing finishes and rusted or SSPC-SP2 or SP3-cleaned steel.

**Features**
- Excellent performance over minimal surface preparation of steel substrates
- Suitable as a topcoat for most tightly adhered existing coatings
- Excellent choice for field touch-up of zinc-rich primers and galvanized steel
- Unique formulation with aluminum flakes provides exceptional barrier protection
- May be applied at 35°F (2°C) when CM 15 FC’s part B is utilized.
- VOC compliant to current AIM regulations

**Color**
CM 15: Aluminum (C901); Red (M500)*
CM 15 FC: Aluminum (C901); Red (M500)*

Color variations within a batch and from batch-to-batch may occur due to the metallic pigments and variations in application techniques and conditions. Neither product is color matched, nor will they match each other. (15 FC may have a greenish appearance.) *Red (M500) is available for use as a contrasting primer in multiple coat applications, but should always be topcoated.

**Primers**
Self-priming. May be applied over most tightly adhering coatings as well as inorganic zinc primers. A mist coat may be required to minimize bubbling over inorganic zinc primers.

**Topcoats**
Acrylics, Alkyds, Epoxies, Polyurethanes

**Dry Film Thickness**
- 3.0 mils (75 microns) over existing coatings
- 5.0 mils (125 microns) minimum on rusted steel
- 7.0-10.0 mils (175-250 microns) in one or two coats for severe exposures. Do not exceed 10.0 mils (250 microns) in a single coat.

**Solids Content**
By Volume: 90% ± 2%

**Theoretical Coverage Rate**
- 1444 mil ft² (36.0 m²/l at 25 microns)
- 288 ft² at 5 mils (7.2 m² /l at 125 microns)

**VOC Values**
- CM 15 & CM 15 FC:
  - As supplied: 0.7 lbs/gal (88 g/l)
  - Thinned: 32 oz/gal w/#76: 1.9 lbs/gal (231 g/l)
  - 32 oz/gal w/#10: 2.0 lbs/gal (242 g/l)

**HAPS Values**
As supplied: 0.70 lbs/solid gal

**Dry Temp. Resistance**
Continuous: 180°F (82°C)
Non-Continuous: 250°F (121°C)

Discoloration is observed above 180°F (82°C).

### Substrates & Surface Preparation

**General**
Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

**Steel**
- **Immersion**: SSPC-SP10 with a 2.0-3.0 mil (50-75 micron) surface profile.
- **Non-Immersion**: SSPC-SP6 with a 2.0-3.0 mil (50-75 micron) surface profile for maximum protection. SSPC-SP2, SP3, SP7, or SP12 are also acceptable methods.

**Galvanized Steel**
For optimum performance sweep blast cleaning is recommended. Consult your Carboline Sales Representative for specific recommendations.

**Previously Painted Surfaces**
Lightly sand or abrade to roughen and degloss the surface. Existing paint must attain a minimum 3A rating in accordance with ASTM D3359 “X-Scribe” adhesion test.

### Performance Data

<table>
<thead>
<tr>
<th>Test Method</th>
<th>System</th>
<th>Results</th>
<th>Report #</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D522 Flexibility</td>
<td>Blasted steel 1 ct. CM15</td>
<td>Conical - crack 0.38&quot;, actual elongation 48.57% Cylindrical-no cracking observed</td>
<td>A) SR340 B) ITL223</td>
</tr>
<tr>
<td>ASTM D2000 Taber Abrasion</td>
<td>1 ct. CM15</td>
<td>89.8 mg per 3000 cycles CS 17 wheel, 1000 gm load</td>
<td>02362</td>
</tr>
<tr>
<td>ASTM G14 Impact Resistance</td>
<td>Blasted steel 1 ct. CM15</td>
<td>Area damaged: A) 1/4 inch (0.25&quot;)</td>
<td>02282</td>
</tr>
<tr>
<td></td>
<td>Rusted steel 1 ct. CM15</td>
<td>B) 1/4 - 9/16 inch (0.44&quot;)</td>
<td></td>
</tr>
<tr>
<td>ASTM B117 Salt Spray</td>
<td>Rusted steel 1 ct. CM 15</td>
<td>No blistering, rusting, or softening</td>
<td>02460</td>
</tr>
<tr>
<td>ASTM D1735 Water Fog</td>
<td>Rusted steel 1 ct. CM 15</td>
<td>No blistering or softening No rust creep from scribe</td>
<td>SR 295</td>
</tr>
</tbody>
</table>

Test reports and additional data available upon written request.

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March 2007 replaces November 2003

0185
Carbomastic® 15 & 15 FC

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General guidelines:

- **Spray Application (General)**: The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.
- **Conventional Spray**: Pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, .086” I.D. fluid tip and appropriate air cap.

Airless Spray

- Pump Ratio: 30:1 (min.)
- GPM Output: 3.0 (min.)
- Material Hose: 3/8” I.D. (min.)
- Tip Size: .015-.025"
- Output PSI: 1900-2100

*Note: Teflon packings are recommended and available from the pump manufacturer.

- **Brush & Roller**: Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. Use clean natural bristle brush or medium nap phenolic core roller. Work coating into all irregularities.

- **Plural Component**: May be applied by plural component spray equipment. Contact Carboline Technical Service for specific recommendations.

Mixing & Thinning

**Mixing**: Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS.

**Ratio**: 1:1 Ratio (A to B)

**Thinning**: May be thinned up to 32 oz/gal (25%) with Thinner #10. Substitute Thinner #72 when non-photochemically reactive thinners are desired. To extend pot life, may be thinned up to 32 oz/gal (25%) with Thinner #76. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

- **Pot Life**: 2 Hours at 75°F (24°C) unthinned. 1 Hour at 90°F (32°C) unthinned. Pot life ends when coating becomes too viscous to use.

- **Pot Life**: Approximately 30 minutes at 75°F (24°C) unthinned. When thinned 12%, pot life will be 45 minutes at 75°F. Pot life ends when coating becomes too viscous to use.

Cleanup & Safety

**Cleanup**: Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

**Safety**: Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

**Ventilation**: When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

**Caution**: This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

March 2007 replaces November 2003

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Selection & Specification Data

<table>
<thead>
<tr>
<th>Generic Type</th>
<th>Amine-Cured Novolac Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Glass flake-filled coating with dense cross-linking that exhibits excellent overall chemical resistance to a variety of aggressive chemicals. Glass reinforcement provides added abrasion resistance, permeation resistance and internal reinforcement. 1205 exhibits very good acid resistance. Excellent for use as a lining for tanks or pipes in process facilities where hot water or abrasive conditions exist. Also used as a primary or secondary containment lining for a variety of aggressive chemicals.</td>
</tr>
</tbody>
</table>
| Features              | • Excellent resistance to acids, caustics, ethanol, gasoline, jet fuels and solvents.  
                         • Excellent abrasion resistance.  
                         • Excellent thermal shock resistance.  
                         • VOC compliant to current AIM regulations.  
                         • Excellent resistance to deionized or demineralized water up to 200°F (93°C) continuous.  
                         • Excellent resistance to crude oil up to 200°F (93°C). |
| Color                 | Red (0500); Gray (5742) |
| Finish                | Satin |
| Primers              | Self-priming. May be applied over epoxies and phenolics as recommended. |
| Topcoats              | Not recommended |
| Dry Film Thickness    | 15.0 mils (375 microns) minimum to be achieved in 1 or 2 coats. |
| Solids Content        | 70% ± 2% |
| Theoretical Coverage Rate | 1117 mil ft² (27.9 m²/l at 25 microns) |
| VOC Values            | As supplied: 2.08 lbs/gal (250 g/l)  
                         Thinned: 13 oz/gal w/#213: 2.58 lbs/gal (308 g/l)  
                         13 oz/gal w/#2: 2.54 lbs/gal (305 g/l)  
                         These are nominal values. |
| Dry Temp. Resistance  | Continuous: 425°F (218°C)  
                         Non-Continuous: 450°F (232°C)  
                         Discoloration is observed above 200°F (93°C). |
| Temperature Resistance (Immersion*) | Water/Brine: 200°F  
                                           Crude Oil: 200°F  
                                           Crude Oil/Water: 200°F  
                                           Demineralized water: 180°F  
                                           Ethanol: 130°F |

*Linings exposed to cargos warmer than the outside steel temperature are subject to a “cold-wall” effect. The smaller the temperature differential, the less negative influence on performance.

Substrates & Surface Preparation

General
Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel
Immersion: SSPC-SP10  
Non-Immersion: SSPC-SP6  
Surface Profile: 2.0-3.0 mils (50-75 micron)

Concrete
Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Prepare surfaces in accordance with ASTM D4258-92 Surface Cleaning of Concrete and ASTM D4259 Abrading Concrete. Voids in concrete may require surfacing.

Performance Data

<table>
<thead>
<tr>
<th>Test Method</th>
<th>System</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Cycling Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Freeze/Thaw test cycling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>from 0°F – 425°F for 11 days</td>
<td>Blasted steel</td>
<td>No blistering, cracking or checking.</td>
</tr>
<tr>
<td></td>
<td>2 cts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SR 332</td>
</tr>
<tr>
<td>Cyclic Steam-Out Simulation 300°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blasted steel</td>
<td>No blistering, cracking, or delamination.</td>
</tr>
<tr>
<td></td>
<td>1 ct</td>
<td>03744</td>
</tr>
</tbody>
</table>

Performance Data: Test reports and additional data available upon written request.

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General)
The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray
Pressure pot equipped with dual regulators, ½” I.D. minimum material hose. .110” I.D. fluid tip and appropriate air cap.

Airless Spray
Pump Ratio: 45:1 (min.)*  
GPM Output: 3.0 (min.)  
Material Hose: ½” I.D. (min.)  
Tip Size: .035-.041”  
Output PSI: 2200-2500  
*Teflon packings are recommended and available from the pump manufacturer.

Brush
Recommended for touch up and stripping of welds only. Use a natural bristle brush with full strokes. Avoid rebrushing.

Roller
Not recommended.
Mixing & Thinning

Mixing
Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS.

Ratio
4:1 Ratio (A to B)

Thinning
May be thinned up to 13 oz/gal (10%) thinner #213. For application on horizontal surfaces, may be thinned up to 13 oz/gal (10%) with Thinner #2. Agitate Thinner #213 before use. Thinner #213 will have a thick viscous appearance, which is normal. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life
3 Hours at 75°F (24°C)
Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures.

Cleanup & Safety

Cleanup
Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety
Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation
When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

Caution
This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>65-85°F (18-29°C)</td>
<td>65-85°F (18-29°C)</td>
<td>65-85°F (18-29°C)</td>
<td>30-60%</td>
</tr>
<tr>
<td>Minimum</td>
<td>55°F (13°C)</td>
<td>50°F (10°C)</td>
<td>50°F (10°C)</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum</td>
<td>90°F (32°C)</td>
<td>110°F (43°C)</td>
<td>100°F (38°C)</td>
<td>85%</td>
</tr>
</tbody>
</table>

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrates temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

<table>
<thead>
<tr>
<th>Surface Temp. &amp; 50% Relative Humidity</th>
<th>Dry to Handle</th>
<th>Dry to Recoat or Topcoat</th>
<th>Final Cure for Immersion &amp; Maximum Recoat Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>50°F (10°C)</td>
<td>18 Hours</td>
<td>48 Hours</td>
<td>21 Days</td>
</tr>
<tr>
<td>60°F (16°C)</td>
<td>12 Hours</td>
<td>32 Hours</td>
<td>14 Days</td>
</tr>
<tr>
<td>75°F (24°C)</td>
<td>8 Hours</td>
<td>16 Hours</td>
<td>7 Days</td>
</tr>
<tr>
<td>90°F (32°C)</td>
<td>3 Hours</td>
<td>8 Hours</td>
<td>4 Days</td>
</tr>
</tbody>
</table>

These times are based on a 15.0 mil (375 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the maximum recoat time is exceeded, the surface must be abraded by sweep blasting prior to the application of additional coats. For force curing, contact Carboline Technical Service for specific requirements.

Packaging, Handling & Storage

Shipping Weight
1 Gallon Kit: 12 lbs (5.5 kg)
5 Gallon Kit: 58 lbs (26.3 kg)

Flash Point (Setaflash)
Part A: 53°F (12°C)
Part B: 200°F (93°C)

Storage (General)
Store indoors.

Storage Temperature
40° - 110° F (4° - 43°C)

Storage & Humidity
0-90% Relative Humidity

Shelf Life
Part A & B: Min. 36 months at 75°F (24°C)

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

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Selection & Specification Data

<table>
<thead>
<tr>
<th>Generic Type</th>
<th>Solvent Based Inorganic Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Time-tested corrosion resistant primer that protects steel galvanically in the harshest environments. Over four decades, Carbozinc 11 (CZ 11) has been the industry standard for high-performance inorganic zinc protection on steel structures worldwide.</td>
</tr>
</tbody>
</table>
| Features              | • CZ 11 and CZ 11 FG meet Class B slip co-efficient and creep testing criteria for use on faying surfaces  
                        • Rapid cure. Dry to handle in 45 minutes at 60°F (16°C) and 50% relative humidity  
                        • Low temperature cure down to 0°F (-18°C)  
                        • High zinc loading. Meets FDA requirements in gray color.  
                        • Available in ASTM D520, Type II zinc version.  
                        • Very good resistance to salting.  
                        • May be applied with standard airless or conventional spray equipment.  
                        • VOC compliant in certain areas  
| CZ 11 FG              | • Lower zinc loading for economics.  
                        • VOC compliant for shop/fabricator use only. |
| Color                 | Green (0300); Gray (0700) |
| Finish                | Flat |
| Primers               | Self Priming |
| Topcoats              | Not required for certain exposures. Can be topcoated with Epoxies, Polyurethanes, Acrylics, High-Heat Silicones and others as recommended by your Carboiline sales representative. Under certain conditions, a mist coat is required to minimize topcoat bubbling. |
| Dry Film Strength     | 2.0-3.0 mils (50-75 microns). Dry film thickness in excess of 6.0 mils (150 microns) per coat is not recommended. |
| Solids Content        | By Weight: 79% ± 2% CZ 11  
                        74% ± 2% CZ 11 FG |
| Zinc Content          | By Weight: 85% ± 2% CZ 11  
                        79% ± 2% CZ 11 FG |
| Theoretical Coverage  | CZ 11: 1000 mil ft² (22.8 m²/l at 25 microns)  
                        CZ 11 FG: 850 mil ft² (19.4 m²/l at 25 microns)  
                        Allow for loss in mixing and application |
| Coverage Rate         | 333 ft² at 3.0 mils (8.2 m²/l at 75 microns)  
                        283 ft² at 3.0 mils (7.0 m²/l at 75 microns) |
| VOC Values            | Carbozinc 11  
                        EPA Method 24: 4.0 lbs/gal (479 g/l)  
                        Thinned: 7 oz/gal w/#21: 4.1 lbs/gal (492 g/l)  
                        5 oz/gal w/#26: 4.1 lbs/gal (492 g/l)  
                        5 oz/gal w/#33: 4.1 lbs/gal (492 g/l)  
                        These are nominal values.  
                        Carbozinc 11 FG  
                        EPA Method 24: 4.3 lbs/gal (515 g/l)  
                        Thinned: For use in fabrication shops only to remain in VOC compliance in accordance with EPA Standards  
                        7 oz/gal w/#21: 4.5 lbs/gal (539 g/l)  
                        5 oz/gal w/#26: 4.5 lbs/gal (539 g/l)  
                        5 oz/gal w/#33: 4.5 lbs/gal (539 g/l)  
                        These are nominal values. |
| Dry Temp. Resistance  | Untouchable:  
                        Continuous: 750°F (399°C)  
                        Non-Continuous: 800°F (427°C)  
                        With recommended silicones topcoats:  
                        Continuous: 1000°F (538°C)  
                        Non-Continuous: 1200°F (649°C) |

Substrates & Surface Preparation

General
Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil, and all other contaminants that could interfere with adhesion of the coating.

Steel
Non-Immiscibility: SSPC SP6 and obtain a 1.0-3.0 mil (25-75 micron) angular blast profile.

Performance Data

<table>
<thead>
<tr>
<th>Test Method</th>
<th>System</th>
<th>Results</th>
<th>Report #</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM A-325</td>
<td>Blasted steel 1 ct. CZ 11</td>
<td>0.66 lb/sq ft meets requirements for Class B rating</td>
<td>02722</td>
</tr>
<tr>
<td>ASTM B117</td>
<td>Salt Spray</td>
<td>1 ct. CZ 11 at 2 mils dry film thickness over blasted steel</td>
<td>No rusting or blistering, cracking or delamination after 4000 hrs. Moderate salting of the surface only. SR 408</td>
</tr>
<tr>
<td>ASTM D3363</td>
<td>Pencil Hardness</td>
<td>1 ct. CZ 11</td>
<td>No blistering or rusting of coating or rusting of bare steel area after 650 hrs. Immersion in 5% sodium chloride solution; 15° round bare area in coating. 02514</td>
</tr>
</tbody>
</table>

Test reports and additional data available upon written request.

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modification to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General)
The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco. Keep material under mild agitation during application. If spraying stops for more than 10 minutes, recirculate the material remaining in the spray line. Do not leave mixed primer in the hoses during work stops.

Conventional Spray
Agitated pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, with a maximum length of 50’, 070°F I.D. fluid tip and appropriate air cap.

Airless Spray
Pump Ratio: 30:1 (min.)
GPM Output: 3.0 GPM
Material Hose: 3/8” I.D. (min.)
Tip Size: 0.19-0.23”
Output PSI: 1500-2000
Filter Size: 60 mesh
Teflon packings are recommended and available from the pump manufacturer.

Brush
For touch-up of areas less than one square foot only. Use medium bristle brush and avoid rebrushing.

Roller
Not recommended
Carbozinc® 11

Mixing & Thinning

Mixing
Power mix base, then combine and power mix as follows. Pour zinc filler very slowly into premixed base with continuous agitation. Mix until free of lumps. Pour mixture through a 30 mesh screen. DO NOT MIX PARTIAL KITS.

Tip: Sifting zinc through a window screen will aid in the mixing process by breaking up or catching dry zinc lumps.

Ratio

<table>
<thead>
<tr>
<th>Part A:</th>
<th>.75 gal</th>
<th>3.75 gallons</th>
<th>3.75 gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin Kit</td>
<td>1 Gal Kit</td>
<td>5 Gallon Kit</td>
<td>4.6 Gallon Kit</td>
</tr>
<tr>
<td>Zinc Filler</td>
<td>14.6 lbs</td>
<td>73 lbs</td>
<td>50 lbs</td>
</tr>
</tbody>
</table>

Thinning

May be thinned up to 5 oz/gal (4%) with #26 for ambient and warm surfaces. For extremely warm or windy conditions, may be thinned up to 7 oz/gal (6%) with #21. Use of thinners other than those recommended or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life

8 Hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use.

Cleanup & Safety

Cleanup
Use Thinner #21 or Isopropyl Alcohol. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety
Read and follow all caution statements on this product data sheet and the MSDS for this product. Employees normal workmenlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation

When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

Caution

This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>40-95°F (4-35°C)</td>
<td>40-110°F (4-43°C)</td>
<td>40-95°F (4-35°C)</td>
<td>40-90%</td>
</tr>
<tr>
<td>Minimum</td>
<td>0°F (-18°C)</td>
<td>0°F (-18°C)</td>
<td>0°F (-18°C)</td>
<td>30%</td>
</tr>
<tr>
<td>Maximum</td>
<td>130°F (54°C)</td>
<td>200°F (93°C)</td>
<td>130°F (54°C)</td>
<td>96%</td>
</tr>
</tbody>
</table>

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

<table>
<thead>
<tr>
<th>Surface Temp. &amp; 50% Relative Humidity</th>
<th>Dry to Handle</th>
<th>Dry to Topcoat/Recoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°F (-18°C)</td>
<td>4 Hours</td>
<td>7 Days</td>
</tr>
<tr>
<td>40°F (4°C)</td>
<td>1 Hour</td>
<td>48 Hours</td>
</tr>
<tr>
<td>60°F (16°C)</td>
<td>3/4 Hour</td>
<td>24 Hours</td>
</tr>
<tr>
<td>80°F (27°C)</td>
<td>½ Hour</td>
<td>18 Hours</td>
</tr>
<tr>
<td>100°F (38°C)</td>
<td>¼ Hour</td>
<td>16 Hours</td>
</tr>
</tbody>
</table>

These times are based on a 3.0-4.0 mil (75-100 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Humidity levels below 50% will require longer cure times. Notes: Any salting that appears on the zinc surface as a result of prolonged weathering exposure must be removed prior to the application of additional coatings. Also, loose zinc must be removed from the cured film by rubbing with fiberglass screen wire if: 1) The cure conditions specified for the product were not observed, or 2) When “dry spray/overspray” is evident on the cured film and a topcoat will be applied. For accelerated curing or where the relative humidity is below 40%, allow an initial 2-hour ambient cure. Follow 2 hour cure with water misting or steam to keep the coated surface wet for a minimum of 8 hours and until the coated surface achieves a “2H” pencil hardness per ASTM D3363.

Packaging, Handling & Storage

<table>
<thead>
<tr>
<th>CZ 11 Shipping Weight (Approximate)</th>
<th>1 Gallon Kit</th>
<th>5 Gallon Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CZ 11 FG Shipping Weight (Approximate)</td>
<td>4.6 Gallon Kit</td>
<td>104 lbs (47 kg)</td>
</tr>
</tbody>
</table>

Flash Point (Setaflash)

| Part A: | 55°F (13°C) |
| Zinc Filler: | NA |

Storage (General)

Store Indoors.

Storage Temperature

40°F - 100°F (4-38°C).

Relative Humidity

0-90% Relative Humidity

Sheelf Life: 11 & 11FG

Part A: 12 months at 75°F (24°C) Part B: 24 months at 75°F (24°C)

*Sheelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

350 Hanley Industrial Court, St. Louis, MO 63144-1599
314/644-1900 314/644-4617 (fax) www.carboline.com

October 2006 replaces September 2006

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**Selection & Specification Data**

<table>
<thead>
<tr>
<th>Generic Type</th>
<th>Single package silicone finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>High-performance finish for areas exposed to extreme temperatures. Suitable for service from 400°F-1000°F (204°C-538°C). Color stability at maximum temperature will depend on color selected. Heat curing will result in full film formation properties.</td>
</tr>
</tbody>
</table>
| Features           | - Resistant to severe thermal shock  
                     - Provides outstanding long-term performance when applied over Carbozinc inorganic zinc primers  
                     - Air-dries to touch (see curing schedule) |
| Color & Dry Temperature Resistance * | Available in the following stock colors:  
Black (C900) 1000°F (538°C) Continuous  
Aluminum (C901) 1000°F (538°C) Continuous  
Black and Aluminum allow surges to 1200°F (649°C)  
Gray (C705) 750°F (399°C) |
| Finish             | Gloss - initial (Flat after heat curing) |
| Primers            | Inorganic zins. None needed for stainless steel or aluminum. |
| Topcoats           | Normally none |
| Dry Film Thickness  | 2 mils (50 microns), 4 wet mils (100 microns) |
|                     | Do not exceed 2.0 mils in a single coat. |
|                     | 4700 Aluminum: 1.5 mils (40 microns)  
Two coats are recommended over stainless steel and one or two coats over inorganic zins. |
| Solids Content     | By Volume: 48% ± 2  
4700 Aluminum by volume: 30% ± 2 |
| Theoretical Coverage Rate | 770 mil/ft²/gal. (19 m²/l at 25 microns)  
4700 Aluminum: 481 mil/ft²/gal. (12 m²/l at 25 microns). |
| VOC Values         | As Supplied: 3.8 lbs./gal (456 g/l)  
(sprayed un-thinned except in hot application)  
Thinned: 12.8 oz/gal w/#235 (10%) 4.1 lbs./gal (492 g/l)  
4700 Aluminum supplied: 5.04 lbs./gal (604 g/l)  
Thinned: 8 oz/gal w/#10 (6%) 5.16 lbs./gal (618 g/l)  
16 oz/gal w/#10 (12%) 5.27 lbs./gal (632 g/l) |
| Limitations        | - Do not use for immersion service.  
- Do not exceed thickness recommendation. Excessive film thickness may result in blistering and delamination when the temperature is increased. |

---

**Substrates & Surface Preparation**

<table>
<thead>
<tr>
<th>General</th>
<th>Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>SSPC-SP 10 with a 0.5-1.0 mils (12-25 micron) surface profile. Prime with specific Carboline primers as recommended by your Carboline sales representative.</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>Sweep blast cleaning (SSPC-SP7) is recommended.</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Sweep blast cleaning (SSPC-SP7) is recommended.</td>
</tr>
</tbody>
</table>

* The alignment of aluminum flakes in aluminum-filled finishes is very dependent on application conditions and techniques. Care must be taken to keep conditions as constant as possible to reduce variations in final appearance. It is also advisable to work from a single batch of material since variations can occur from batch to batch. For more information consult Carboline Technical Service Department.

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January 2009 replaces November 2004

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**Application Equipment**

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

**General Guidelines:**

**Spray Application (General)**

The following spray equipment has been found suitable for application of this material. Conventional spray application is preferred.

**Conventional Spray**

Use DeVilbis P-MBC, E-needle and tip, and a 704 air cap or equivalent. Use adequate air volume for proper equipment operation. Hold gun 10-12" from the surface and at right angles. Overlap each pass 50%. Apply 4.0 wet mils to obtain desired dry film.

**Airless recommended.**

**Brush & Roller (General)**

Recommended for touch up of small areas or where spray application is not permitted. Avoid excessive re-brushing or re-rolling will create a non-uniform appearance.

**Note**

Different application procedures or methods will result in streaky or non-uniform appearance with aluminum containing products.

**Mixing & Thinning**

**Mixing**

Power mix until uniform in consistency. Avoid excessive air entrapment.

**Thinning**

Normally not required. May be thinned up to 12.8 oz./gal. (10%) by volume with Thinner #236 for "hot" applications exceeding 150°F (66°C). 4700 Aluminum may be thinned up to 16 oz./gal. 12% by volume with Thinner #10. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

**Cleanup & Safety**

**Cleanup**

Use Thinner #2. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

**Safety**

Read and follow all caution statements on this Product Data Sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

**Ventilation**

When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to assure all personnel are below guidelines. If not sure of the ability to monitor levels, use MSHA/NIOSH approved respirator.

**Caution**

This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

---

**Application Conditions**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>77°F (25°C)</td>
<td>125°F (52°C)</td>
<td>80°F (27°C)</td>
<td>50%</td>
</tr>
<tr>
<td>Minimum</td>
<td>55°F (13°C)</td>
<td>40°F (4°C)</td>
<td>40°F (4°C)</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum</td>
<td>95°F (35°C)</td>
<td>300°F (148°C)</td>
<td>120°F (49°C)</td>
<td>90%</td>
</tr>
</tbody>
</table>

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

**Curing Schedule**

<table>
<thead>
<tr>
<th>Substrate Temperature</th>
<th>Dry to Touch</th>
<th>Dry to Topcoat with itself</th>
<th>Dry to Handle*</th>
<th>Final Cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>77°F (25°C)</td>
<td>1 Hour</td>
<td>4 Hours</td>
<td>8 Hours</td>
<td>2 Hours at 400°F</td>
</tr>
</tbody>
</table>

These times are based on a 2.0 mil (50 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration. During high humidity conditions, it is recommended that the application be done while temperatures are increasing. If the final cure time is exceeded, the surface must be abraded prior to the application of additional coats.

* Dry to handle (thumb-twist test). Final hardness and ultimate film properties are not reached until heat curing has been achieved. Final cure: To obtain optimal properties, must be cured at 400°F. After a 2 hour flash-off at 75°F, allow temperature to increase slowly to 400°F. Hold at 350°F to 450°F for 2 hours. The coating may then be placed in service.

**Packaging, Handling & Storage**

<table>
<thead>
<tr>
<th>Shipping Weight (Approximate)</th>
<th>1 Gallon Kit</th>
<th>5 Gallon Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 lbs. (5.5 kg)</td>
<td>60 lbs. (27 kg)</td>
<td></td>
</tr>
</tbody>
</table>

**Flash Point (Setaflash)**

Thermaline 4700 83°F (28°C)  
Thermaline 4700 Aluminum 68°F (20°C)

**Storage (General)**

Store indoors

**Storage Temperature & Humidity**

Between 40°F-100°F (4°C-38°C)  
0-90% Humidity

**Shelf Life:**

<table>
<thead>
<tr>
<th>4700</th>
<th>4700 Alum</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 months at 77°F (25°C)</td>
<td>12 months at 77°F (25°C)</td>
</tr>
</tbody>
</table>

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

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January 2009 replaces November 2004

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Carbozinc Finish

Selection & Specification Data

<table>
<thead>
<tr>
<th>Generic Type</th>
<th>Inorganic ethyl silicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Carbozinc Finish is a high solids, high build inorganic topcoat used to seal and protect inorganic zinc primers. The film exhibits exceptional toughness, high temperature resistance, and is available in a limited assortment of colors. Being inorganic, Carbozinc Finish provides exceptional weatherability and long-term performance. When used as finish over a permanent zinc primer, the system becomes an ultra-long lasting system.</td>
</tr>
</tbody>
</table>
| Features            | • Outstanding weatherability  
                       • Long life performance  
                       • High temperature resistance  
                       • VOC compliant  
                       • Available in limited colors  
                       • Isocyanate free  
                       • Single package |
| Color               | Limited |
| Finish              | Flat |
| Primers             | Typically used over inorganic zinc primers. |
| Dry Film Thickness   | 3 - 5 mils (75 - 125 microns) |
| Solids Content      | By Volume: 48% |
| Theoretical Coverage Rates | 770 mil ft² (19 m²/l at 25 microns) |
| VOC Values (calculated) | As supplied: 3.0 lbs/gal (360 g/l) mixed  
                          Thinned: 6 oz/gal w/ #33 3.21 lbs/gal (385 g/l)  
                          This product may be thinned with alternate VOC exempt thinners. Consult Carboline Technical Service. |
| Dry Temp. Resistance | Continuous: 1000°F (538°C) |

Substrates & Surface Preparation

<table>
<thead>
<tr>
<th>General</th>
<th>Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating. Refer to specific primer’s Product Data Sheet for detailed requirements of the specified primer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Apply over properly applied and cured inorganic zinc primers.</td>
</tr>
</tbody>
</table>

June 2006 replaces April 2004N.

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Application Equipment

Listed below are the general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application
This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVibiss and Graco.

Airless Spray Application
Pump Ratio: 30:1 (min.)
Volume Output: 2.5 gpm min. 11.5 l/min min.
Material Hose: ½” I.D. min. 12.5mm min.
Tip Size: 0.017-0.021” 0.43-0.53mm
Output Pressure: 2100-2500 psi 135-170kg/cm²

Brush
For touch up use only. Use medium bristle brush and avoid rebrushing. Two coats may be required to obtain desired thickness and appearance. For best results tie-in within 5 min.

Mixing & Thinning

Mixing
Power mix to a uniform consistency.

Thinning
May be thinned up to 5% by volume with Carboline Thinner #33.

Pot Life
Indefinite. Avoid moisture contamination.

Cleanup & Safety

Cleanup
Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety
Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Cleanup & Safety (Cont.)

Ventilation
When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Substrate</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimum</td>
<td>60°F – 85°F (16°C – 29°C)</td>
<td>60°F-86°F (16°C-30°C)</td>
<td>60°F-86°F (16°C-30°C)</td>
<td>40-90%</td>
</tr>
<tr>
<td>Minimum</td>
<td>40°F (4°C)</td>
<td>40°F (4°C)</td>
<td>40°F (4°C)</td>
<td>30%</td>
</tr>
<tr>
<td>Maximum</td>
<td>90°F (32°C)</td>
<td>110°F (43°C)</td>
<td>110°F (43°C)</td>
<td>95%</td>
</tr>
</tbody>
</table>

Industry standards are for substrate temperatures during application to be 5°F (3°C) above the dew point. This product requires moisture to complete its final cure. Use water mist if humidity is below minimums.

Curing Schedule

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Touch Dry</th>
<th>Dry to Handle</th>
</tr>
</thead>
<tbody>
<tr>
<td>75°F (24°C)</td>
<td>15 min</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

These times are based on recommended coverage rates. Curing under low humidity conditions will extend times.

Carbozinc inorganic zinc primers may be topcoated early with this inorganic finish. Consult Carboline Technical Service.

Packaging, Handling & Storage

<table>
<thead>
<tr>
<th>Shipping Weight (Approximate)</th>
<th>1 Gallon Kit</th>
<th>5 Gallon Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 lbs (kg)</td>
<td>65 lbs (kg)</td>
<td></td>
</tr>
</tbody>
</table>

Flash Point (Setaflash)

<table>
<thead>
<tr>
<th>Material</th>
<th>Flash Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbozinc Finish</td>
<td>66°F (19°C)</td>
</tr>
<tr>
<td>Thinner 33</td>
<td>75°F (24°C)</td>
</tr>
<tr>
<td>Thinner 2</td>
<td>23°F (-5°C)</td>
</tr>
</tbody>
</table>

Storage (General)
Store Indoors. KEEP DRY

<table>
<thead>
<tr>
<th>Storage</th>
<th>40 - 100°F (4°C - 38°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature &amp; Humidity</td>
<td>0-90% Relative Humidity</td>
</tr>
</tbody>
</table>

| Shelf Life | 3 months at 76°F (24°C) |

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

June 2006 replaces April 2004 N

To the best of our knowledge the Technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carboxane® are registered trademarks of Carboline Company.
### Selection & Specification Data

<table>
<thead>
<tr>
<th>Generic Type</th>
<th>Phenalkamine epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>High performance epoxy that has excellent resistance to fresh and salt water exposures. This coating exhibits outstanding moisture and surface tolerance during application, low temperature cure capability, and very fast cure response for quick return to service. It contains an inert flake reinforcement (micaceous iron oxide) to enhance film strength and performance.</td>
</tr>
</tbody>
</table>
| Features       | • High solids, low VOC  
                  • Low temperature cure  
                  • Excellent wetting properties  
                  • Excellent surface tolerance  
                  • Excellent moisture tolerance (application)  
                  • Fast cure response  
                  • Suitable for immersion service in fresh or salt water after 60 minute cure @ 75°F |
| Gloss          | Semi-gloss |
| Color          | Tan |
| Primers        | Self Priming |
| Topcoats       | Acrylics, Alkyds, Epoxies, Polyurethanes |
| Dry Film       | For most applications: 5-10 mils (125-250 microns) |
| Solids Content | Theoretical solids of mixed material by volume: 80 +/- 2% |
| Theoretical Coverage Rate | 1283 mil ft² (32 m² at 25 microns)  
                             256 sq. ft. at 5 mils (6.4 sq. ft @ 125 microns) |
| Solids Content | NOTE: Material losses during mixing and applications will vary and must be taken into consideration when estimating job requirements. |
| Dry Temp. Resistance | Continuous: 200°F (93°C)  
                          Non-Continuous: 250°F (121°C) |
| VOC Values (calculated) | As supplied: 1.42 lbs/gal (170 g/l) mixed Thinned: 1.4 oz/gal w/ #2: 2.06 lbs/gal (246 g/l) These are nominal values and may vary with color. |
| HAPS Values    | As supplied: 1.4 lbs/solid gal |
| Limitations    | Epoxies lose gloss, discolor and eventually chalk in sunlight exposure. Discoloration is more pronounced with Carbomastic 615 HS. |

### Substrates & Surface Preparation

| General          | Remove any oil or grease from surface to be coated with clean rags soaked in Carboline Thinner #2, or toluol. Concrete Do not apply coating unless concrete has cured at least 28 days @ 70°F (21°C) and 60% RH or equivalent. |
| Substrates Steel | Immersion: SSPC-SP10 with a 2.0-3.0 mil (50-75 micron) surface profile.  
                  Non-Immersion: SSPC-SP6 with a 2.0-3.0 mil (50-75 micron) surface profile for maximum protection. SSPC-SP2, SP3, SP7, or SP12 are also acceptable methods |
| Concrete         | Concrete: Normally clean and dry. Remove all loose, unsound concrete. This product can tolerate damp concrete (green appearance but not visibly wet). Consult Carboline Technical Service for more specific recommendations. |

### Ordering Information

| Prices may be obtained from Carboline Sales Representative or Main Office. Terms – Net 30 days. |
| 1 Gal. Kit | 615 HS | 15.8 lbs. |
| 5 Gal. Kit | 615 HS | 79 lbs. |

### Application Equipment

| Listed below are the general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results. |
| Spray Application | Hold gun 12-14 inches from the surface and at a right angle to the surface. |
| Airless Spray | Pump Ratio: 30:1 (min.)  
                 Volume Output: 9.5 l/min. (2.5 gpm min.)  
                 Material Hose: 9.5mm min. (3/8” I.D. min.)  
                 Tip Size: 0.43-0.53mm (0.017-0.021”)  
                 Output Pressure: 140-175kg/cm² (2000-2500 psi) |
| Use a 1/2” minimum I.D. material hose  
The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco. |
| Mfr. & Gun | Pump*  
Binks Model 520 | Bulldog 45:1  
Jupiter 8D |
| Use either model below:  
Binks 207-300 (DeVilbiss)  
Graco 207-300 |
| Mfr. & Gun | Pump*  
Binks Model 520 | Bulldog 45:1  
Jupiter 8D |
| *Teflon packings are recommended and available from pump manufacturer. |
Carbomastic 615 HS

Conventional Spray
Pressure pot equipped with dual regulators, 3/8" i.D. minimum material hose, .070" i.D. fluid tip and appropriate air cap.

Brush or Roller
Not recommended for tank lining applications except when striping welds. For non-immersion applications over damp surfaces, brush and roller is the preferred method. Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling.

For best results, tie-in within 10 minutes at 75°F (24°C). Thin up to 11% by volume per gallon with Carboline #2. Use a short-nap synthetic roller cover with phenolic core.

Mixing & Thinning
Mix separately, then combine and mix in the following proportions:

<table>
<thead>
<tr>
<th>Material</th>
<th>Part A</th>
<th>Part B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Gal. Kit</td>
<td>.2 gallon</td>
<td>.8 gallon</td>
</tr>
<tr>
<td>5 Gal. Kit</td>
<td>1 gallon</td>
<td>4 gallon</td>
</tr>
</tbody>
</table>

Thin up to 12% by volume with Carboline Thinner #2.

Pot Life
1½ hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use.

Cleanup & Safety

Cleanup
Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety
Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation
When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

Caution
This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Material</th>
<th>Surface</th>
<th>Ambient</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimum</td>
<td>60°-75°F (16°-24°C)</td>
<td>60°-75°F (16°-24°C)</td>
<td>60°-75°F (16°-24°C)</td>
<td>30-70%</td>
</tr>
<tr>
<td>Minimum</td>
<td>45°F (7°C)</td>
<td>20°F (-7°C)</td>
<td>20°F</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum</td>
<td>90°F (32°C)</td>
<td>120°F (50°C)</td>
<td>100°F</td>
<td>95%</td>
</tr>
</tbody>
</table>

Industry standards for substrate temperatures to be above the dew point. For immersion conditions it is recommended to follow this procedure. For non-immersion conditions Carbomastic 615 HS can tolerate damp substrates. See Brush or Roller above. Special thinning and application techniques may be required above or below normal conditions. Do not apply to substrates with ice or ice crystal formation. Dehumidify or raise the temperature to eliminate ice on the substrate.

Curing Schedule

<table>
<thead>
<tr>
<th>Surface Temperature</th>
<th>Dry to topcoat minimum</th>
<th>Minimum cure for water immersion</th>
<th>Maximum recoat time</th>
</tr>
</thead>
<tbody>
<tr>
<td>@ 50% RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20°F (-7°C)</td>
<td>72 hours</td>
<td>7 days</td>
<td>90 days</td>
</tr>
<tr>
<td>35°F (2°C)</td>
<td>17 hours</td>
<td>48 hours</td>
<td>60 days</td>
</tr>
<tr>
<td>60°F (14°C)</td>
<td>8 hours</td>
<td>3 hours</td>
<td>30 days</td>
</tr>
<tr>
<td>75°F (24°C)</td>
<td>2 hours</td>
<td>1 hour</td>
<td>15 days</td>
</tr>
<tr>
<td>90°F (32°F)</td>
<td>1.5 hours</td>
<td>1 hour</td>
<td>7 days</td>
</tr>
</tbody>
</table>

These times above are based on a 5.0-10.0 mil (125-250 micron) dry film thickness per coat. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. For force curing, contact Carboline Technical Service for specific requirements.

Packaging, Handling & Storage

Flash Point (Setaflash)
Part A: >300°F (83°C)
Part B: 45°F (7°C)
Thinner 2: 23°F (-5°C)

Storage (General)
Store Indoors. KEEP DRY

Storage Temperature
40 -100°F (4-38°C).

& Humidity
0-95% Relative Humidity

Shelf Life
Part A: 24 months at 76°F (24°C)
Part B: 24 months at 76°F (24°C)

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

December 2008
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Selection & Specification Data

Generic Type
Inorganic silicate

Description
Thermaline 4000 is a high heat polymer coating used for the protection of equipment operating at elevated temperatures. It is typically used over Carbozinc® inorganic zinc primers for outstanding corrosion protection and heat resistance. The combination of the zinc primer with this finish provides exceptional performance in durability. Unlike most high temperature silicone-based technologies with soft films, Thermaline 4000 does not require a heat cure for film forming properties. It cures hard rapidly under ambient conditions (humidity greater than 30%).

Features
- Inorganic; stable; inert polymer
- Outstanding durability
- Excellent corrosion protection (when used over Carbozinc inorganic primers)
- High temperature resistance (1000°F)
- VOC compliant
- Cures at ambient conditions (hard in 2 hours)
- Cures down to 40°F
- Does not require heat cure for high-temp service
- Outstanding resistance to handling damage
- Single-package

Color
White (A826), Black (C900), Med. Grey (1709), Lt. Grey (F703), and Tan (0262) are available colors.

Primers
Typically used over inorganic zinc primers.

Dry Film Thickness
3-5 mils (75-125 microns)

Solids Content
By Volume: 57% ± 2%

Theoretical Coverage Rates
914 mil ft² (22.8 m²/l at 25 microns) Allow for loss in mixing and application

VOC Values (calculated)
- As supplied: 3.0 lbs/gal (360 g/l) mixed
- Thinned: 6 oz/gal w/ #33 3.21 lbs/gal (385 g/l)

Dry Temp. Resistance
Continuous: 1000°F (538°C)

Substrates & Surface Preparation

General
Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating. Refer to specific primer’s Product Data Sheet for detailed requirements of the specified primer.

Steel
Minimum: SSPC-SP6 for zinc primer application Surface Profile: 1.0-3.0 mils (25-75 micron)

Apply over properly applied and clean inorganic zinc primers. When used over Carbozinc 11 Series primers allow a minimum 2-hour cure on primer prior to topcoating.

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December 2009 replaces June 2009 N

4708
Application Equipment

Listed below are the general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

**Spray Application**

The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

**Conventional Spray**

Conventional pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, and 0.043" to 0.070" I.D. fluid tip and appropriate air cap.

**Airless Spray Application**

| Pump Ratio: | 30:1 (min.) |
| Volume Output: | 2.5 gpm min. 11.5 l/min min. |
| Material Hose: | 3/8" I.D. min. 9.0 mm min. |
| Tip Size: | 0.017-0.021" 0.43-0.53mm |
| Output Pressure: | 2100-2500 psi 135-170kg/cm² |

**Brush**

For touch up use only. Use medium bristle brush and avoid rebushing. Two coats may be required to obtain desired thickness and appearance. For best results tie-in within 5 min.

Mixing & Thinning

**Mixing**

Power mix to a uniform consistency.

**Thinning**

May be thinned up to 5% by volume with Carboline Thinner #33.

**Pot Life**

Indefinite. Avoid moisture contamination.

Cleanup & Safety

**Cleanup**

Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

**Safety**

Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Cleanup & Safety (Cont.)

**Ventilation**

When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

December 2009 replaces June 2009
* also consult paint supplier's Internet home page

HEMPEL

SUPPLIER'S DOCUMENTATION *

provided by

HEMPEL

APPENDIX 2

* also consult paint supplier’s Internet home page

May be obsoleted days after printing.

Please check PW-Intranet for latest edition.
## Surface preparation:

Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501:1988.

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area</th>
<th>Shade no</th>
<th>Shade</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/ltr)</th>
<th>Application methods</th>
<th>Recommended Nozzle orifice</th>
<th>Nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>f/c Grey</td>
<td>12170</td>
<td>125</td>
<td>80</td>
<td>7.8</td>
<td>(X)</td>
<td>X</td>
<td>0.19” - 0.21”</td>
</tr>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>f/c Grey</td>
<td>11320</td>
<td>150</td>
<td>80</td>
<td>7.4</td>
<td>(X)</td>
<td>X</td>
<td>0.19” - 0.21”</td>
</tr>
<tr>
<td>HEMPATHANE HS 55610</td>
<td>f/c Grey</td>
<td>11730</td>
<td>125</td>
<td>80</td>
<td>8.1</td>
<td>X</td>
<td>X</td>
<td>0.17” - 0.21”</td>
</tr>
</tbody>
</table>

### Recoating intervals

Ample ventilation

<table>
<thead>
<tr>
<th>Quality no</th>
<th>D.F.T. (micron)</th>
<th>Recoated with quality no</th>
<th>40°C 40°C</th>
<th>30°C 30°C</th>
<th>20°C 20°C</th>
<th>10°C 10°C</th>
<th>0°C 0°C</th>
<th>-10°C -10°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>15560</td>
<td>80</td>
<td>15560</td>
<td>50 Min</td>
<td>None</td>
<td>70 Min</td>
<td>None</td>
<td>95 Min</td>
<td>None</td>
</tr>
<tr>
<td>15560</td>
<td>80</td>
<td>55610</td>
<td>90 Min</td>
<td>36 Hrs</td>
<td>2 Hrs</td>
<td>54 Hrs</td>
<td>3 Hrs</td>
<td>72 Hrs</td>
</tr>
</tbody>
</table>

Remarks and Product information see next page.
### Specification sheet

**Hempel (Germany) GmbH**

**Project:** Paul Wurth 519 E

**Area:**
Type C  Industrial Areas, moderate salinity, exterior, no slag pits, C4 middle

**Remarks:**
Paint system for new works and maintenance works.

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life 20°C</th>
<th>Dry to touch 20°C</th>
<th>Flash point °C</th>
<th>Thinner °C</th>
<th>Application restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>12170</td>
<td>62</td>
<td></td>
<td>4 : 1</td>
<td>2 h</td>
<td>1 h</td>
<td>27</td>
<td>08450</td>
<td>0</td>
</tr>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>11320</td>
<td>59</td>
<td></td>
<td>4 : 1</td>
<td>2 h</td>
<td>1 h</td>
<td>27</td>
<td>08450</td>
<td>0</td>
</tr>
<tr>
<td>HEMPATHANE HS 55610</td>
<td>11730</td>
<td>65</td>
<td></td>
<td>7 : 1</td>
<td>2 h</td>
<td>5 h</td>
<td>31</td>
<td>08080</td>
<td>-10 85</td>
</tr>
</tbody>
</table>

The data, specifications, directions and recommendations (hereinafter "Information") given in this painting specification are based upon test results obtained under controlled or specifically defined conditions and said Information is correct to the best of our knowledge. The User must satisfy itself that it is appropriate to use the Product in accordance with the Information in the actual conditions under which the Product is intended to be used, and the Manufacturer and Seller do not guarantee the accuracy, completeness or appropriateness of the Information when the Product is used in those conditions. The provisions of Clause 8 of the GENERAL CONDITIONS OF SALE, DELIVERY AND SERVICE shall apply to any and all claims arising out of or in connection with the use of the Product as recommended above, overleaf or otherwise.
Area: Type D specific Bellless Top components

Surface preparation:
Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501-1:1988.

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area %</th>
<th>Shade</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/ltr)</th>
<th>Application methods</th>
<th>Recommended Nozzle orifice</th>
<th>Nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR ZINC 87260</td>
<td>f/c</td>
<td>Red-grey</td>
<td>19830</td>
<td>125 70</td>
<td>X X</td>
<td>.015&quot;-.026&quot;</td>
<td>160 bar</td>
</tr>
<tr>
<td>HEMPADUR 17550</td>
<td>f/c</td>
<td>Red</td>
<td>57370</td>
<td>200 150</td>
<td>(X) (X)</td>
<td>0.0 bar</td>
<td></td>
</tr>
<tr>
<td>HEMPADUR 17550</td>
<td>f/c</td>
<td>Black</td>
<td>19990</td>
<td>200 150</td>
<td>(X) (X)</td>
<td>0.0 bar</td>
<td></td>
</tr>
</tbody>
</table>

Recoating intervals. Ample ventilation

<table>
<thead>
<tr>
<th>Quality no</th>
<th>D.F.T. (micron)</th>
<th>Recoated with quality no</th>
<th>40°C Min.</th>
<th>40°C Max.</th>
<th>30°C Min.</th>
<th>30°C Max.</th>
<th>20°C Min.</th>
<th>20°C Max.</th>
<th>10°C Min.</th>
<th>10°C Max.</th>
<th>0°C Min.</th>
<th>0°C Max.</th>
<th>-10°C Min.</th>
<th>-10°C Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>87260</td>
<td>70</td>
<td>17550</td>
<td>2 Hrs</td>
<td>None</td>
<td>4 Hrs</td>
<td>None</td>
<td>6 Hrs</td>
<td>None</td>
<td>14 Hrs</td>
<td>None</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>17550</td>
<td>150</td>
<td>17550</td>
<td>5 Hrs</td>
<td>29 Hrs</td>
<td>8 Hrs</td>
<td>48 Hrs</td>
<td>12 Hrs</td>
<td>72 Hrs</td>
<td>27 Hrs</td>
<td>6½ Day</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
</tbody>
</table>

Remarks and Product information see next page.
### Specification sheet

**Hempel (Germany) GmbH**

**Project:**  Paul Wurth 519 E

**Area:**
Type D specific Bellless Top components

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life  20°C</th>
<th>Dry to touch  20°C</th>
<th>Flash point °C</th>
<th>Thinner</th>
<th>Application restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR ZINC 87260</td>
<td>19830</td>
<td>62</td>
<td></td>
<td>5 : 1</td>
<td>8 h</td>
<td></td>
<td>23</td>
<td>08810</td>
<td>5</td>
</tr>
<tr>
<td>HEMPADUR 17550</td>
<td>57370</td>
<td>76</td>
<td></td>
<td>4 : 1</td>
<td>6 h</td>
<td></td>
<td>25</td>
<td>08450</td>
<td>5</td>
</tr>
<tr>
<td>HEMPADUR 17550</td>
<td>19990</td>
<td>76</td>
<td></td>
<td>4 : 1</td>
<td>6 h</td>
<td></td>
<td>25</td>
<td>08450</td>
<td>5</td>
</tr>
</tbody>
</table>

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**Area:**
Type F, Slag Granulation System, external surfaces

**Surface preparation:**
Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501-1:1988.

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area %</th>
<th>Shade</th>
<th>Shade no.</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/ltr)</th>
<th>Application methods</th>
<th>Recommended Nozzle orifice</th>
<th>Recommended Nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR MASTIC 45880</td>
<td>t/c Grey</td>
<td>12170</td>
<td>200</td>
<td>160</td>
<td>4.8</td>
<td>(X) (X)</td>
<td>.017&quot;-.023&quot;</td>
<td>250 bar</td>
</tr>
<tr>
<td>HEMPADUR MASTIC 45880</td>
<td>f/c Grey</td>
<td>17770</td>
<td>200</td>
<td>160</td>
<td>5.1</td>
<td>(X) (X)</td>
<td>.017&quot;-.023&quot;</td>
<td>250 bar</td>
</tr>
</tbody>
</table>

**t/u: touch up**  **f/c: full coat**  **Total d.f.t.**  **320**

**Recoating intervals. Ample ventilation**

<table>
<thead>
<tr>
<th>Quality no</th>
<th>D.F.T. (micron)</th>
<th>Recoated with quality no</th>
<th>40°C Min.</th>
<th>40°C Max.</th>
<th>30°C Min.</th>
<th>30°C Max.</th>
<th>20°C Min.</th>
<th>20°C Max.</th>
<th>10°C Min.</th>
<th>10°C Max.</th>
<th>0°C Min.</th>
<th>0°C Max.</th>
<th>-10°C Min.</th>
<th>-10°C Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>45880</td>
<td>160</td>
<td>45880</td>
<td>4 Hrs</td>
<td>None</td>
<td>6 Hrs</td>
<td>None</td>
<td>8 Hrs</td>
<td>None</td>
<td>23 Hrs</td>
<td>None</td>
<td>68 Hrs</td>
<td>None</td>
<td>5½ Day</td>
<td>None</td>
</tr>
</tbody>
</table>

Remarks and Product information see next page.
**Area:**
Type F, Slag Granulation System, external surfaces

**Remarks:**
Paint system for new works and maintenance works.

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life 20°C</th>
<th>Dry to touch 20°C</th>
<th>Flash point °C</th>
<th>Thinner °C</th>
<th>Min. Temp. °C</th>
<th>Max. RH%</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR MASTIC 45880</td>
<td>12170</td>
<td>77</td>
<td>95880</td>
<td>3 : 1</td>
<td>1 h</td>
<td>4 h</td>
<td>35</td>
<td>08450</td>
<td>-5</td>
<td></td>
</tr>
<tr>
<td>HEMPADUR MASTIC 45880</td>
<td>17770</td>
<td>81</td>
<td>95880</td>
<td>3 : 1</td>
<td>1 h</td>
<td>4 h</td>
<td>35</td>
<td>08450</td>
<td>-5</td>
<td></td>
</tr>
</tbody>
</table>

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## Area:
Type G, High Temperature to 449°C

## Surface preparation:
Oil and grease etc. to be removed by emulsion cleaning. Salts and other contamination to be removed by high pressure fresh water hosing. When the surface is dry: Damaged and rusty shopprimer as well as welds to be abrasive blasted to Sa. 2½ according to ISO 8501-1:1988 with a surface profile corresponding to Rugotest No. 3 BN 10a. Intact shopprimer to be thoroughly abrasive hard swept to a dense roughness of magnitude as indicated above. Dust off residues.

## Application methods

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area</th>
<th>Shade no.</th>
<th>Shade</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/litr)</th>
<th>Application methods</th>
<th>Recommended nozzle orifice</th>
<th>Recommended nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPEL'S GALVOSIL 15702</td>
<td>f/c</td>
<td>19840</td>
<td>75</td>
<td>50</td>
<td>12.8</td>
<td>(X)</td>
<td>0.019&quot;-.023&quot;</td>
<td>100 bar</td>
</tr>
<tr>
<td>HEMPEL'S SILICONE ALUMINIUM 56910</td>
<td>f/c</td>
<td>19000</td>
<td>75</td>
<td>25</td>
<td>14.0</td>
<td>(X)</td>
<td>0.017&quot;</td>
<td>125 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recoating intervals. Ample ventilation</th>
<th>Hrs=Hour(s)</th>
<th>Mth=Month(s)</th>
<th>N/R=Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality no</td>
<td>D.F.T. (micron)</td>
<td>Recoated with quality no</td>
<td>40°C Min.</td>
</tr>
<tr>
<td>15702</td>
<td>50</td>
<td>56910</td>
<td></td>
</tr>
</tbody>
</table>

Remarks and Product information see next page.
**Specification sheet**

Hempel (Germany) GmbH

**Project:** Paul Wurth 519 E

**Area:** Type G, High Temperature to 449°C

---

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life 20°C</th>
<th>Dry to touch 20°C</th>
<th>Flash point °C</th>
<th>Thinner</th>
<th>Application restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPEL'S GALVOSIL 15702</td>
<td>19840</td>
<td>64</td>
<td>97170</td>
<td>7.4 : 2.6</td>
<td>8 h</td>
<td>30 min</td>
<td>14</td>
<td>08700</td>
<td>HEMPEL'S GALVOSIL 15702</td>
</tr>
<tr>
<td>HEMPEL'S SILICONE ALUMINIUM 56910</td>
<td>19000</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>08080</td>
</tr>
</tbody>
</table>

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Area:
Type H, Gearboxes, surfaces exposed to oil or grease

Surface preparation:
Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501-1:1988.

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area %</th>
<th>Shade</th>
<th>Shade no.</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/ltr)</th>
<th>Application methods</th>
<th>Recommended Nozzle orifice</th>
<th>Recommended Nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR 87430</td>
<td>f/c</td>
<td>Sand yellow</td>
<td>20470</td>
<td>Wet: 125</td>
<td>Dry: 80</td>
<td>8.0</td>
<td>(X)</td>
<td>X</td>
</tr>
<tr>
<td>t/u: touch up</td>
<td>f/c: full coat</td>
<td>Total d.f.t.</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X: Recommended (X): Possible</td>
</tr>
</tbody>
</table>
**Area:**
Type H, Gearboxes, surfaces exposed to oil or grease

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life min.</th>
<th>Dry to touch max. °C</th>
<th>Flash point °C</th>
<th>Thinner</th>
<th>Application restrictions Min. Temp. Max. RH% °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR 87430</td>
<td>20470</td>
<td>64</td>
<td>89300</td>
<td>7.5 : 1</td>
<td>8 h</td>
<td></td>
<td>23</td>
<td>08810</td>
<td>5</td>
</tr>
</tbody>
</table>

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# Specification sheet

**Project:** Paul Wurth 519 E

## Area:
Type J, Industrial Areas, moderate salinity, exterior, no slag pits, C 4 High

## Surface preparation:
Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water cleaned in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501-1:1988.

### Product name (including quality number) | Treated area | Shade | Shade no. | Film thickness (micron) | Theoretical spreading rate (sqm/ltr) | Application methods | Nozzle orifice | Recommended Nozzle pressure |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>f/c</td>
<td>Grey</td>
<td>12170</td>
<td>200</td>
<td>5.2</td>
<td>(X)</td>
<td></td>
<td>.019&quot;-.021&quot; 175 bar</td>
</tr>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>f/c</td>
<td>Grey</td>
<td>11320</td>
<td>200</td>
<td>4.9</td>
<td>(X)</td>
<td></td>
<td>.019&quot;-.021&quot; 175 bar</td>
</tr>
<tr>
<td>HEMPATHANE HS 55610</td>
<td>f/c</td>
<td>Grey</td>
<td>11730</td>
<td>125</td>
<td>8.1</td>
<td>X</td>
<td>X</td>
<td>.017&quot;-.021&quot; 175 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>t/u: touch up</th>
<th>f/c: full coat</th>
<th>Total d.f.t.</th>
<th>320</th>
</tr>
</thead>
</table>

### Recoeating intervals. Ample ventilation
<table>
<thead>
<tr>
<th>Hrs=Hour(s)</th>
<th>Mth=Month(s)</th>
<th>N/R=Not Recommended</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Quality no</th>
<th>D.F.T. (micron)</th>
<th>Recoeated with quality no</th>
</tr>
</thead>
<tbody>
<tr>
<td>15560</td>
<td>120</td>
<td>15560</td>
</tr>
<tr>
<td>15560</td>
<td>120</td>
<td>55610</td>
</tr>
</tbody>
</table>

### Theoretical spreading rate
- **HEMPADUR FAST DRY 15560**
  - Grey 12170: 200 sqm/ltr
  - Grey 11320: 200 sqm/ltr
  - Grey 11730: 125 sqm/ltr

### Application methods
- Brush
- Roller
- Spray

### Recommended Nozzle pressure
- .019"-.021" 175 bar
- .017"-.021" 175 bar

### Recoating intervals

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>40°C</td>
<td>80 Min</td>
<td>None</td>
</tr>
<tr>
<td>30°C</td>
<td>115 Min</td>
<td>None</td>
</tr>
<tr>
<td>20°C</td>
<td>3 Hrs</td>
<td>None</td>
</tr>
<tr>
<td>10°C</td>
<td>5 Hrs</td>
<td>None</td>
</tr>
<tr>
<td>0°C</td>
<td>11 Hrs</td>
<td>None</td>
</tr>
<tr>
<td>-10°C</td>
<td>N/R</td>
<td>N/R</td>
</tr>
</tbody>
</table>

**Quality Code:** Christian Sauer

**Remarks and Product information see next page.**
**Area:**
Type J, Industrial Areas, moderate salinity, exterior, no slag pits, C 4 High

**Remarks:**
Paint system for new works and maintenance works.

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio</th>
<th>Pot life</th>
<th>Dry to touch</th>
<th>Flash point</th>
<th>Application restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>volume</td>
<td>20°C</td>
<td>20°C</td>
<td>Thinner</td>
<td>Min. Temp. Max. RH%</td>
</tr>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>12170</td>
<td>62</td>
<td>97560</td>
<td>4 : 1</td>
<td>2 h</td>
<td>1 h</td>
<td>27</td>
<td>08450 0</td>
</tr>
<tr>
<td>HEMPADUR FAST DRY 15560</td>
<td>11320</td>
<td>59</td>
<td>97560</td>
<td>4 : 1</td>
<td>2 h</td>
<td>1 h</td>
<td>27</td>
<td>08450 0</td>
</tr>
<tr>
<td>HEMPATHANE HS 55610</td>
<td>11730</td>
<td>65</td>
<td>97050</td>
<td>7 : 1</td>
<td>2 h</td>
<td>5 h</td>
<td>31</td>
<td>08080 -10 85</td>
</tr>
</tbody>
</table>

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**Area:**
Type F, Slag Granulation System, internal surfaces, Temp. max 90 °C

**Surface preparation:**
Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water hosed in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501-1:1988. Surface profile corresponding to Rugotest No. 3, BN 10, Keane-Tator Comparator, 3.0 G/S, or ISO Comparator Rough Medium (G).
Dust off residues.

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area %</th>
<th>Shade</th>
<th>Shade no.</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/ltr)</th>
<th>Application methods</th>
<th>Recommended Nozzle orifice</th>
<th>Nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR 85671</td>
<td></td>
<td>f/c</td>
<td></td>
<td>11630</td>
<td>150 100</td>
<td></td>
<td>(X)</td>
<td>.018&quot;-.021&quot;</td>
</tr>
<tr>
<td>HEMPADUR 85671</td>
<td></td>
<td>f/c Light red</td>
<td>50900</td>
<td>150 100</td>
<td>6.8</td>
<td>(X)</td>
<td>.018&quot;-.021&quot;</td>
<td>200 bar</td>
</tr>
<tr>
<td>HEMPADUR 85671</td>
<td></td>
<td>f/c Off white</td>
<td>11630</td>
<td>150 100</td>
<td>6.8</td>
<td>(X)</td>
<td>.018&quot;-.021&quot;</td>
<td>200 bar</td>
</tr>
</tbody>
</table>

t/u: touch up f/c: full coat Total d.f.t. 300

Recoating intervals. Ample ventilation

<table>
<thead>
<tr>
<th>Quality no</th>
<th>D.F.T. (micron)</th>
<th>Recoated with quality no</th>
<th>40°C Min.</th>
<th>40°C Max.</th>
<th>30°C Min.</th>
<th>30°C Max.</th>
<th>20°C Min.</th>
<th>20°C Max.</th>
<th>10°C Min.</th>
<th>10°C Max.</th>
<th>0°C Min.</th>
<th>0°C Max.</th>
<th>-10°C Min.</th>
<th>-10°C Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>85671</td>
<td>100</td>
<td>85671</td>
<td>N/R</td>
<td>N/R</td>
<td>36 Hrs</td>
<td>10½ Day</td>
<td>72 Hrs</td>
<td>21 Day</td>
<td>7½ Day</td>
<td>52½ Day</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>85671</td>
<td>100</td>
<td>85671</td>
<td>N/R</td>
<td>N/R</td>
<td>36 Hrs</td>
<td>10½ Day</td>
<td>72 Hrs</td>
<td>21 Day</td>
<td>7½ Day</td>
<td>52½ Day</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
</tbody>
</table>

Remarks and Product information see next page.
## Specification sheet

**Project:** Paul Wurth 519 E

**Area:**
Type F, Slag Granulation System, internal surfaces, Temp. max 90 °C

**Remarks:**
Normal good painting practice must be followed throughout the entire painting procedure.

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life 20°C</th>
<th>Dry to touch 20°C</th>
<th>Flash point °C</th>
<th>Thinner</th>
<th>Min. Temp. °C</th>
<th>Max. RH%</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPADUR 85671</td>
<td>11630</td>
<td>68</td>
<td>97371</td>
<td>8.8 : 1.2</td>
<td>3 h</td>
<td>6 h</td>
<td>24</td>
<td>08450</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>HEMPADUR 85671</td>
<td>50900</td>
<td>68</td>
<td>97371</td>
<td>8.8 : 1.2</td>
<td>3 h</td>
<td>6 h</td>
<td>24</td>
<td>08450</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>HEMPADUR 85671</td>
<td>11630</td>
<td>68</td>
<td>97371</td>
<td>8.8 : 1.2</td>
<td>3 h</td>
<td>6 h</td>
<td>24</td>
<td>08450</td>
<td>10</td>
<td>80</td>
</tr>
</tbody>
</table>

The data, specifications, directions and recommendations (hereinafter "Information") given in this painting specification are based upon test results obtained under controlled or specifically defined conditions and said Information is correct to the best of our knowledge. The User must satisfy itself that it is appropriate to use the Product in accordance with the Information in the actual conditions under which the Product is intended to be used, and the Manufacturer and Seller do not guarantee the accuracy, completeness or appropriateness of the Information when the Product is used in those conditions. The provisions of Clause 8 of the GENERAL CONDITIONS OF SALE, DELIVERY AND SERVICE shall apply to any and all claims arising out of or in connection with the use of the Product as recommended above, overleaf or otherwise.
Area:
Type F, Slag Granulation System, internal surfaces, Temp > 90 °C

Surface preparation:
Oil and grease etc. to be removed by emulsion cleaning. Entire area to be (high pressure) fresh water hosed in order to remove salts and other contaminants. When the surface is dry: Abrasive blasting to minimum Sa 2½ according to ISO 8501-1:1988. Surface profile corresponding to Rugotest No. 3, BN 10, Keane-Tator Comparator, 3.0 G/S, or ISO Comparator Rough Medium (G).
Dust off residues.

<table>
<thead>
<tr>
<th>Product name (including quality number)</th>
<th>Treated area %</th>
<th>Shade</th>
<th>Shade no.</th>
<th>Film thickness (micron)</th>
<th>Theoretical spreading rate (sqm/ltr)</th>
<th>Application methods</th>
<th>Recommended Nozzle orifice</th>
<th>Recommended Nozzle pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPEL'S VINYL ESTER GF 35910 f/c Grey</td>
<td>11480</td>
<td>500</td>
<td>500</td>
<td>2.0</td>
<td>(X) (X) X</td>
<td>.030&quot;-.060&quot;</td>
<td>275 bar</td>
<td></td>
</tr>
<tr>
<td>HEMPEL'S VINYL ESTER GF 35910 f/c Off white</td>
<td>11630</td>
<td>500</td>
<td>500</td>
<td>2.0</td>
<td>(X) (X) X</td>
<td>.030&quot;-.060&quot;</td>
<td>275 bar</td>
<td></td>
</tr>
</tbody>
</table>

Recoating intervals. Ample ventilation

<table>
<thead>
<tr>
<th>Quality no</th>
<th>D.F.T. (micron)</th>
<th>Recoated with quality no</th>
<th>40°C Min.</th>
<th>40°C Max.</th>
<th>30°C Min.</th>
<th>30°C Max.</th>
<th>20°C Min.</th>
<th>20°C Max.</th>
<th>10°C Min.</th>
<th>10°C Max.</th>
<th>0°C Min.</th>
<th>0°C Max.</th>
<th>-10°C Min.</th>
<th>-10°C Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>35910</td>
<td>500</td>
<td>35910</td>
<td>75 Min.</td>
<td>14 Hrs</td>
<td>2 Hrs</td>
<td>24 Hrs</td>
<td>4 Hrs</td>
<td>48 Hrs</td>
<td>10 Hrs</td>
<td>5 Day</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
</tbody>
</table>

Remarks and Product information see next page.
Specification sheet
Hempel (Germany) GmbH

Project: Paul Wurth 519 E

Area:
Type F, Slag Granulation System, internal surfaces, Temp > 90 °C

Remarks:
Normal good painting practice must be followed throughout the entire painting procedure.

<table>
<thead>
<tr>
<th>Product information:</th>
<th>Shade no.</th>
<th>Volume solids %</th>
<th>Curing agent</th>
<th>Mixing ratio volume</th>
<th>Pot life 20° C</th>
<th>Dry to touch 20° C</th>
<th>Flash point °C</th>
<th>Thinner</th>
<th>Application restrictions Min. Temp. Max. RH% °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMPEL'S VINYL ESTER GF 35910</td>
<td>11480</td>
<td>100</td>
<td>99410</td>
<td>98 : 2</td>
<td>45 min</td>
<td>6 h</td>
<td>28</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>HEMPEL'S VINYL ESTER GF 35910</td>
<td>11630</td>
<td>100</td>
<td>99410</td>
<td>98 : 2</td>
<td>45 min</td>
<td>6 h</td>
<td>28</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

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HEMPEL

Issued: December 2007 Page 1 of 3

HEMPEL

HEMADUR FAST DRY 15560

BASE 15569 with CURING AGENT 97560

Description:
HEMADUR FAST DRY 15560 is a two-component, polyamine adduct cured epoxy paint with a very short drying time. Contains zinc phosphate.

Recommended use:
As a quick drying primer or intermediate coat in HEMADUR systems for especially fast recoatable in-shop applications. Can be used for on-site work too if eg VOC compliance is requested.

Service temperatures:
Maximum, dry exposure only: 140°C/284°F. See REMARKS overleaf.

Certificates/Approvals:

Availability:
Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS:
Colours/Shade nos: Grey 12170 - Reddish grey 12430
(MIO version) (See REMARKS overleaf)

Finish: Flat

Volume solids, %: 62 ± 1

Theoretical spreading rate: 6.2 m²/litre - 100 micron
249 sq.ft./US gallon - 4 mils

Flash point: 27°C/81°F

Specific gravity: 1.5 kg/litre - 12.5 lbs/US gallon

Surface dry: ½ (approx.) hr at 20°C/68°F (ISO 1517)

Dry to touch: 1-1½ hour at 20°C/68°F

Fully cured: 7 days at 20°C/68°F


355 g/litre - 3.0 lbs/US gallon

*Another shade: red 50630 may be available according to assortment list.

The physical constants stated are nominal data according to the HEMPEL Group’s approved formulas. They are subject to normal manufacturing tolerances and where stated, being standard deviation according to ISO 3534-1.

APPLICATION DETAILS:
Mixing ratio for 15560:
Base 15569 : Curing agent 97560
4 : 1 by volume

Application method: Airless spray Air Spray Brush

Thinner (max. vol.):
08450 (5%) 08450 (15%) 08450 (5%)

Pot life: 2 hours (20°C/68°F)

Nozzle orifice: .019”- .021”

Nozzle pressure: 175 bar/2500 psi

(Airless spray data are indicative and subject to adjustment)

Cleaning of tools:
HEMPEL’S TOOL CLEANER 99610

Indicated film thickness, dry: 100 micron/4 mils (See REMARKS overleaf)

Indicated film thickness, wet: 175 micron/7 mils

Recoat interval, min:
See REMARKS overleaf

Recoat interval, max:
See REMARKS overleaf

Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers; consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.
HEMPADUR FAST DRY 15560

SURFACE PREPARATION: New steel (dry conditions): Abrasive blasting to Sa 2½. For temporary protection, if required, use suitable shopprimer. All damage of shopprimer and contamination from storage and fabrication should be thoroughly cleaned prior to final painting. For repair and touch-up use HEMPADUR 15560.

Maintenance: Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Remove all rust and loose material by wet or dry abrasive blasting or power tool cleaning. Feather edges to sound and intact areas. After wet abrasive blasting hose down the surface with fresh water and allow drying. Touch up bare spots to full film thickness.

APPLICATION CONDITIONS: Use only where application and curing can proceed at temperatures above 0°C/32°F. The temperature of the paint itself should be 15°C/60°F or above to secure proper application properties.

Maintenance: In confined spaces provide adequate ventilation during application and drying.

PRECEDING COAT: None, or according to specification.

SUBSEQUENT COAT: HEMPADUR, HEMPATHANE, HEMPATEX or HEMUCRYL as per specification.

REMARKS:

VOC: EU directive 2004/42/EC:

<table>
<thead>
<tr>
<th>VOC in g/l</th>
<th>As supplied</th>
<th>15 vol. % thinning</th>
<th>Limit phase I, 2007</th>
<th>Limit phase II, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004/42/EC:</td>
<td>355</td>
<td>420</td>
<td>550</td>
<td>500</td>
</tr>
</tbody>
</table>

VOC: For VOC of other shades, please refer to Safety Data Sheet.

Shade: CURING AGENT 97560 will become darker during storage. This will result in a darker and more yellowish shade than grey 12170. The colour change will have no influence on the performance.

Weathering service temperatures: The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product. Film thicknesses: May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and recoating interval. Normal range is 75-150 micron/3-6 mils.

Irregular surfaces: Special care should be taken in relation to irregular surfaces (welding seams, undercuts etc.) as application with an excessive film thickness - typically being more than 400 micron/16 mils per coat - may result in cracking especially on such areas.

Recoating: Recoating intervals related to later conditions of exposure:

<table>
<thead>
<tr>
<th>Surface temperature</th>
<th>Exposure during service</th>
<th>Recoated with</th>
<th>Minimum In-field application*</th>
<th>Minimum Workshop application</th>
<th>Maximum**</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°C/68°F</td>
<td>Atmospheric</td>
<td>HEMPATHANE</td>
<td>1 hour</td>
<td>15 minutes</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HEMPATEX</td>
<td>2 hours</td>
<td>2 hours</td>
<td>8 hours</td>
</tr>
<tr>
<td>75 micron/3 mils</td>
<td></td>
<td>HEMPADUR</td>
<td>2 hours</td>
<td>3 hours</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>58030</td>
<td>1 hour</td>
<td>2 hours</td>
<td>8 hours</td>
</tr>
</tbody>
</table>

* In case of general maintenance involving epoxy systems of high total dry film thickness, the minimum recoating interval may advantageously be doubled up.

** For mild atmospheric exposure recoating with HEMPADUR and HEMPATHANE qualities has no maximum. For other qualities please contact HEMPEL.

If the maximum recoating interval is exceeded, whatever the subsequent coat, roughening of the surface is necessary to ensure optimum intercoat adhesion or in the case of recoating with coatings other than HEMPADUR, apply a (thin) additional coat of HEMPADUR FAST DRY 15560 within the above directions for recoating.

A completely clean surface is mandatory to ensure intercoat adhesion, especially in the case of long recoating intervals. Any dirt, oil and grease have to be removed with eg suitable detergent followed by high pressure fresh water cleaning. Salts to be removed by fresh water hosing. Any degraded surface layer, as a result of a long exposure period, must be removed as well.
HEMPADUR FAST DRY 15560

Water jetting may be relevant to remove any degraded surface layer and may also replace the above-mentioned cleaning methods when properly executed. Consult HEMPEL for specific advice if in doubt.

To check whether the quality of the surface cleaning is adequate, a test patch may be relevant.

Note: HEMPADUR FAST DRY 15560 is for professional use only.

ISSUED BY: HEMPEL A/S - 1556012170C0009
HEMPATHANE HS 55610
BASE 55619 with CURING AGENT 97050

Description: HEMPATHANE HS 55610 is a two-component polyurethane topcoat, cured with aliphatic isocyanate, with good gloss and colour retention. Contains zinc phosphate.

Recommended use: As a VOC-compliant, high-build finishing coat for protection of structural steel in corrosive environment. May be specified as a one coat “Direct To Metal” system in mild atmospheric environments.

Service temperatures: Maximum, dry exposure only: 120°C/248°F (see REMARKS overleaf)

Availability: Not included in Group Assortment. Availability subject to special agreement.

PHYSICAL CONSTANTS:
Colours/Shade nos: White/10000*
Finish: Glossy
Volume solids, %: 65 ± 1
Theoretical spreading rate: 6.5 m²/litre - 100 micron
261 sq.ft./US gallon - 4 mils
Flash point: 31°C/88°F
Specific gravity: 1.4 kg/litre - 11.7 lbs/US gallon
Surface dry: 3 (approx.) hours at 20°C/68°F (ISO 1517)
Dry to touch: 5 (approx.) hours at 20°C/68°F
Fully cured: 7 days at 20°C/68°F
V.O.C.: 330 g/litre - 2.7 lbs/US gallon

*Wide range of colours available via Hempel's MULTI-TINT system.

The physical constants stated are nominal data according to the HEMPEL Group’s approved formulas. They are subject to normal manufacturing tolerances and where stated, being standard deviation according to ISO 3534-1.

APPLICATION DETAILS:
Mixing ratio for 55610: Base 55619 : Curing agent 97050
7 : 1 by volume
Application method: Airless spray (see REMARKS overleaf) Brush (see REMARKS overleaf)
Thinner (max.vol.): 08080 (5%) 08080 (5%)
Pot life: 2 hours (20°C/68°F)
Nozzle orifice: .017"-.021"
Nozzle pressure: 175 bar/2540 psi
(Airless spray data are indicative and subject to adjustment)

Cleaning of tools: THINNER 08080/08880
Indicated film thickness, dry: 100 micron/4 mils (see REMARKS overleaf)
Indicated film thickness, wet: 150 micron/6 mils
Recoat interval, min: 16 hours (20°C/68°F)
Recoat interval, max: None (see REMARKS overleaf)

Safety: Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.
HEMPATHANE HS 55610

SURFACE PREPARATION:
For one coat, direct to metal: as per relevant painting specification.

APPLICATION CONDITIONS:
The surface must be completely clean and dry at the time of application, and its temperature must be above the dew point to avoid condensation. Minimum temperature for curing is -10°C / 14°F.

At the freezing point and below, be aware of the risk of ice on the surface which will hinder the adhesion. High humidity and/or condensation during application and the following 24 hours (20°C/68°F) may adversely affect the film formation.

In confined spaces provide adequate ventilation during application and drying.

PRECEDING COAT:
HEMPADUR FAST DRY 15560, HEMPADUR MASTIC 45880/45881 or according to specification.

SUBSEQUENT COAT:
None.

REMARKS:
At service temperatures above 100°C/212°F HEMPATHANE HS 55610 will become more soft. Furthermore, discolouration may occur.

VOC - EU directive
2004/42/EC:

<table>
<thead>
<tr>
<th></th>
<th>As supplied</th>
<th>S vol. % thinning</th>
<th>Limit phase, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC in g/l</td>
<td>330</td>
<td>360</td>
<td>500</td>
</tr>
</tbody>
</table>

For VOC of other shades, please refer to Safety Data Sheet.

Colours:
Certain lead-free red and yellow colours may discolour when exposed to chlorine-containing atmosphere.

To obtain full opacity, an extra coat may be necessary, especially for certain lead-free colours in eg red, orange, yellow and green.

Stripe coating:
When specified as a one coat “Direct to Metal”-system 100 micron/4 mils must be applied.

In addition follow “Good Painting Practise” and apply stripe coating before the spray application on areas difficult to cover properly by spray application.

Film thicknesses:
Normal range dry is minimum 50 micron/2 mils (diluted) and minimum 75 micron/3 mils (undiluted), maximum 125 micron/5 mils. This will alter spreading rate and may influence drying time and recoat interval.

Recoat interval:
Maximum recoating interval: A completely clean surface is mandatory to ensure intercoat adhesion, especially at long recoat intervals. Any dirt, oil, and grease have to be removed. e.g. with suitable detergent followed by (high pressure) fresh water cleaning. Salts to be removed by fresh water hosing.

To check an adequate quality of the surface cleaning a test patch is recommended before actual recoating.

Notes:
CURING AGENT 97050 is sensitive to moisture. Store in a dry place and keep the can tightly closed until use. Open curing agent cans with caution as overpressure might exist. Even small traces of water in the mixed paint will reduce the pot life and result in film defects.

HEMPATHANE HS 55610 is for professional use only.

ISSUED BY:
HEMPEL A/S - 5561010000CR001

This Product Data Sheet supersedes those previously issued.
For explanations, definitions and scope, see “Explanatory Notes” in the HEMPEL Book.

Data, specifications, directions and recommendations given in this data sheet represent only test results or experience obtained under controlled or specially defined circumstances. Their accuracy, completeness or appropriateness under the actual conditions of any intended use of the Products herein must be determined exclusively by the Buyer and/or User.

The Products are supplied and all technical assistance is given subject to HEMPEL’s GENERAL CONDITIONS OF SALES, DELIVERY AND SERVICE, unless otherwise expressly agreed in writing. The Manufacturer and Seller disclaim, and Buyer and/or User waive all claims involving, any liability, including but not limited to negligence, except as expressed in said GENERAL CONDITIONS for all results, injury or direct or consequential losses or damages arising from the use of the Products as recommended above, on the overleaf or otherwise.

Product data are subject to change without notice and become void five years from the date of issue.
HEMPADUR ZINC 87260
BASE 87269 with CURING AGENT 89200

Description:
HEMPADUR ZINC 87260 is a two-component, amine adduct cured epoxy resin coating with zinc dust. Due to the high content of metallic zinc dust, the material offers cathodic protection in the event of minor damage. It is fast-drying, abrasion-resistant and has a high active corrosion control effect.

Recommended use:
Undercoat for steel, bridge and tank constructions, particularly suitable for hydraulic steel structures. Material No. 897.0304/05 in accordance with TL/TP-KOR-Stahlbauten, Blatt 87 (Technical delivery and test specifications for the corrosion protection of steel structures).

Service temperatures:
Dry exposure only: max. 150°C/302°F

Certificates, approvals:
Approved by the German Federal Highway Research Institute (BAST), TL/TP-KOR-Stahlbauten, Blatt 81, 87, 94.

Availability:
Not part of Group Assortment. Availability subject to special agreement.

PHYSICAL CONSTANTS:

Colours/Shade nos:
grey / 19460

Finish:
flat

Volume solids:
approx. 65%

Theoretical spreading rate:
9.4 m²/l - 70 µm

Flash point:
>23°C

Specific gravity:
ca. 2.9 g/cm³ (DIN 53 217)

Surface dry:
30 Min. at 23°C/73.4°F, 50% RH.

Weather-resistant:
4 hrs. at 23°C/73.4°F, 50% RH.

Fully cured:
7 days a 20°C/68°F

VOC:
290 g/l

Shelf-life:
Cool, dry and frost-free. At least 12 months in closed original container.

The physical constants are subject to normal manufacturing tolerances. Please consult the "Explanatory notes to product data sheets" in the HEMPEL Product Data Manual.

APPLICATION DETAILS:

Mixing ratio:
Base 87269 : Curing agent 89200
19 : 1 by weight

Application method:
Airless spray

Pot life:
2 hours at 20°C/68°F

Nozzle orifice:
.015" - .029" = 0.38 - 0.76 mm

Nozzle pressure:
160 - 200 bar

Cleaning of tools:
Thinner 08810

Indicated film thickness, dry:
70 µm

Indicated film thickness, wet:
125 µm

Recoat interval:
min. 6 hrs. (20°C/68°F, 50% RH)
The recoat intervals are indicated in the application instructions.

Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with the skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosion and take measures to protect the environment. Apply only in well ventilated areas.

Issue:
87269-mzz-english / 08-2007 / Page 1 – Not subject to QA Change Management Control

HEMPPEL
Product Data Sheet
2. HEMPADUR ZINC 87260

Surface preparation: Abrasive blasting as per DIN EN ISO 12944, Part 4
Surface cleanliness Sa 2½

Application conditions:
Relative humidity: max. 85 %
Surface temperature: +5°C - +40°C/41°F - 104°F and min. 3°C/37.4°F above the dew point

The surface temperature must not fall below +5°C/41°F during the drying and curing process. At temperatures around the freezing point and below, there is a risk of ice forming on the surface (loss of adhesion)
Best application properties are achieved at a paint temperature of 17 - 23°C/62.6 – 73.4°F.

Preceding coat: As per specification
Subsequent coat: As per specification

Coating thickness: May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying times and recoating intervals. The normal range of coating thickness is 40 – 80 μm.

Cleaning: Clean thoroughly before recoating (especially if the product has been stored outdoors). Roughening the surface may be necessary under special circumstances to ensure sufficient intercoat adhesion.

Notes: HEMPADUR ZINC 87260 is for professional use only.

All data indicated here are merely intended to describe the material and are based on tests and results obtained from practical use. No guarantee can therefore be provided for their accuracy or completeness. We also recommend consulting the relevant sections of DIN EN ISO 12944. All data are subject to change without notice. This data sheet shall become void five years from the date of issue at the latest.

Published by HEMPEL (GERMANY) GmbH, Hindenburgdamm 60, 25421 Pinneberg, Germany. Registered at the local court of Pinneberg under HRB 2390, Managing Director: Jacob Gulmann.

Issue: 87260-mrg-english / 08-2007 / Page 2 – Not subject to QA Change Management Control
HEMPADUR® 17550
BASE 17559 with CURING AGENT 98110

Description:
HEMPADUR 17550 is a two-component polyamide cured epoxy paint. It cures to a flexible, well adhering coating with good abrasion and impact resistance. Cures down to 5°C/41°F.

Recommended use:
As a primer for HEMPATEX, HEMPADUR and HEMPATHANE systems on hot dipped galvanized surfaces, aluminium and stainless steel in moderately corrosive environments. Also suited when roughening of the surface is not possible. Material No. 681.11/12 according to TL/TP-KOR-Stahlbauten, sheet 81.

Service temperatures:
Maximum, dry exposure only: 140°C/284°F.

Availability:
Not included in Group Assortment. Availability subject to special agreement.

PHYSICAL CONSTANTS:
Colours/Shade nos:
Black/19990 : brown/57370 (RAL 3007)
Finish:
Flat
Volume solids, %:
76 ± 1
Theoretical spreading rate:
6.3 m²/litre - 120 micron
208 sq.ft./US gallon - 4.8 mils
Flash point:
30°C/86°F
Specific gravity:
1.5 kg/litre - 12.5 lbs/US gallon
Dry to touch:
6 (app) hours at 20°C/68°F
Fully cured:
7 days at 20°C/68°F
V.O.C.:
215 g/litre - 1.8 lbs/US gallon

Shelf life:
1 year (25°C/77°F) from time of production. Depending on storage conditions, mechanical stirring may be necessary before usage. If the shelf life is exceeded please contact HEMPEL for further advice.

APPLICATION DETAILS:
Mixing ratio for 17550:
Base 17559 : Curing agent 98110
4 : 1 by volume
Application method:
Airless spray
Brush
Thinner (max.vol.):
08450 (5%) 08450 (5%)
Pot life:
4 hours (20°C/68°F)
Nozzle orifice:
.017"/.021"
Nozzle pressure:
175 bar/2450 psi

Cleaning of tools:
(Airless spray data are indicative and subject to adjustment)
HEMPADUR'S TOOL CLEANER 99610
Indicated film thickness, dry:
120 micron/4.8 mils
Indicated film thickness, wet:
150 micron/6.0 mils
Recast interval, min:
See REMARKS overleaf
Recast interval, max:
See REMARKS overleaf

Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.

Issued: August 2007
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HEMPADUR 17550

SURFACE PREPARATION:

Stainless steel and aluminium surfaces: Remove dirt, oil and grease etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. It is very important that all contamination and dust are removed.

Roughening of the surface is recommended for optimum adhesion.

Galvanizing: Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Zinc salts (white rust) must be removed by high pressure hosing combined with rubbing with a stiff nylon brush if necessary.

It is recommended to recast spray-metallised surfaces as soon as possible to avoid possible contamination.

APPLICATION CONDITIONS:

Apply only on a dry and clean surface with a temperature above the dew point to avoid condensation. At the freezing point and below be aware of the risk of ice on the surface, which will hinder adhesion.

Use only where application and curing can proceed at temperatures above 5°C/41°F. The temperature of the surface must also be above this limit.

The temperature of the paint itself should be 15-25°C/59-77°F.

In confined spaces provide adequate ventilation during application and drying.

SUBSEQUENT COAT: HEMPADUR, HEMPATHANE or HEMPATEX qualities according to specification.

REMARKS:

Passivation:

Surface preparation: coating the galvanized surface.

Water should not be used for cooling down the steel.

Cleaning of steel should not be initiated unless the steel temperature is below 30°C/86°F.

Application:

As the galvanized zinc layer may be porous it is recommended to apply a mist coat of undiluted HEMPADUR 17550, allow air to escape, and then apply a full coat of HEMPADUR 17550 a few minutes later.

Film thicknesses:

May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and recoating interval. Normal range dry is 80-150 micron/3.2-6.0 mils.

Recoating:

Recoating intervals related to later conditions of exposure (50 micron/2 mils dry):

<table>
<thead>
<tr>
<th>Surface temperature</th>
<th>20°C/68°F</th>
<th>20°C/68°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recoated with</td>
<td>Mild</td>
<td>Medium</td>
</tr>
<tr>
<td>HEMPADUR</td>
<td>8 hours</td>
<td>8 hours</td>
</tr>
<tr>
<td>HEMPATHANE</td>
<td>8 hours</td>
<td>8 hours</td>
</tr>
</tbody>
</table>

*Except for mild climatic conditions avoid long-term exposure of galvanized steel coated with a thin layer of paint only as this may create white rust under the paint.

If the maximum recoating interval is exceeded, whatever the subsequent coat, roughening of the surface is necessary to ensure optimum intercoat adhesion or in the case of recoating with coatings other than HEMPADUR, apply a (thin) additional coat of HEMPADUR 17550 within the above directions for recoating.

A completely clean surface is mandatory to ensure intercoat adhesion, especially in the case of long recoating intervals. Any dirt, oil and grease have to be removed with eg suitable detergent followed by high pressure fresh water cleaning. Salts to be removed by fresh water hosing.

Any degraded surface layer, as a result of a long exposure period, must be removed as well.

Water jetting may be relevant to remove any degraded surface layer and may also replace the above-mentioned cleaning methods when properly executed. Consult HEMPEL for specific advice if in doubt.

To check whether the quality of the surface cleaning is adequate, a test patch may be relevant.

HEMPADUR 17550 is for professional use only.

Note:

This Product Data Sheet supersedes those previously issued.

For explanations, definitions and scope, see “Explanatory Notes” in the HEMPEL Book.

Data, specifications, directions and recommendations given in this data sheet represent only test results or experience obtained under controlled or specially defined circumstances. Their accuracy, completeness or appropriateness under the actual conditions of any intended use of the Products herein must be determined exclusively by the Buyer and/or User. The Products are supplied and all technical assistance is given subject to HEMPEL’s GENERAL CONDITIONS OF SALES, DELIVERY AND SERVICE, unless otherwise expressly agreed in writing. The Manufacturer and Seller disclaim, and Buyer and/or User waive all claims involving, any liability, including but not limited to negligence, except as expressed in said GENERAL CONDITIONS for all results, injury or direct or consequential losses or damages arising from the use of the Products as recommended above, on the “overleaf or otherwise.

Product data are subject to change without notice and become void five years from the date of issue.
HEMPADUR MASTIC 45880/
HEMPADUR MASTIC 45881

High temperatures: 45881: BASE 45889 with CURING AGENT 95881
Low to medium temperatures: 45880: BASE 45889 with CURING AGENT 95880

Description:
HEMPADUR MASTIC 45880/45881 is a two-component polyamide adduct cured, high solids, high build epoxy paint. It forms a hard and tough coating, has good wetting properties and low temperature curing.

Recommended use:
As a selfprimed, surface tolerant paint system or as an intermediate or finishing coat in heavy duty paint systems where low VOC and high film build are required. Multipurpose coating as per specification for maintenance including ballast tanks and underwater hull and new steel in those cases, where a need for few products outweighs more specialised coatings. Can be specified where extended recoating properties for polyurethane topcoats are requested (typically travel coating). May be used directly on cured zinc silicate (GALVOSIL products) or spray-metallized surfaces to minimize popping. As a topcoat where the usual outdoor cosmetic appearance of epoxy paints is acceptable.

Service temperatures:
Maximum, dry exposure only: 120°C/248°F

Certificates/Approvals:
Tested for non-contamination of grain cargo at the Newcastle Occupational Health, Great Britain. Complies with Section 175.300 of the Code of Federal Regulations in respect of carriage of dry foodstuffs (FDA) in spaces with an internal surface area larger than 1000 m²/10,750 sq.ft. HEMPADUR MASTIC 45881 is in accordance with Aramco’s specification APCS 1, APCS 12, APCS 26 and 26T. Classified as class 1 material according to BS 476; Part 7; 1997 (fire testing). HEMPADUR MASTIC 45881 is approved as a low flame spread material by Danish, French, Spanish, Singaporean, Malaysian and Indonesian authorities according to IMO resolution MSC 61 (67). Has a French, Spanish, Danish, Singaporean, Malaysian and Indonesian EC-type Examination Certificate. Complies with EU Directive 2004/42/EC, subcategory j. Please see REMARKS overleaf.

Availability:
Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS:
Version, mixed product:

<table>
<thead>
<tr>
<th></th>
<th>45880</th>
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</thead>
<tbody>
<tr>
<td>Colours/Shade nos:</td>
<td>Grey/12170*</td>
<td>Grey/12170*</td>
</tr>
<tr>
<td>Finish:</td>
<td>Semi-gloss</td>
<td>Semi-gloss</td>
</tr>
<tr>
<td>Volume solids, %:</td>
<td>77 ± 1</td>
<td>77 ± 1</td>
</tr>
<tr>
<td>Theoretical spreading rate:</td>
<td>3.9 m²/litre - 200 micron</td>
<td>3.9 m²/litre - 200 micron</td>
</tr>
<tr>
<td>154 sq.ft./US gallon - 8 mils</td>
<td>154 sq.ft./US gallon - 8 mils</td>
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</tr>
<tr>
<td>Flash point:</td>
<td>35°C/95°F</td>
<td>35°C/95°F</td>
</tr>
<tr>
<td>Specific gravity:</td>
<td>1.4 kg/litre - 11.7 lbs/US gallon</td>
<td>1.4 kg/litre - 11.7 lbs/US gallon</td>
</tr>
<tr>
<td>Dry to touch:</td>
<td>4 (approx) hours at 20°C/68°F</td>
<td>3 (approx) hours at 30°C/86°F</td>
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<tr>
<td>Fully cured:</td>
<td>7 days at 20°C/68°F</td>
<td>5 days at 30°C/86°F</td>
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<tr>
<td>V.O.C.:</td>
<td>220 g/litre - 1.8 lbs/US gallon</td>
<td>220 g/litre - 1.8 lbs/US gallon</td>
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</table>

APPLICATION DETAILS:
Version:

<table>
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<tbody>
<tr>
<td>Mixing ratio:</td>
<td>3 : 1 by volume</td>
<td>3 : 1 by volume</td>
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<tr>
<td>Application method:</td>
<td>Airless spray</td>
<td>Airless spray</td>
</tr>
<tr>
<td>Thinner (max. vol.):</td>
<td>Airless spray (touch up)</td>
<td>Airless spray (touch up)</td>
</tr>
<tr>
<td>Pot life:</td>
<td>1 hour (20°C/68°F) (Airless spray)</td>
<td>1½ hour (30°C/86°F) (Airless spray)</td>
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<tr>
<td>2 hours (20°C/68°F) (Brush)</td>
<td>2 hours (30°C/86°F) (Brush)</td>
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<td>Nozzle orifice:</td>
<td>.017”-.023”</td>
<td>.017”-.023”</td>
</tr>
<tr>
<td>Nozzle pressure:</td>
<td>250 bar/3600 psi</td>
<td>250 bar/3600 psi</td>
</tr>
<tr>
<td>Cleaning of tools:</td>
<td>HEMPEL'S TOOL CLEANER 99910 or HEMPEL'S THINNER 08450</td>
<td>HEMPEL'S TOOL CLEANER 99910 or HEMPEL'S THINNER 08450</td>
</tr>
<tr>
<td>Indicated film thickness, dry:</td>
<td>200 micron/8 mils</td>
<td>275 micron/11 mils</td>
</tr>
<tr>
<td>Recoad interval, min/max:</td>
<td>According to separate APPLICATION INSTRUCTIONS</td>
<td>According to separate APPLICATION INSTRUCTIONS</td>
</tr>
</tbody>
</table>

Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.
HEMPADUR MASTIC 45880/45881

SURFACE PREPARATION:

New steel: When used as an intermediate or finishing coat please refer to the data sheet for the preceding GALVOSIL or HEMPADUR primer. When used as a primer please refer to the specification.

Zinc silicate painted or spray-metallized surfaces: Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Zinc salts (white rust) must be removed by high pressure hosing combined with rubbing with a stiff nylon brush if necessary. It is recommended to recoat spray-metallized surfaces as soon as possible to avoid possible contamination.

Concrete: Remove slip agent and other possible contaminants by emulsion washing followed by high pressure hosing with fresh water. Remove scum layer and loose matter to a hard, rough and uniform surface, preferably by abrasive blasting, possibly by other mechanical treatment or acid etching. Seal surface with suitable sealer, as per relevant painting specification.

Repair and maintenance: Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Clean damaged areas thoroughly by power tool cleaning to minimum St 2 (spot-repairs) or by abrasive blasting to min. Sa 2, preferably to Sa 2½. Improved surface preparation will improve the performance of HEMPADUR MASTIC 45880/45881. As an alternative to dry cleaning, water jetting to min. Wa 2½ (ISO 8501-4:2006) or according to specification, may be used. A flash-rust degree of maximum M (ISO 8501-4:2006) is acceptable before application. Feather edges to sound and intact paint. Dust off residues.

On pit-corroded surfaces, excessive amounts of salt residues may call for water jetting, wet abrasive blasting, alternatively dry abrasive blasting, high pressure fresh water hosing, drying, and finally, dry abrasive blasting again.

APPLICATION CONDITIONS: Apply only on a dry and clean surface with a temperature above the dew point to avoid condensation. Use only when application and curing can proceed at temperatures above -5°C/23°F (recommended lowest temperature is 0°C/32°F) for HEMPADUR MASTIC 45880 and above approx 15°C/59°F for HEMPADUR MASTIC 45881. The temperature of the paint itself should be 15°C/59°F or above, but advantageously below approximately 30°C/86°F to secure proper application properties. Optimal spraying properties are obtained at a paint temperature of 18-22°C/64-72°F. In warmer climates, the paint should be stored in a cool place and the paint temperature should preferably be kept below 30°C/86°F. In confined spaces provide adequate ventilation during application and drying. In cases where faster drying at very low temperatures is required, HEMPADUR MASTIC 45880 may advantageously be replaced by HEMPADUR 45143. Please also see separate APPLICATION INSTRUCTIONS.

PRECEDING and SUBSEQUENT COAT: None or according to specification.

REMARKS:

VOC - EU directive:

<table>
<thead>
<tr>
<th></th>
<th>As supplied</th>
<th>5 vol. % thinning</th>
<th>Limit phase I, 2007</th>
<th>Limit phase II, 2010</th>
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<tr>
<td>45880</td>
<td>275</td>
<td>305</td>
<td>550</td>
<td>500</td>
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<tr>
<td>45881</td>
<td>255</td>
<td>280</td>
<td>550</td>
<td>500</td>
</tr>
</tbody>
</table>

VOC: For VOC of other shades, please refer to Safety Data Sheet.

Certificates have been issued under the former quality number 4588.

Colours/Colour-stability:

Certain lead-free red and yellow colours may discolour when exposed to chlorine-containing atmosphere.

Leadcolours may become discoloured when exposed to sulphide-containing atmosphere.

Like other epoxy coatings in white/whitish colour a yellowing may take place in cases of application under unfavourable weather conditions, especially sudden drops in temperature during drying and initial cure and/or lack of ventilation.

Weathering/service temperatures:

The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product.

Film thicknesses/thinning:

May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and recoating interval. Normal range dry is 125-200 micron/5-8 mils. May be specified in lower film thickness for which purpose additional thinning is required, please see separate APPLICATION INSTRUCTIONS.

Avoid application of excessive film thicknesses.

Shades:

The product is also available in a Micaceous Iron Oxide (MIO) pigmented shade (Shade no. 12430 – reddish grey) and in aluminium pigmented shades (Shade nos. 19870 - dark alu and 19000 - light alu).
HEMPADUR MASTIC 45880/45881

Application onto zinc silicate or spray-metalized surfaces

It is recommended to apply HEMPADUR MASTIC 45880/45881 by using a "mist-coat" procedure. Provided the paint temperature is approximately above 20°C/68°F, a thin, undiluted coat is applied (the mist coat) and after a few minutes, a second coat is applied in the full specified film thickness. If the paint temperature is below 20°C/68°F, thinning (max 15%) may be required. Curing agents 95880 and 95881 are hazy. This is intended and has no negative influence on the performance.

Note: HEMPADUR MASTIC 45880/45881 is for professional use only.

ISSUED BY: HEMPEL A/S - 4588012170C0011/4588112170C0008

This Product Data Sheet supersedes those previously issued.

For explanations, definitions and scope, see “Explanatory Notes” in the HEMPEL Book.

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Product data are subject to change without notice and become void five years from the date of issue.

Issued: November 2008
HEMPEL’S GALVOSIL® 15702

BASE 15708 with HEMPEL’S ZINC DUST 97170

Description:
HEMPEL’S GALVOSIL 15702 is a two-component, solvent-borne, self-curing, inorganic zinc silicate with outstanding resistance against weathering and abrasion. It has excellent chemical resistance within the pH range 6-9. For service temperature range, see below. Applicable by airless spray. Offers cathodic protection of local mechanical damage.

Recommended use:
1. As a general purpose, heavy-duty, rust-preventing primer.
2. As a single, complete coating for long-term protection of steel exposed to moderately to severely corrosive environment and to abrasion.
3. As a tank lining in accordance with the CARGO PROTECTION GUIDE.

Service temperatures:
See REMARKS overleaf.

Approvals, certificates:
Complies with Section 175.300 of Food Additive Regulation (in respect of carriage of dry foodstuffs) of the Code of Federal Regulations as found by review of the U.S. Food and Drug Administration (FDA). Certificated by Scientific & Technical Services to comply with the requirements of low moisture fats and oil according to FDA. Approved by Lloyd’s Register of Shipping as a recognized corrosion control coating. Meets the requirements laid down by ASTM A-490 Class “B” for Slip Co-efficient and Creep Resistance.

Availability:
Not included in Group Assortment. Availability subject to special agreement.

PHYSICAL CONSTANTS:
Colours/Shade nos: Metal grey/19840
Finish: Flat
Volume solids, %: 64 ± 1
Theoretical spreading rate: 12.8 m²/litre - 50 micron
513 sq.ft./US gallon - 2 mils
Flash point: 14°C/57°F
Specific gravity: 2.65 kg/litre - 22.1 lbs/US gallon
Dry to touch: 30 (approx.) min. at 20°C/68°F (65-75% RH)
Fully cured: 3 (approx.) days at 20°C/68°F (65-75% RH) (See REMARKS overleaf)
V.O.C.: 535 g/litre - 4.5 lbs/US gallon
Shelf life: 1 year from time of production (25°C/77°F). Shelf life is dependent on storage temperature. Shelf life is reduced at storage temperatures above 25°C/77°F. Do not store above 40°C/104°F. Shelf life is exceeded if the liquid is gelled or if the mixed product forms gels before application.

The physical constants stated are nominal data according to the HEMPEL Group’s approved formulas. They are subject to normal manufacturing tolerances and where stated, being standard deviation according to ISO 3534-1.

APPLICATION DETAILS:
Mixing ratio for 15702:
Base 15708 : zinc dust 97170
3.1 parts by weight : 6.9 parts by weight
(Mixing by volume - see REMARKS overleaf)
Application method:
Airless spray
Air spray
Brush (touch-up)
Thinner (max.vol.):
Air spray: 08700 (30%)
Air spray: 08700 (50%)
Air spray: 08700 (10%)
Pot life:
8 hours (20°C/68°F)
Nozzle orifice:
.019" - .023"
Nozzle pressure:
100 bar/1500 psi
(Clean airless spray data are indicative and subject to adjustment)
Cleaning of tools:
THINNER 08700
Indicated film thickness, dry:
50 micron/2 mils (See REMARKS overleaf)
Indicated film thickness, wet:
75 micron/3 mils
Recoat interval, min:
See REMARKS overleaf
Recoat interval, max:
None (See REMARKS overleaf)
Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.
HEMPEL’S GALVOSIL 15702

SURFACE PREPARATION: Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Gritblasting to minimum Sa 2½ with a surface profile equivalent to Rugotest No. 3, BN10a, Keane-Tator Comparator, min. 3.0 G/S, or ISO Comparator rough MEDIUM (G). In case of new steel to be exposed to no more than medium aggressive (industrial) environment and without any extraordinary demands to lifetime, a surface preparation degree of SSPC-SP6 may suffice. Consult separate APPLICATION INSTRUCTIONS, and, as relevant, the corresponding PAINTING SPECIFICATION for cargo tanks.

APPLICATION CONDITIONS: The surface must be completely clean and dry with a temperature above the dew point to avoid condensation. At temperatures ranging from -10°C/15°F to 40°C/105°F. Curing needs minimum 65% relative humidity. Consult separate APPLICATION INSTRUCTIONS.

SUBSEQUENT COAT: As a tank coating: none. Otherwise according to specification.

REMARKS: Some of the certificates have been issued under the former quality number 1570.

Dry service temperatures:
- Resistant to permanent temperatures up to 500°C/932°F.
- Resistant to occasional short-term heating (peak temperatures) up to 500°C/932°F while permanent service temperatures are otherwise below 400°C/752°F.
- In the case of cyclic service conditions with regular periods of low and high temperatures, the temperature should be kept below 400°C/752°F.

Wet service: Non-saline water: Maximum 60°C/140°F.

Film thicknesses: If topcoated with a heavy-duty system, 50 micron/2 mils dry film thickness (75 micron/3 mils wet) is recommended. Consult separate APPLICATION INSTRUCTIONS before recoating.

High temperature service: To avoid cracking it is important to keep the dry film thickness at maximum 40-50 micron/1.6-2 mils, especially in cases where service conditions include sudden temperature changes.

Mixing: When mixing part of the content in a can the mixing ratio on volume should be made as follows: Measure 7.4 parts of liquid 15708, then add zinc dust 97170 up to a total of 10,0 parts by volume.

Thinning: For application at high temperatures, a special thinner is available.

Minimum interval at 20°C/68°F, 65-75% RH for recoating with:
- HEMPADUR (system/high-build) 3 days, full curing (see APPLICATION INSTRUCTIONS)
- HEMPADUR (25 micron/1 mil) 24 hours

Recoating: Recoating intervals are strongly dependent on both temperature and humidity. Deviations from the standard conditions may shorten or prolong the recoating intervals. Consult separate APPLICATION INSTRUCTIONS.

The recoating interval of 24 hours for 25 micron/1 mil HEMPADUR is only valid in case the subsequent coat is applied more than 1 week after (20°C/68°F), 75% RH, humid weather.

Curing, cargo tanks: Before cargo tanks are taken into use, the coating must be completely through-cured. It is required to carry out low pressure hosing of the tanks with (fresh) water 2-3 times at ambient temperatures. Allow the tanks to remain wet between washings. Reference is made to corresponding PAINTING SPECIFICATION for cargo tanks.

CONTACT HEMPEL about temperatures permissible.

Non-saline water: Maximum 60°C/140°F.

Mixing: When mixing part of the content in a can the mixing ratio on volume should be made as follows: Measure 7.4 parts of liquid 15708, then add zinc dust 97170 up to a total of 10,0 parts by volume.

Recoating: Recoating intervals are strongly dependent on both temperature and humidity. Deviations from the standard conditions may shorten or prolong the recoating intervals. Consult separate APPLICATION INSTRUCTIONS.

The recoating interval of 24 hours for 25 micron/1 mil HEMPADUR is only valid in case the subsequent coat is applied more than 1 week after (20°C/68°F), 75% RH, humid weather.

Otherwise, the minimum recoating interval is the same as for system/high-build.

Curing, cargo tanks: Before cargo tanks are taken into use, the coating must be completely through-cured. It is recommended to carry out low pressure hosing of the tanks with (fresh) water 2-3 times at ambient temperatures. Allow the tanks to remain wet between washings. Reference is made to corresponding PAINTING SPECIFICATION for cargo tanks.

Note: HEMPEL’S GALVOSIL 15702 is for professional use only.

Issued: January 2004 Page 2 of 2

This Product Data Sheet supersedes those previously issued.

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Product data are subject to change without notice and become void five years from the date of issue.
HEMPEL’S SILICONE ALUMINIUM 56910

Description: HEMPEL’S SILICONE ALUMINIUM 56910 is a heat resistant aluminium pigmented polysiloxane paint.

Recommended use: For long-term protection of hot pipelines, exhaust pipes, smoke stacks and other hot surfaces. In corrosive environment see PRECEDING COAT overleaf.

Service temperatures: Maximum, dry exposure only: 600°C/1112°F.

Certificates/Approvals: Complies with EU Directive 2004/42/EC, subcategory i (see REMARKS overleaf).

Availability: Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS
Colours/Shade nos: Aluminium/19000
Finish: Semi-flat (See REMARKS overleaf)
Volume solids, %: 35 ± 1
Theoretical spreading rate: 14.0 m²/litre - 25 micron
561 sq.ft./US gallon - 1.0 mil
Flash point: 25°C/77°F
Specific gravity: 1.1 kg/litre - 9.2 lbs/US gallon
Surface dry: 1 (approx.) hour at 20°C/68°F (ISO 1517)
Dry to touch: 2-4 hours at 20°C/68°F
V.O.C.: 585 g/litre - 4.9 lbs/US gallon

The physical constants stated are nominal data according to the HEMPEL Group’s approved formulas. They are subject to normal manufacturing tolerances and where stated, being standard deviation according to ISO 3534-1.

APPLICATION DETAILS:
Application method: Airless spray Air spray Brush
Thinner (max.vol.): 08080 (5%) 08080 (15%) 08080 (5%) (See REMARKS overleaf)
Nozzle orifice: .017”
Nozzle pressure: 125 bar/1800 psi
(Clean airless spray data are indicative and subject to adjustment)
Indicated film thickness, dry: THINNER 08080
25 micron/1 mil (See REMARKS overleaf)
Indicated film thickness, wet: 75 micron/3 mils
Recoat interval, min: 24 hours (20°C/68°F) (See REMARKS overleaf)
Recoat interval, max: See REMARKS overleaf

Safety: Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.
HEMPEL’S SILICONE ALUMINIUM 56910

SURFACE PREPARATION: Remove oil and grease etc. thoroughly with suitable detergent. Remove salts and other contaminants by (high pressure) fresh water cleaning. Abrasive blasting to Sa 2½.

APPLICATION CONDITIONS: Clean and dry surface with a temperature above the dew point to avoid condensation. In confined spaces provide adequate ventilation during application and drying.

PRECEDING COAT: Can be used directly on blast-cleaned steel. For maximum corrosion protection, a primer coat of one of the following paints is recommended (40 micron/1.6 mil dry film thicknesses): HEMPEL’S SILICONE ZINC 16900 or HEMPEL’S GALVOSIL 15700. This will lower the heat resistance; reference is made to the product data sheets for the mentioned primers.

SUBSEQUENT COAT: None.

REMARKS:
- VOC - EU directive 2004/42/EC: VOC in g/l
  - As supplied: 585
  - 5 vol. % thinning: 595
  - Limit phase I, 2007: 600
  - Limit phase II, 2010: 500
- Gloss: After exposure to heat the gloss is reduced.
- Thermo plasticity: The paint film is somewhat thermoplastic also after heating.
- Film thicknesses: For high temperature service, the total dry film thickness of HEMPEL’S SILICONE ALUMINIUM 56910 should preferably be kept at 75 micron/3 mils as maximum.
- First exposure: On first exposure to heat the temperature increase from ambient temperature to the required service temperature must run over a period of 24 hours.
- Curing: The coating will be fully cured after:
  - 3 days at 100°C/212°F,
  - 1 day at 150°C/302°F,
  - or 2 hours at 200°C/392°F.
- Recoating: May be recoated when through dry (24 hours at 20°C/68°F) or after being heated for one hour to approximately 200°C/392°F. Before recoating after exposure in contaminated environment, clean surface thoroughly by high pressure fresh water hosing and allow to dry.
- Zinc silicate primer: If HEMPEL’S SILICONE ALUMINIUM 56910 is applied on zinc silicate coatings, such as HEMPEL’S GALVOSIL 15700, popping may occur after application or after first heating up. The best way to avoid popping is to apply a mist coat in the first pass of HEMPEL’S SILICONE ALUMINIUM 56910. Let the air escape and apply the full coat of HEMPEL’S SILICONE ALUMINIUM 56910.

Note: HEMPEL’S SILICONE ALUMINIUM 56910 is for professional use only.

ISSUED BY: HEMPEL A/S - 5691019000CO004

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HEMPADUR 87430
BASE 87439 with CURING AGENT 89300

Description:
HEMPADUR ZINC 87430 is a two-component, modified, amine adduct cured epoxy resin coating with zinc phosphate. It is fast-drying and has a high active corrosion control effect.

Recommended use:
Undercoat for steel, bridge and tank construction.
Material No. 687.02 in accordance with TÜV-KOR-Stahlbauten, Blatt 87 (Technical delivery and test specifications for the corrosion protection of steel structures).

Service temperatures:
Dry exposure only: max. 150°C/302°F

Certificates, approvals:
Approved by the German Federal Highway Research Institute (BAST), TÜV-KOR-Stahlbauten, Blatt 87.

Availability:
Not part of Group Assortment. Availability subject to special agreement.

PHYSICAL CONSTANTS:

Colours/Shade no.:
sand yellow / 20470 (RAL 1002)*

Finish:
semi-gloss (matte)

Solids volume:
approx. 64%

Theoretical spreading rate:
8.0 m²/l - 80 µm

Flash point:
>23°C/73.4°F

Specific gravity:
approx. 1.6 g/cm³ (DIN 53 217)

Surface dry:
30 min. at 23°C/73.4°F, 50% RH

Weather-resistant:
6 hrs. at 23°C/73.4°F, 50% RH

Fully cured:
7 days at 20°C/68°F

VOC:
330 g/l

Shelf-life:
Cool, dry and frost-free. At least 12 months in closed original container.

* Other colours available as per assortment list.

The physical constants are subject to normal manufacturing tolerances.
Please consult the "Explanatory notes to product data sheets" in the HEMPEL Product Data Manual.

APPLICATION DETAILS:

Mixing ratio:
Base 87439 : Curing agent 89300
12 : 1 by weight

Application method:
Airless spraying
Thinner (max. vol.)
08810 (max. 5%)
Pot life:
8 hours at 20°C/68°F
Nozzle orifice:
0.008" - 0.018" = 0.23 - 0.48 mm
Nozzle pressure:
180 - 250 bar
(Airless spray data are guide values and subject to adjustment)

Cleaning of tools:
Thinner 08810
60 µm
Indicated film thickness, dry:
125 µm
Indicated film thickness, wet:
min. 6 hrs. (20°C/68°F, 50% RH)

Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with the skin and eyes, and do not swallow; if swallowed consult a doctor immediately. Take precautions against possible risks of fire or explosion and take measures to protect the environment. Apply only in well ventilated areas.

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2. HEMPADUR 87430

Surface preparation:
Abrasive blasting as per DIN EN ISO 12944, Part 4
Surface cleanliness Sa 2½

Application conditions:
Relative humidity: max. 85%  
Surface temperature: +5°C / +41°F – 104°F and min. 3°C / 37.4°F above the dew point.

The surface temperature must not fall below +5°C / +41°F during the drying and curing process. At temperatures around the freezing point and below, there is a risk of ice forming on the surface (loss of adhesion).

Best application properties are obtained at a paint temperature of 17 - 23°C.

Preceding coat:
As per specification

Subsequent coat:
As per specification

Weathering:
The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product.

Service temperatures:
May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying times and recoating intervals. The normal range of coating thickness is 75 – 150 μm.

Cleaning:
Clean thoroughly before recoating (especially if the product has been stored outdoors). Roughening the surface may be necessary under special circumstances to ensure sufficient intercoat adhesion. An absolutely clean surface is required for good intercoat adhesion, particularly in the case of long recoat intervals. Any dirt, oil and grease has to be removed with suitable cleaning agents, followed by high pressure cleaning with fresh water at 120 – 160 bar.

Remove any salts by washing with fresh water.

Any surface products due to degradation resulting from lengthy periods of operation also have to be removed.

Water jetting may be relevant to remove any degraded surface layers and may also replace the above-mentioned cleaning methods when properly executed.

Contact HEMPEL in case of doubt.

It is recommended that a specimen area should be used to check the quality of surface pretreatment.

Notes:
HEMPADUR 87430 is for professional use only.
HEMPADUR 85671
BASE 85675 with CURING AGENT 97371

Scope:
These application instructions cover surface preparation, application equipment, and application of HEMPADUR 85671.

The following are general rules, which may be supplemented with more detailed descriptions when needed, for instance for major new-buildings/new constructions or extensive repair jobs.

Steel work:
All steel work must comply with ISO 8501-3:2001, preparation grade P3.

The steel must be of first class quality and should not have been allowed to rust more than corresponding to grade B of ISO 8501-1:2007. Local areas showing rust grade C must be subject to extended inspection of salt contamination.

All steel work (including welding, flame cutting, grinding) must be finished before the surface preparation starts.

Surface preparation:
Prior to abrasive blast cleaning of the steel, remove oil, grease, salts and other contamination with a suitable detergent followed by high pressure fresh water hosing.

Water soluble salts shall be removed by high pressure fresh water hosing if the concentration is above 50 mg/m$^2$.

Alkali deposits on new welding seams as well as soap traces from pressure testing of tanks to be removed by fresh water and scrubbing with stiff brushes.

Control for contamination according to separate guidelines.

On repair jobs, a rough blasting to remove all loosely adhering materials may be required before degreasing/washing is carried out.

Old steel: Even after a very thorough cleaning, pits may typically contain contamination in the form of remnants of chemicals/water soluble salts. For this reason, repeated detergent washing plus abrasive blasting may be necessary. After the first blasting, a very thorough vacuum cleaning is carried out in order to see if any “chemical bleeding” occurs as well as controls for water soluble salts (reference is made to separate instructions) are made. Special care should be taken in evaluating pitted areas - ask for special guidelines.

For optimum performance, gritblast to very near white metal, Sa 2½-3, ISO 8501-1:2007. In practice this requirement is to be understood as white metal Sa 3 at the moment of abrasive blasting, but allows a slight reduction at the moment of paint application.

The resulting surface profile must be equivalent to Rugotest No. 3, min. BN 10, or ISO 8503/1 rough MEDIUM (G).

Use steel grit, aluminium silicate, or similar sharp edged abrasives of a good quality free of foreign matters, soft particles, and the like. Control for contamination according to separate guidelines.

In case steel grit is used this must furthermore be controlled so that a proper grain size distribution is maintained.

Steel grit with particle sizes of 0.2-1.2 mm or aluminium silicate of 0.4-1.8 mm will usually create the desired surface profile when the air pressure measured at the nozzle is 6-7 bar/85 -100 psi.
HEMPADUR 85671

The compressed air must be dry and clean. The compressor must be fitted with suitable oil and water traps.

When the abrasive blasting is completed, remove residual grit and dust by vacuum cleaning. Abrasive particles not removed by vacuum cleaning are to be removed by brushing with clean brushes followed by vacuum cleaning.

The importance of systematic working must be stressed when blasting. Poorly blasted areas covered with dust are very difficult to locate during the blast inspection made after the rough cleaning.

**Shopprimed and previously painted surfaces:** All shopprimer or existing coating materials to be completely removed. Avoid the use of zinc shopprimer whenever possible.

However, if the steel is shopprimed with zinc, it is very important that all zinc is removed by abrasive blast cleaning. Separate check procedures will be necessary to demonstrate the effectiveness of removal. More blast cleaning may be deemed necessary! Use of a red zinc shopprimer will facilitate the visual check of the blast cleaning and is considered necessary in order to obtain an acceptable surface preparation.

**Note:** Degree of steelwork finish and surface preparation are more detailed described in HEMPEL’s Technical Standard for Tank Coating Work.

**Application equipment:**

HEMPADUR 85671 is to be applied by airless spray equipment. Stripe coating and minor repairs can be carried out by brushing.

**Airless spray equipment:** A large pump is preferred, with a pump capacity of 8-12 litres/minute.

- Pump ratio: Min. 45:1
- Nozzle orifice: .018”-.021”
- Nozzle pressure: 200 bar (2900 psi)
- Hoses: To avoid excessive loss of pressure in long hoses, hoses with an internal diameter of up to 0.5” can be used. (Spray data are indicative and subject to adjustment).

**Thinning**

If required: max. 10% of THINNER 08450. Additional thinning may be required at higher temperatures to counteract dry-spray. However, never use more thinner than required to avoid possible risk of solvent entrapment. Thinner only to be added to the mixed paint.

Spraying properties are influenced by the induction time (premix time). Too much “thixotropy” will disappear after a certain reaction of the mixed components.

**Cleaning of equipment:**

The whole equipment to be cleaned thoroughly with HEMPEL’S TOOL CLEANER 99610 after use.

**Mixing, pot life:**

a. Mix the entire content of corresponding base and curing agent packings. If it is necessary to mix smaller portions, this must only be done by weighing base and curing agent in the prescribed weight ratio: 158 parts by weight of base and 11.4 parts by weight of curing agent or by volume 8.8 parts by volume base and 1.2 parts by volume curing agent.

b. Stir the mixed paint thoroughly by means of a clean mechanical mixer until a homogeneous mixture is obtained.

c. Allow the mixed paint to prereact before application, see table next page.
d. Use all mixed paint before the pot life is exceeded. The pot life depends on the paint’s temperature as shown in table below (valid for a 20 litres can):

<table>
<thead>
<tr>
<th>Temperature of mixed paint</th>
<th>Induction time</th>
<th>Spray application within</th>
</tr>
</thead>
<tbody>
<tr>
<td>(15°C/59°F)</td>
<td>25 minutes</td>
<td>4 hours</td>
</tr>
<tr>
<td>20°C/68°F</td>
<td>15 minutes</td>
<td>3 hours</td>
</tr>
<tr>
<td>25°C/77°F</td>
<td>10 minutes</td>
<td>2 hours</td>
</tr>
<tr>
<td>30°C/86°F</td>
<td>5 minutes</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

* Below 15°C/59°F the viscosity can be too high for airless spray application.

* Temperatures at 30°C/86°F and above should be avoided due to a risk of dry-spray.

**Application procedure:**

The first full coat is usually applied immediately after vacuum cleaning. First stripe coat to follow afterwards.

**Film-build/continuity:** With this tank coating intended for aggressive service, it is of special importance that a continuous, pinhole-free paint film is obtained at application of each coat. An application technique which will ensure good film formation and no dry-spray on all surfaces must be adopted.

It is very important to use nozzles of the correct size, i.e. not too big. Select small nozzles for spray application of complicated structures, while bigger nozzles may be used for regular surfaces.

A proper, uniform distance of the spray gun to the surface, 30-50 cm, should be aimed at. To obtain good and steady atomizing, the viscosity of the paint must be suitable and the spray equipment must be sufficient in output pressure and capacity. At high working temperatures, use of extra thinner may be necessary to avoid dry-spray.

The paint layer must be applied homogenously and as close to the specification as possible. The consumption of paint must be controlled and heavy layers must be avoided because of the risk of sags and cracks and solvent retention.

Furthermore, great care must be taken to cover edges, openings, rear sides of stiffeners etc. Thus, on these areas a stripe coat will usually be necessary.

The finished coating must appear as a homogeneous film with a smooth surface and irregularities such as dust, dry spray, abrasives, must be remedied.

**Note:** In case of old, pit corroded steel, application of a diluted, extra first coat is recommended to obtain better "penetration" in the fine pits. For this purpose, it is relevant to dilute 5-10%. Application by brush is recommended and film thickness so low that the surface is "saturated" only.

**Stripe coating:**

All places difficult to cover properly by spray application should be stripe coated twice by brushing immediately before the spray application. First stripe coat is applied after the first full coat and second stripe coat after second full coat.

The second stripe coat with brush can be replaced with spray application with a small narrow nozzle, but still air slots and similar and possible undercuts (welds) and the like will require brush application.

**Film thicknesses:**

The final dry film thickness of the three coat system must be between 300-600 micron (max. 450 micron below 15°C)/12-24 mils (max. 18 mils below 59°F).

Corresponding to 100 micron/4 mils dry film thickness, the wet film thickness must be 150-175 micron/6.7 mils and must be measured regularly.

Normally up to 200 micron/8 mils per coat may be accepted for 100 micron/4 mils specifications, but at temperatures below 15°C/59°F, it is important not to exceed a dry film thickness of 150 micron/6 mils in any area.
HEMPADUR 85671

Microclimate:

The actual climate conditions at the substrate during application:

The minimum surface temperature until full cure is 10°C/50°F.

To ensure an all-over steel temperature of minimum 10°C/50°F, special attention should be paid to possible “cold bridges” e.g. stiffeners on deck.

In case of steel temperatures lower than 10°C/50°F there is a severe risk of incomplete curing, resulting in a too open film with reduced chemical resistance.

When the outside temperature is lower than 10°C/50°F, it is therefore recommended to use insulation mats on deck and in addition to aim at a general steel temperature of 15°C/59°F to minimise the risk of too low steel temperatures.

Furthermore, the steel temperature should be kept reasonably constant - within the range of ± 3°C/5°F is recommended. Any changes of the outside temperature should therefore be carefully monitored and heating equipment calibrated accordingly.

The maximum surface temperature should preferably be below approximately 30°C/86°F. In a warm climate it is recommended to carry out application during night time. Application at higher temperatures is possible, but extra care must be taken to avoid poor film formation and excessive spray-dust.

The steel temperature must be above the dew point. As a rule of thumb a steel temperature which is 3°C/5°F above the dew point can be considered safe.

The relative humidity should preferably be 40-60%, maximum 80%. In confined spaces, supply an adequate amount of fresh air during application and drying to assist the evaporation of solvent.

Drying and curing, ventilation:

In a dry film thickness of 100 micron/4 mils, with a steel temperature of 20°C/68°F, a relative air humidity of maximum 80% and adequate ventilation, HEMPADUR 85671 will be dry to touch after 4-6 hours. Under these drying conditions, the paint film will accept light traffic after approximately 16 hours.

Correct film formation depends on an adequate ventilation during drying.

A good guideline for tank coating work is to ventilate to a calculated 10% of LEL during application and until the coating is dry.

One litre undiluted HEMPADUR 85671 gives off in total 81 litres solvent vapour until it is completely dry.

The lower explosive limit, LEL, is 1.0%.

To reach a common safety requirement of 10% LEL, the theoretical ventilation requirement is 81 m³ per litre paint.

Because solvent vapours are heavier than atmospheric air, effective ventilation requires forced ventilation with exhaust from the lowest part of the tank.

During the following period until full curing a few air shifts per hour will suffice. Take actions to avoid “pockets” of stagnant air.

Please contact HEMPEL for further advice. Actual safety precautions may require stronger ventilation.
HEMPADUR 85671

Curing time:
Provided that adequate ventilation, recommended relative humidity, specified film thickness, and recommended minimum recoating interval are kept, the following curing times are valid:

<table>
<thead>
<tr>
<th>Steel temperature</th>
<th>10°C/50°F</th>
<th>15°C/59°F</th>
<th>20°C/68°F</th>
<th>25°C/77°F</th>
<th>30°C/86°F</th>
<th>35°C/95°F</th>
<th>40°C/104°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curing time</td>
<td>18 days</td>
<td>14 days</td>
<td>10 days</td>
<td>8 days</td>
<td>7 days</td>
<td>6 days</td>
<td>4 days</td>
</tr>
</tbody>
</table>

Post curing:
The chemical resistance of the coating can be extended by post curing, which must take place within the first year in service.

Post curing is accomplished by carrying a hot cargo of mineral lube oil, vegetable oil or animal oil at minimum 50°C/122°F. The curing time is 8 days at 50°C/122°F and 4 days at 60°C/140°F.

Post curing of double-hull tankers may also be accomplished by using tank cleaning machines to spray hot, clean fresh water to achieve a minimum steel temperature of 60°C/140°F and maximum 80°C/176°F. The curing time is 16 hours at 60°C/140°F and 3 hours at 80°C/176°F. All adjacent ballast tanks must be empty and all adjacent cargo tanks must be either empty or carrying a liquid cargo of minimum 40°C/104°F.

Contact HEMPEL for detailed advice about post curing.

Recoating intervals:
Provided observance of the above stated ventilation and relative humidity for the following recoating intervals in relation to the (steel) temperature are valid:

<table>
<thead>
<tr>
<th>Steel temperature</th>
<th>10°C/50°F*</th>
<th>15°C/59°F</th>
<th>20°C/68°F</th>
<th>25°C/77°F</th>
<th>30°C/86°F</th>
<th>35°C/95°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum, non-potable water service</td>
<td>90 hours</td>
<td>60 hours</td>
<td>36 hours</td>
<td>24 hours</td>
<td>18 hours</td>
<td>14 hours</td>
</tr>
<tr>
<td>between the first and the second coat</td>
<td>60 hours</td>
<td>40 hours</td>
<td>24 hours</td>
<td>16 hours</td>
<td>12 hours</td>
<td>9 hours</td>
</tr>
<tr>
<td>between the second and the third coat</td>
<td>7½ days</td>
<td>5 days</td>
<td>3 days</td>
<td>2 days</td>
<td>36 hours</td>
<td>30 hours</td>
</tr>
<tr>
<td>Potable water service, all coats; minimum:**</td>
<td>47 days</td>
<td>34 days</td>
<td>21 days</td>
<td>16 days</td>
<td>14 days</td>
<td>11 days</td>
</tr>
<tr>
<td>Maximum</td>
<td>90 hours</td>
<td>60 hours</td>
<td>36 hours</td>
<td>24 hours</td>
<td>18 hours</td>
<td>14 hours</td>
</tr>
</tbody>
</table>

* Absolute minimum temperature recommended.
** The approval from Folkehelseinstituttet, Norway will apply provided a minimum recoat interval of 6 days (20°C/68°F).

The maximum relative humidity before and between the coats should not exceed 80% and the steel temperature should always be above the dew point, in practice minimum 3°C/5°F above the dew point.

Conditions for paint application work:
Dry spray is not acceptable as this will reduce the protective characteristics of the paint and make later tank cleaning difficult. Dry spray can be avoided by using adequate stagings, spraying equipment and methods.

Hold spray gun at a right angle to and about 30 cm/1 foot from surface making even parallel passes at a rate to produce the specified wet film thickness as per specification.

Avoid dry spray (overspray creating excessive paint mist), e.g. by using a smaller fan angle, and the lowest possible pressure. A small fan angle should also be used, if spray application is used, for "stripe coating" of for instance reverse sides of stiffeners. Each layer must be applied homogeneously, must be free from pinholes and other defects and as near above the specification of 100 micron/4 mils dry film thickness, as possible. The consumption of paint must be controlled, and heavy layers must be avoided because of the risk of sagging, crack formation and solvent retention. Surface irregularities such as dry spray, sagging, exaggerated thickness or embedded dust or abrasives will have to be remedied.
HEMPADUR 85671

If a sandpapering between layers, for instance on the bottom, is needed, great care must be taken to avoid damaging of otherwise intact surfaces. When using mechanical means only lightweight equipment should be used, orbital sander is recommended. Yet, avoid sandpapering on top of welds or irregularities or near to vertical surfaces.

The finished coating must appear as a homogeneous surface without pores, runners or pollution of any kind.

Control of dry film thicknesses:

For the standard specification following applies to the dry film thickness:

The minimum dry film thickness is 300 micron/12 mils, maximum recommended thickness is 600 micron/24 mils (below 15°C/59°F: 450 micron/18 mils). The minimum dry film thickness is evaluated according to the "90-10" rule, i.e. no more than 10% of the total number of individual measurements must be lower than the minimum dry film thickness, and the lowest individual measurement must be at least 90% of minimum dry film thickness, i.e. 270 micron/10.8 mils. The maximum dry film thickness can also be evaluated according to the "90-10" rule. Dry film thickness control must not be carried out within the first 24 hours after application of final coat (20°C, sufficient ventilation). The measurement must be carried out using an electromagnetic dry film thickness gauge calibrated with shims placed on a smooth steel substrate.

Taking into use:

Do not use the tank or pipeline before the coating is properly cured. Reference is made to curing time on page 4.

Being a solvent-borne paint HEMPADUR 85671 does contain traces of solvents after full curing. These solvents will leach out into the surrounding media during service.

In order to keep the concentrations below acceptable levels the following conditioning procedure is recommended for HEMPADUR 85671 in contact with potable water. When cured for 1 month (20°C/68°F), but before taking the tank into use for potable water, fill twice with water at 60°C/140°F each time for a period of no less than 24 hours and finally flush with fresh water.

For tanks larger than 100.000 litres/26.000 US gallons flush the surface with fresh water (min. 15°C/59°F) for two days. Then wash the tank thoroughly with soap water, followed by brushing with water or steam cleaning.

On vessels adjacent tanks must be empty during the conditioning.

Repairs:

It is of great importance that all damage to the coating is repaired.

Repair shall be started as soon as possible. Repair of mountings for stagings, etc. must take place in connection with the dismantling of the stagings, the tempo of which should be adjusted to the touch-up procedure.

It is important that the repaired areas, as well as the rest of the coated areas, are fully cured before the tank is taken into use or washed by the tank cleaning system.

The extent of damage to the coating can be evaluated by a seawater test: Wash the tanks with clean seawater by means of the tank cleaning machines until profiles and/or heating coils on tank top is covered. Allow the water to stay for minimum 48 hours, after which period the tank is emptied and cleaned with clean fresh water to remove salts.

The repair process:

General: Before mechanical treatment is started, surfaces to be repaired have to be cleaned for any salts and other contamination.

Areas up to approximately A4 size (20x30 cm):

The surface preparation can be executed by grinding to a clean rough metal surface, feathering edges of intact coating and slightly sanding the adjacent surface.

Clean and wash with HEMPEL'S THINNER 08450.

Touch up to full film thickness with minimum 3 coats of HEMPADUR 85671.
HEMPADUR 85671

Areas up to 1 sq.m:
The surface preparation must be executed by vacuum blasting or open nozzle blasting so that the steel has a proper roughness and cleanliness to Sa 3 according to ISO 8501-1:2007. The overlapping zone must be sanded or sweep blasted to ensure a good adhesion of the new paint.

Clean and wash with HEMPEL’S THINNER 08450.

Touch-up to full film thickness with minimum 3 coats HEMPADUR 85671.

Areas above 1 sq.m. or areas where several damaged spots are concentrated:
Treatment: Repeat the original specification.

Safety:
Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.

ISSUED BY: HEMPEL A/S - 8567111630CR003

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Application Instructions

HEMPLE’S VINYL ESTER GF 35910
HARDENER 99410

Scope:

These Application Instructions cover surface preparation, application equipment, and application details for HEMPEL’S VINYL ESTER GF 35910.

Surface preparation:

**New steel:** Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Abrasive blasting to Sa 2½. Minimum surface profile corresponding to Rugotest No. 3, BN11, Keane-Tator Comparator, 5.5 G/S, or ISO Comparator Coarse (G). After blasting, clean the surface carefully from abrasives and dust.

**On pit-corroded surfaces,** excessive amounts of salt residues may call for dry abrasive blasting, high pressure fresh water hosing, drying, and finally, dry abrasive blasting again as described above.

**Galvanized, Zinc primed steel etc.** Metallic zinc inhibits the curing process - the product is not compatible with galvanized steel or other zinc coated substrates. Steel primed with zinc dust containing pre-fabrication primers must be re-blasted to min. Sa 2½-3 to remove all traces of zinc.

Application equipment:

HEMPLE’S VINYL ESTER GF 35910, being a high-viscosity material, requires special measures to be taken at application.

**Standard airless heavy-duty spray equipment:**

- **Pump ratio:** min 60:1 (See Note below)
- **Pump output:** min. 12 litres/minute (theoretical)
- **Input pressure:** min. 6 bar/90 psi
- **Spray hoses:** max. 50 metres/150 feet, 3/8” internal diameter, nylon lined
- **Regular surfaces:** max. 3 metres/10 feet, 1/4” internal diameter
- **Nozzle size:** .030” through .060” reversible tip
- **Fan angle:** 40-60°

**Filter:** Surge tank filter and tip filter should be removed.

**Note:** Avoid the use of a suction hose. Use an interchangeable pipe, which makes it possible to remove cured paint.

The pump should preferably be fitted with leather seals although Teflon (PTFE) seals are acceptable for small jobs.

Pump ratio 60:1 is recommended, however, if only 45:1 is available, it is recommended to shorten the hoses to 15 metres/50 feet hose (Min. ½” internal diameter). Before application starts, the filter should be removed and hoses should be washed with styrene.

**Thinning:**

**Do not thin.** Alternatively max. 5% styrene may be added, but this must be done with care as the anti-sagging properties are drastically reduced and chemical resistance may be affected.

Airless spray data are indicative and subject to adjustment.
HEMPEL'S VINYL ESTER GF 35910

Mixing:

**Steel temperature between 10°C/50°F and 20°C/68°F:**

Add ½ a bottle of HARDENER 99410 into the BASE 35919 and mix for 1 minute. Add the second half of HARDENER 99410 and continue to stir until contents are thoroughly mixed (approx. 2 minutes).

Before start-up, the pump must be flushed with styrene.

At spray stop the equipment should be flushed out using a small amount of styrene, followed by methyl ethyl ketone (MEK) for at least 15 minutes. Where spraying is to continue, flush with styrene.

The pump should work fast during flushing operations and care taken to ensure that equipment is thoroughly cleaned.

**Steel temperature at and above 25°C/77°F:**

1. Add the content of 1 bottle of RETARDER 99190 and mix thoroughly by mechanical agitation with BASE 35919 only.

   *After mixing RETARDER 99190 with BASE 35919 it is essential that at least 5 minutes are allowed before Adding the HARDENER 99410, as described above.*

2. HARDENER 99410 should then be added as described above.

   *UNDER NO CIRCUMSTANCES RETARDER 99190 SHOULD BE ADDED AFTER THE HARDENER 99410 HAS BEEN ADDED. THIS WILL TOTALLY NEGATE THE CURING REACTION.*

Pot life:

When measured under standard conditions the pot life is 45 minutes at 20°C/68°F. However, for a 20 litres/5 US gallons mix, the heat developed by the chemical reaction is so intense that the corresponding practical pot life is substantially shorter.

Therefore:

- Irrespective of equipment, use the paint immediately after mixing. At a normal application speed the 20 litres/5 US gallons are used in approx. 10 minutes.

- Observe the paint temperature frequently for instance by touching the can with your hand. If it feels more than hand warm (above approx. 50°C/120°F, discard the paint and flush the equipment immediately irrespective of type of spray equipment.

Paint temperature:

If the temperature in the can is below approximately 15°C/59°F, the viscosity will be too high for application. If the paint temperature when mixing is 25°C/77°F or higher, a substantial risk of shortened pot life and curing in can/spray equipment exists. When working in warm, subtropical/tropical climates a refrigerated container can be used for storing/cooling of the paint before application.

Stripe coating:

Edges, corners, manual welds, and places difficult to cover properly by spray application should be stripe coated either before or after the spray application.

For service in corrosive chemicals a thorough stripe coating procedure is mandatory.

Extra film thickness:

Extra thickness - extra layer(s) - may be necessary in case of severely pitted and/or for exposure to highly corrosive chemicals.

Indicated film thickness:

Between 500 and 3000 micron in one or more coats depending on later service conditions.

Recoating intervals:

Within a maximum of 85% Relative Humidity the following recoating intervals apply:

<table>
<thead>
<tr>
<th>Steel temperature</th>
<th>10°C/50°F</th>
<th>15°C/59°F</th>
<th>20°C/68°F</th>
<th>25°C/77°F*</th>
<th>30°C/86°F*</th>
<th>35°C/95°F*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>12 hours</td>
<td>9 hours</td>
<td>5 hours</td>
<td>5 hours</td>
<td>4 hour</td>
<td>(4 hours)</td>
</tr>
<tr>
<td>Max</td>
<td>3 days</td>
<td>3 days</td>
<td>2 days</td>
<td>2 days</td>
<td>1 day</td>
<td>(18 hours)</td>
</tr>
</tbody>
</table>
HEMPEL’S VINYL ESTER GF 35910

HEMPEL’S VINYL ESTER GF 35910 MUST NOT be exposed to condensation or Relative Humidity higher than 85% before recoating. *Intervals at and above 25°C/77°F is based on an addition of Retarder 99190. Strong ultraviolet/sunlight will reduce maximum recoating interval significantly.

Cleaning of tools: The equipment should be flushed out and cleaned using styrene followed by methyl ethyl ketone (MEK).

Curing table: The following curing times apply:

<table>
<thead>
<tr>
<th>Steel temperature</th>
<th>10°C/50°F</th>
<th>15°C/59°F</th>
<th>20°C/68°F</th>
<th>25°C/77°F</th>
<th>30°C/86°F</th>
<th>35°C/95°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully cured</td>
<td>8 days</td>
<td>6 days</td>
<td>4 days</td>
<td>3 days</td>
<td>2 days</td>
<td>(2 days)</td>
</tr>
</tbody>
</table>

Time before taking into service: When the painted surface will be exposed to heavy duty service (e.g. exposure to chemicals, heavy wear and tear), the recommended minimum curing time is:

<table>
<thead>
<tr>
<th>Steel temperature</th>
<th>10°C/50°F</th>
<th>15°C/59°F</th>
<th>20°C/68°F</th>
<th>25°C/77°F</th>
<th>30°C/86°F</th>
<th>35°C/95°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>8 days</td>
<td>6 days</td>
<td>4 days</td>
<td>3 days</td>
<td>2 days</td>
<td>(2 days)</td>
</tr>
</tbody>
</table>

HEMPEL’S VINYL ESTER GF 35910 is resistant to immersion in calm seawater and other less aggressive water immersion service after an initial curing time as listed hereunder:

<table>
<thead>
<tr>
<th>Steel temperature</th>
<th>10°C/50°F</th>
<th>15°C/59°F</th>
<th>20°C/68°F</th>
<th>25°C/77°F</th>
<th>30°C/86°F</th>
<th>35°C/95°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>60 hours</td>
<td>40 hours</td>
<td>24 hours</td>
<td>24 hours</td>
<td>18 hours</td>
<td>(12 hours)</td>
</tr>
</tbody>
</table>

Notes:

1. The temperatures in the tables above are mean values.
2. Curing will proceed under water.
3. Less curing than stated above before exposure to seawater may result in significant discoloration of the surface.

Post curing: Post-cure of HEMPEL’S VINYL ESTER GF 35910 is possible and may be mandatory in case of special service conditions. The following procedure must be followed:-
- Allow the lining to cure for a minimum of 12 hours after application of last coat.
- Raise the temperature within the vessel to between 60°C and 80°C using dry heat (The temperature must not exceed 100°C).
- Maintain this temperature for between 6 and 8 hours.

Remarks:

In case of deep pittings higher film thickness is recommended on areas with pittings. To secure sufficient curing at low surface temperatures as well as to secure a pinhole-free paint film at any temperature, the product should always be applied in a wet film thickness above 600 micron.

Quality Control:

As HEMPEL’S VINYL ESTER GF 35910 is often used in highly corrosive service proper quality control is of particular importance. Such controls should include following:
1. Control that the proper dry film thickness has been achieved
2. Holiday/pinhole detection at high voltage (Voltage according to specified thickness)
3. Test of full cure (Acetone test)
   a. A small area should be washed with clean Acetone to dissolve the surface inhibited film and remove stickiness; the area should then be allowed to dry.
   b. Gently rub the washed surface with a piece of cloth soaked with Acetone. Should the surface become tacky or if it was impossible to obtain a tack free surface under a), then the coating is not fully cured.

Repairs:

It is of great importance that all damage to the coating is repaired. Repair must be started up as soon as possible. Repair of mountings for staging, pinholes etc. must take place in connection with the dismantling of the staging, the tempo of which shall be adjusted to the touch-up procedure.

It is important that the repaired areas, as well as the rest of the coated areas, are fully cured before the tank is taken into use.
HEMPEL'S VINYL ESTER GF 35910

The repair process: General: Before mechanical treatment, surfaces to be repaired have to be cleaned for any salts and other contamination.

Small areas and single pinholes.

The surface preparation can be executed by grinding to a clean rough metal surface, feathering edges of intact coating and slightly sanding the adjacent surface.

Pinholes are best treated by using a 3 mm flat bottomed drill to enlarge the pinhole down to the substrate.

Clean and wash with HEMPEL'S THINNER 08450.

Work HEMPEL'S VINYL ESTER GF 35910 into the hole before brushing a small amount of the material over the top and immediately surrounding zone. Ensure that the specified total thickness is achieved.

Larger areas or areas with extensive pin holing.

Treatment: Repeat the original specification.

Shelf life

Shelf life is dependent on storage temperature. Shelf life is reduced at storage temperatures above 20°C/68°F. HEMPEL'S VINYL ESTER GF 35910 should never be stored in direct sunlight. It is recommended to keep the storage temperature a low as possible - if necessary via refrigeration. Recommended storage temperature is 5 - 20°C (41 - 68°F).

Safety:

Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.

ISSUED BY: HEMPEL A/S - 3591011630

This Product Data Sheet supersedes those previously issued.
For explanations, definitions and scope, see “Explanatory Notes” in the HEMPEL Book.
Data, specifications, directions and recommendations given in this data sheet represent only test results or experience obtained under controlled or specially defined circumstances. Their accuracy, completeness or appropriateness under the actual conditions of any intended use of the Products herein must be determined exclusively by the Buyer and/or User.
The Products are supplied and all technical assistance is given subject to HEMPEL’s GENERAL CONDITIONS OF SALES, DELIVERY AND SERVICE, unless otherwise expressly agreed in writing. The Manufacturer and Seller disclaim, and Buyer and/or User waive all claims involving, any liability, including but not limited to negligence, except as expressed in said GENERAL CONDITIONS for all results, injury or direct or consequential losses or damages arising from the use of the Products as recommended above, on the overleaf or otherwise.
Product data are subject to change without notice and become void five years from the date of issue.
SUPPLIER’S DOCUMENTATION
provided by
INTERNATIONAL
SUPPLIER

* also consult paint supplier’s Internet home page

Please check PW-Internet for latest edition.

May be obsolete days after printing.
<table>
<thead>
<tr>
<th>PAINT SYSTEM</th>
<th>TYPE C *</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAINT MANUFACTURER</td>
<td>INTERNATIONAL PAINT</td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td>C4-High Corrosivity. (ISO 12944-2)</td>
</tr>
<tr>
<td>DURABILITY</td>
<td>Medium durability 5-15 years</td>
</tr>
</tbody>
</table>

**PAINT SYSTEM FOR NEW WORKS** (in fabrication shop)

**Cleaning before surface preparation**

All surfaces should be clean, dry and free of contamination. Pre-treat in accordance with ISO 8504:2000.

**Surface preparation**

Abrasive Blast clean to Sa 2 ½ (ISO 8501-1:1998) or SSPC-SP6

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness in μm</th>
<th>Trade name</th>
<th>Description</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80</td>
<td>Interseal 670 HS-Alu</td>
<td>Surface tolerant Epoxy-Alu pigmented</td>
<td>Alu</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
<td>Interseal 670 HS</td>
<td>Surface tolerant Epoxy</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>Interseal 670 HS</td>
<td>Surface tolerant Epoxy</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>240</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PAINT SYSTEM FOR MAINTENANCE WORKS** (on site)

**Cleaning before surface preparation**

All surfaces should be clean, dry and free of contamination. Pre-treat in accordance with ISO 8504:2000.

**Surface preparation**

Hand or Power tool clean all damaged and corroded areas to a minimum of St2 of ISO 8591-1 or SSPC-SP2

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
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<td></td>
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<td></td>
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**REPAIR PAINT SYSTEM** (in fabrication shop & on site)

**Surface preparation**

Hand or Power tool clean all damaged and corroded areas to a minimum of St2 of ISO 8591-1 or SSPC-SP2

**Paint system**

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<td><strong>Total</strong></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*Type C:* This paint system applies for:

- Exterior.
- Industrial areas and coastal areas.
- Moderate salinity.
- No slag pits.
**PAINT SYSTEM**

<table>
<thead>
<tr>
<th>TYPE F * + TYPE J *</th>
</tr>
</thead>
</table>

**PAINT MANUFACTURER**
INTERNATIONAL PAINT

**ENVIRONMENT**
C4-High Corrosivity (ISO 12944-2)

**DURABILITY**
Medium durability 5-15 years

---

**PAINT SYSTEM FOR NEW WORKS** (in fabrication shop)

**Cleaning before surface preparation**
All surfaces should be clean, dry and free of contamination. Pre-treat in accordance with ISO 8504:2000

**Surface preparation**
Abrasive Blast clean to Sa 2 ½ (ISO 8501-1:1998) or SSPC-SP6

**Paint system**

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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**PAINT SYSTEM FOR MAINTENANCE WORKS** (on site)

**Cleaning before surface preparation**
All surfaces should be clean, dry and free of contamination. Pre-treat in accordance with ISO 8504:2000

**Surface preparation**
Hand or power tool clean all damaged and corroded areas to a minimum of St2 of ISO 8591-1 or SSPC-SP2

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness in µm</th>
<th>Trade name</th>
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<td>Interseal 670 HS</td>
<td>Surface tolerant Epoxy</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>240</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**REPAIR PAINT SYSTEM** (in fabrication shop & on site)

**Surface preparation**
Hand or Power tool clean all damaged and corroded areas to a minimum of St2 of ISO 8591-1 or SSPC-SP2

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
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</tr>
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<td><strong>Total</strong></td>
<td><strong>240</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Type F and Type J*: This paint system applies for:
- Exterior
- Interior with high pollution
- Industrial areas and coastal areas
  - Near slag pits
<table>
<thead>
<tr>
<th>Coating System</th>
<th>TYPE G *</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAINT MANUFACTURER</td>
<td>INTERNATIONAL PAINT</td>
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<tr>
<td>DURABILITY</td>
<td>Medium durability 5-15 years</td>
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</tbody>
</table>

### PAINT SYSTEM FOR NEW WORKS (in fabrication shop)

**Cleaning before surface preparation**
All surfaces should be clean, dry and free of contamination. Pre-treat in accordance with ISO 8504:2000

**Surface preparation**
Abrasive Blast clean to Sa 2 ½ (ISO 8501-1:1988) or SSPC-SP6

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
<th>Nominal thickness in μm</th>
<th>Trade name</th>
<th>Description</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>Interzinc 22</td>
<td>Inorganic zinc rich ethyl silicate primer</td>
<td>Greyish Green</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>Intertherm 50</td>
<td>1 component high temp. resistant coating with silicone binder</td>
<td>Alu</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PAINT SYSTEM FOR MAINTENANCE WORKS (on site)

**Cleaning before surface preparation**
All surfaces should be clean, dry and free of contamination. Pre-treat in accordance with ISO 8504:2000

**Surface preparation**
Abrasive Blast clean to Sa 2 ½ (ISO 8501-1:1988) or SSPC-SP6 (if possible on site) or Hand or Power tool clean damaged and corroded areas to a minimum of St2 of ISO 8591-1 or SSPC-SP2

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
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<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### REPAIR PAINT SYSTEM (in fabrication shop & on site)

**Surface preparation**
Spot abrasive blast corroded or damaged areas to a minimum of Sa 2 ½ (ISO 8501-1:1988) or SSPC-SP6 (in shop and if possible on site) or Hand or power tool clean damaged and corroded areas to a minimum of St2 of ISO 8591-1 or SSPC-SP2 (on site)

**Paint system**

<table>
<thead>
<tr>
<th>Coat</th>
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</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Type G : This paint system applies for:
- Exterior.
- Industrial areas and coastal areas
- Moderate salinity.
- No slag pits
- Temperature resistance from -10 Celsius to +540 Celsius.*
Interseal 670HS

**Surface Tolerant Epoxy**

A low VOC, two component high build, high solids surface tolerant epoxy maintenance coating. Available in an aluminum pigmented version to provide additional anti-corrosive barrier protection.

**Intended Uses**

For application to a wide variety of substrates including hand prepared rust, abrasive blast cleaned and hydroblasted steel, and a wide range of intact, aged coatings. Provides excellent anti-chloride protection in industrial, coastal structures, pulp and paper plants, bridges and offshore environments in both atmospheric exposure and immersion service.

**Regulatory Data**

| Preparatory Operation | Surface | Dry Film Thickness | Working Pot Life | Life | Airless Spray
|------------------------|---------|--------------------|------------------|-----|-----------------
| Hand or Power Tool Preparation | Hand or power tool clean to a minimum SG (ISO 8501-1:1988) or SSPC-SP2. | 10°C (50°F) | 15°C (59°F) | 25°C (77°F) | 40°C (104°F)
| Mix Ratio | 5.67 parts : 1.00 part by volume | 5 hours | 6 hours | 8 hours | 10 hours
| Air Spray | Recommended | Tip range: 0.45-0.58 mm (18-23 thou) | Total output fluid pressure at spray tip not less than 176 kg/cm² (2,580 p.s.i.)
| Airless Spray (Pressure Pot) | Recommended | Gun: DeVilbiss MBC or JGA Air Cap: 704 or 705 Fluid Tip: E
| Brush | Recommended | Typically 100-125 microns (4-5 mils) can be achieved
| Roller | Recommended | Typically 75-100 microns (3-4 mils) can be achieved
| Thinner | (GTAA15) | May be necessary at low temperatures, see Product Characteristics

**Practical Information for Interseal 670HS**

- For curing at low temperatures, an alternative curing agent is available. See Product Characteristics for details.
- Refers to atmospheres where immersion is likely to occur.
- See International Protective Coatings Definitions & Abbreviations.
- Maximum overcoating intervals are shorter when using polylecane topcoats.
- Consult International Protective Coatings for further details.

**Application**

- **Mixing**: Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed it must be used within the working pot life specified.
  1. (1) Agitate Base (Part A) with a power agitator.
  2. (2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

- **Mix Ratio**: 5.67 parts : 1.00 part by volume

- **Working Pot**: 10°C (50°F) 15°C (59°F) 25°C (77°F) 40°C (104°F)

- **Life**: 5 hours 6 hours 8 hours 10 hours

- **Airless Spray (Pressure Pot)**: Recommended
  - Gun: DeVilbiss MBC or JGA
  - Air Cap: 704 or 705
  - Fluid Tip: E

- **Brush**: Recommended
  - Typically 100-125 microns (4-5 mils) can be achieved

- **Roller**: Recommended
  - Typically 75-100 microns (3-4 mils) can be achieved

- **Thinner**: (GTAA15)
  - May be necessary at low temperatures, see Product Characteristics

- **Clean Up**: Do not thin more than allowed by local environmental legislation.
**Intended Uses**

For application to a wide variety of substrates including hand prepared rusty steel, abrasive blast cleaned and hydroblasted steel, and a wide range of intact, aged coatings. Provides excellent anti-corrosive protection in industrial, coastal structures, pulp and paper plants, bridges and offshore environments in both atmospheric exposure and immersion service.

**Certified to**

ANSI/NSF Standard 61. NSF Certification is for tanks greater than 100 gallons (378 litres).

**Practical Information for Intenseal 670HS**

<table>
<thead>
<tr>
<th>Colour</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloss Level</td>
<td>Semi-gloss (Aluminium is eggshell)</td>
</tr>
<tr>
<td>Volume Solids</td>
<td>82% ± 3% (depends on colour)</td>
</tr>
<tr>
<td>Typical Thickness</td>
<td>100-200 microns (4-8 mils) dry equivalent to 122-244 microns (4.9-8.9 mils) wet</td>
</tr>
<tr>
<td>Theoretical Coverage</td>
<td>6.56 m²/litre at 125 microns d.f.t and stated volume solids 263 sq.ft./US gallon at 5 mils d.f.t and stated volume solids</td>
</tr>
<tr>
<td>Practical Coverage</td>
<td>Allow appropriate loss factors</td>
</tr>
<tr>
<td>Method of Application</td>
<td>Airless spray, Air spray, Brush, Roller</td>
</tr>
<tr>
<td>Drying Time</td>
<td>Overcoating Interval Intenseal 670HS with Self Overcoating Interval with recommended topcoats</td>
</tr>
<tr>
<td>Temperature</td>
<td>Touch</td>
</tr>
<tr>
<td>10°C (50°F)</td>
<td>8 hours</td>
</tr>
<tr>
<td>15°C (59°F)</td>
<td>7 hours</td>
</tr>
<tr>
<td>25°C (77°F)</td>
<td>5 hours</td>
</tr>
<tr>
<td>40°C (104°F)</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

*For curing at low temperatures, an alternative curing agent is available. See Product Characteristics section for further details.
†Refers to atmospheric service only.
**Intenseal 670HS is suitable for overcoating a limited range of intact, tightly adherent aged coatings. Excise or flaking coatings should be removed back to a firm edge. Glossy finishes may require light abrasion to provide a physical ‘key’. See Product Characteristics section for further information.

### Application

**Mixing**

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed it must be used within the working pot life specified.

1. **Agitate Base (Part A) with a power agitator.**
2. **Combine entire contents of Curing Agent (Part B) with base (Part A) and mix thoroughly with power agitator.**

**Mix Ratio**

5.67 parts : 1.00 part by volume

**Working Pot Life**

- Base (Part A) 36°C (97°F) 36°C (97°F) 36°C (97°F)
- Curing Agent (Part B) 56°C (133°F) 33°C (91°F)
- Mixed 0°C (32°F) 0°C (32°F) 0°C (32°F)

**VOC**

- Base (Part A) 1.46 kg/l (13.3 lb/gal)
- Curing Agent (Part B) 175 g/l UK - PG6/25(92), Appendix 3
- Mixed 2.00 lb/gal (240 g/l) USA - EPA Method 24

**Clean Up**

Clean all equipment immediately after use with International GTA22. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays.

All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation.

**Surface Preparation**

The performance of this product will depend upon the degree of surface preparation. The surface to be coated should be clean, dry and free from contamination. Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8501-1992. Accumulated dirt and soluble salts must be removed. Dry sponge brushing will normally be adequate for accumulated dirt. Soluble salts should be removed by fresh water washing.

**Abrasive Blast Cleaning**

For immersion service, Intenseal 670HS must be applied to surfaces blast cleaned to Sa2% (ISO 8501-1998) or SSPC-SP10. However, for atmospheric exposure best performance will be achieved when Intenseal 670HS is applied to surfaces prepared to a minimum of Sa2% (ISO 8501-1998) or SSPC-SP6. Surface defects revealed by the blast cleaning process should be ground, filled, or treated in the appropriate manner.

A surface profile of 50-75 microns (2-3 mils) is recommended.

**Hand or Power Tool Preparation**

Hand or power tool clean to a minimum SG (ISO 8501-1998) or SSPC-SP6.

Note, all scale must be removed and areas which cannot be prepared adequately by chipping or needle ground should be prepared blast cleaned to a minimum standard of Sa2 (ISO 8501-1998) or SSPC-SP6. Typically this would apply to C or D grade rusting in this standard.

**Ultra High Pressure Hydroblasting/Abrasive Wet Blasting**

May be applied to surfaces prepared to Sa2% (ISO 8501-1998) or SSPC-SP6 which have flash rusted to no worse than Grade S2/3M (refer to International Hydroblasting Standards) or Grade MB2/3M (refer to International Shot Blasting Standards). It is also possible to apply to damp surfaces in some circumstances. Further information is available from International Protective Coatings.

**Aged Coatings**

Intenseal 670HS is suitable for covering a limited range of intact, tightly adherent aged coatings. Excise or flaking coatings should be removed back to a firm edge. Glossy finishes may require light abrasion to provide a physical ‘key’. See Product Characteristics section for further information.

**Overcoating Interval**

<table>
<thead>
<tr>
<th>Base (Part A)</th>
<th>Curing Agent (Part B)</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°C (50°F)</td>
<td>15°C (59°F)</td>
<td>25°C (77°F)</td>
</tr>
<tr>
<td>5 hours</td>
<td>3 hours</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

ULTRA HIGH PRESSURE HYDROBLASTING/ABRASIVE WET BLASTING

May be applied to surfaces prepared to Sa2% (ISO 8501-1998) or SSPC-SP6 which have flash rusted to no worse than Grade S2/3M (refer to International Hydroblasting Standards) or Grade MB2/3M (refer to International Shot Blasting Standards). It is also possible to apply to damp surfaces in some circumstances. Further information is available from International Protective Coatings.
**Surface Tolerant Epoxy**

**Product Characteristics**

In order to achieve optimum performance on hand prepared steel, the aluminium pigmented version of Interseal 670HS should be applied as a primer coat by brush to ensure thorough wetting out of the substrate by Interseal 670HS.

- For water immersion service, surface preparation to a minimum of Sa2½ (ISO 8501-1:1988) or SPCC (A1.1) followed by application of thicker coats of Interseal 670HS to a total minimum dry film thickness of 250 microns (10 mils) is required.
- Maximum film build in one coat is best attained by airless spray. When applying by methods such as spray, the required film build is unlikely to be achieved. Application by spray may require a multiple cross-spray pattern to attain maximum film build. Low or high temperatures may require specific application techniques to achieve maximum film build.
- A winter grade curing agent is also available to enable more rapid cure at temperatures below 0°C (32°F). This product should not be applied at temperatures below 0°C (32°F), however this curing agent will give an initial shade variation and more rapid discoloration on weathering.
- Interseal 670HS is capable of curing at temperatures below 0°C (32°F). However, this product is not recommended where thermoplastic coatings such as chlorinated rubbers and vinyls have previously been used.

**Safety Precautions**

- Interseal 670HS is suitable for overcoating of aged alkyd, epoxy and polyurethane systems.
- Interseal 670HS should not be applied at temperatures below 0°C (32°F) where there is a possibility of ice formation on the substrate.
- Interseal 670HS is certified to ANSI/NSF Standard 61 (selected colours only). Consult International Protective Coatings for further details.
- Interseal 670HS is recommended by the manufacturer for the following products: Damp and Ignition. Protect from frost.

**Systems Compatibility**

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interseal 670HS</td>
<td>Surface Tolerant Epoxy</td>
</tr>
</tbody>
</table>

**Additional Information**

Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following sections of the International Protective Coatings data manual:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

**Pack Size**

- 20 litre unit Interseal 670HS Base
- 17 litres in a 20 litre container Interseal 670HS Curing Agent
- 3 litres in a 3.7 litre container Interseal 670HS Base
- 4.25 gallons in a 5 gallon container Interseal 670HS Curing Agent
- 0.75 gallons in a 1 gallon container

**Shipping Weight**

- U.N. Shipping No. 1263
- 20 litre unit 30.8 kg (67.9 lb) Base (Part A) 3.5 kg (7.6 lb) Curing Agent (Part B)
- 5 gallon unit 29.4 kg (64.9 lb) Base (Part A) 3.08 kg (6.8 lb) Curing Agent (Part B)

**Storage**

- Shelf Life 12 months minimum at 25°C (77°F).
- Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition. Protect from frost.

**Disclaimer**

The information given in this sheet is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at his own risk. Any warranty, if given, or specific advice we give about the product (whether in this sheet or elsewhere) is given on the basis that it is true to the best of our knowledge and belief, and it is the user’s responsibility to check that the sheet is correct prior to using the product. Issue date: 01/03/2005

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**International Protective Coatings**

International Protective Coatings provide a comprehensive range of protective coatings suitable for application in Europe, the Middle East, South America, Asia, North America and Australasia, wherever the need arises.

**Worldwide Availability**

- Interseal 670HS Base
- Interseal 670HS Curing Agent
- Interseal 670HS Topcoat

**Technical Information**

- Definition & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

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- 0.75 gallons in a 1 gallon container

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- 30.8 kg (67.9 lb) Base (Part A) 3.5 kg (7.6 lb) Curing Agent (Part B)
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**Storage**

- 12 months minimum at 25°C (77°F).
- Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition. Protect from frost.

**Disclaimer**

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**Worldwide Availability**

- Interseal 670HS Base
- Interseal 670HS Curing Agent
- Interseal 670HS Topcoat

**Technical Information**

- Definition & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

**Pack Size**

- 20 litre unit Interseal 670HS Base
- 17 litres in a 20 litre container Interseal 670HS Curing Agent
- 3 litres in a 3.7 litre container
- 5 gallon unit Interseal 670HS Base
- 4.25 gallons in a 5 gallon container Interseal 670HS Curing Agent
- 0.75 gallons in a 1 gallon container

**Shipping Weight**

- U.N. Shipping No. 1263
- 30.8 kg (67.9 lb) Base (Part A) 3.5 kg (7.6 lb) Curing Agent (Part B)
- 29.4 kg (64.9 lb) Base (Part A) 3.08 kg (6.8 lb) Curing Agent (Part B)

**Storage**

- 12 months minimum at 25°C (77°F).
- Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition. Protect from frost.

**Disclaimer**

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Copyright © International Paint Ltd. and International are trademarks.
In order to achieve optimum performance on hand prepared steel, the aluminium pigmented version should be applied as a primer coat by brush to ensure thorough wetting out of the substrate by Interseal 670HS.

For water immersion service, surface preparation to a minimum of Sa2½ (ISO 8501-1:3.08) or SPFC-SP10 followed by application of multi-coats of Interseal 670HS to a total minimum dry film thickness of 250 microns (10 mils) is required.

Maximum film build in one coat is best attained by airless spray. When applying by methods other than airless spray, the required film build is unlikely to be achieved. Application by air spray may require a multiple cross spray pattern to attain maximum film build. Low or high temperatures may require specific application techniques to achieve maximum film build.

If salt water is used in the wet blast process the resulting surface must be thoroughly washed with fresh water before application of Interseal 670HS. With freshly blasted surfaces a slight degree of flash rusting is allowable, and is preferable to the surface being too wet. Puddles, ponding and accumulations of water must be removed.

Interseal 670HS is suitable for overcoating intact, aged, alkyd, epoxy and polyurethane systems. However, this product is not recommended where thermostatic coatings such as chlorinated rubbers and vinyls have previously been used. Please consult International Protective Coatings for alternative recommendations.

Surface temperature must always be a minimum of 3°C (1°F) above dew point. Level of paint and surface finish is dependent on application method. Avoid using a mixture of application methods whenever possible.

In common with all epoxies Interseal 670HS will chalk and discolor on exterior exposure. However, these phenomena are not detrimental to anticorrosive performance.

Premature exposure to ponding water will cause a colour change, especially in dark colours.

Interseal 670HS can be used as a non-skid deck system by modification with addition of GM-352 (crushed flint) aggregate. Application should then be to a suitably primed surface. Typical thicknesses will be between 508-1,000 microns (20-40 mils). Preferred application is by a suitable large tip hopper gun (e.g. Sodag 529 or Air gun textured fit with a 5-10 mm nozzle). Trowel or roller can be used for small areas. Alternatively, a broadcast method of application can be used. Consult International Protective Coatings for further details.

Interseal 670HS is certified to ANSI/NSF Standard 61 (selected colours only). Consult International Protective Coatings for further details. Certification is for tanks greater than 100 gallons (3778 litres), for pipes which are 6 inches (15 cm) in diameter or greater and for valves which are 2 inches (5 cm) in diameter or greater.

**Low Temperature Curing**

A winter grade curing agent is also available to enable more rapid cure at temperatures less than 10°C (50°F), however this curing agent will give an initial shade variation and more rapid discoloration on weathering.

Interseal 670HS is capable of curing at temperatures below 0°C (32°F). However, this product should not be applied at temperatures below 0°C (32°F) where there is a possibility of ice formation on the substrate.

**Overcoating Interval**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Interval with Self</th>
<th>Interval with recommended topcoats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>-5°C (23°F)</td>
<td>24 hours</td>
<td>72 hours</td>
</tr>
<tr>
<td>0°C (32°F)</td>
<td>56 hours</td>
<td>18 hours</td>
</tr>
<tr>
<td>5°C (41°F)</td>
<td>9 hours</td>
<td>18 hours</td>
</tr>
<tr>
<td>10°C (50°F)</td>
<td>24 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>15°C (59°F)</td>
<td>9 hours</td>
<td>36 hours</td>
</tr>
<tr>
<td>20°C (68°F)</td>
<td>24 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>25°C (77°F)</td>
<td>12 hours</td>
<td>21 days</td>
</tr>
</tbody>
</table>

* Refers to situations where immersion is likely to occur.

**Touch Dry**

- 5°C (23°F) 24 hours
- 0°C (32°F) 56 hours
- 5°C (41°F) 9 hours
- 10°C (50°F) 24 hours
- 15°C (59°F) 9 hours
- 20°C (68°F) 24 hours
- 25°C (77°F) 12 hours

**Shelf Life**

12 months minimum at 25°C (77°F). Subject to reinspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition. Protect from frost.

**Disclaimers**

The information given on this sheet is not intended to be exhaustive and no reliance can be placed on it by any person using the product for any purpose other than that specifically recommended in this sheet without the express written confirmation. If in doubt consult International Protective Coatings Definitions & Abbreviations. If in doubt regarding the suitability of use of this product, consult International Protective Coatings for further advice.

**Pack Size**

- 20 litre unit: Interseal 670HS Base
- 24 litres in a 20 litre container
- Interseal 670HS Curing Agent
- 3 litres in a 3.7 litre container
- 5 gallon unit: Interseal 670HS Base
- 4.25 gallons in a 5 gallon container
- Interseal 670HS Curing Agent
- 1.75 gallons in a 2 gallon container

**Shipping Weight**

- U.N. Shipping No. 1203
- 308 kg (679 lbs), Base (Part A) 3.5 kg (7.6 lbs) Curing Agent (Part B)

**Storage**

- Shelf Life: 12 months minimum at 25°C (77°F). Subject to reinspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition. Protect from frost.

**Surface Tolerant Epoxy**

Interseal 670HS is a unique, fast curing high performance epoxy topcoat. It is intended for use on galvanised steel substrates in marine and industrial environments and is suitable for immersion. It is available in a range of RAL colours and has been designed to comply with all relevant national, Health, Safety & Environmental standards and regulations.
PRODUCT DESCRIPTION
A two component solvent based inorganic zinc rich ethyl silicate primer, containing 85% zinc by weight, in the dry film. Complies with the composition and performance requirements of SSPC Paint 20.

Available in ASTM D520, Type II zinc dust version.

INTENDED USES
A metallic zinc primer suitable for use with a wide range of high performance systems and topcoats in both maintenance and new construction of bridges, tanks, pipework, offshore structures and structural steelwork.

Provides excellent corrosion protection for correctly prepared steel substrates, up to temperatures of 540°C (1004°F) when suitably topcoated.

Fast drying primer capable of application in a wide range of climatic conditions.

PRACTICAL INFORMATION FOR INTERZINC 22

<table>
<thead>
<tr>
<th>Colour</th>
<th>Greenish Grey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloss Level</td>
<td>Matt</td>
</tr>
<tr>
<td>Volume Solids</td>
<td>63%</td>
</tr>
<tr>
<td>Typical Thickness</td>
<td>50-80 microns (2-3.2 mils) dry equivalent to 79-127 microns (3.2-5.1 mils) wet</td>
</tr>
<tr>
<td>Theoretical Coverage</td>
<td>8.40 m²/litre at 75 microns d.f.t and stated volume solids</td>
</tr>
<tr>
<td>Practical Coverage</td>
<td>Allow appropriate loss factors</td>
</tr>
<tr>
<td>Method of Application</td>
<td>Airless Spray, Air Spray</td>
</tr>
<tr>
<td>Drying Time</td>
<td>Overcoating Interval with recommended topcoats</td>
</tr>
<tr>
<td>Temperature</td>
<td>Touch Dry</td>
</tr>
<tr>
<td>5°C (41°F)</td>
<td>30 minutes</td>
</tr>
<tr>
<td>15°C (59°F)</td>
<td>20 minutes</td>
</tr>
<tr>
<td>25°C (77°F)</td>
<td>10 minutes</td>
</tr>
<tr>
<td>40°C (104°F)</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>

¹ Drying and overcoating times are dependent upon ambient conditions. The figures quoted above have been determined at the quoted temperature and 65% relative humidity. See Product Characteristics for further advice.

² Maximum overcoating intervals are shorter when using polysiloxane topcoats. Consult International Protective Coatings for further details.

REGULATORY DATA

| Flash Point | Part A 14°C (57°F); Part B Not applicable; Mixed 15°C (59°F) |
| Product Weight | 2.50 kg/l (20.9 lb/gal) |
| VOC | 4.08 lb/gal (490 g/lit) 222 g/kg |

EPA Method 24

See Product Characteristics section for further details
SURFACE PREPARATION

All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Oil or grease should be removed in accordance with SSPC-SP1 solvent cleaning.

Abrasive Blast Cleaning

Abrasive blast clean to Sa2½ (ISO 8501-1:2007) or SSPC-SP6 (or SSPC-SP10 for optimum performance). If oxidation has occurred between blasting and application of Interzinc 22, the surface should be reblasted to the specified visual standard.

Surface defects revealed by the blast cleaning process should be ground, filled, or treated in the appropriate manner.

A surface profile of 40-75 microns (1.5-3.0 mils) is recommended.

Shop Primed Steelwork

Interzinc 22 is suitable for application to unweathered steelwork freshly coated with zinc silicate shop primers.

If the zinc shop primer shows extensive or widely scattered breakdown, or excessive zinc corrosion products, overall sweep blasting will be necessary. Other types of shop primer are not suitable for overcoating and will require complete removal by abrasive blast cleaning.

Weld seams and damaged areas should be blast cleaned to Sa2½ (ISO 8501-1:2007) or SSPC-SP6.

Damaged / Repair Areas

All damaged areas should ideally be blast cleaned to Sa2½ (ISO 8501-1:2007) or SSPC-SP6. However, it is acceptable that small areas can be power tool cleaned to Pt3 (JSRA SPSS:1984) or SSPC-SP11, provided the area is not polished. Repair of the damaged area can then be carried out using a recommended zinc epoxy primer - consult International Protective Coatings for specific advice.

APPLICATION

Mixing

Interzinc 22 is supplied in 2 parts, a liquid Binder base component (Part A) and a Powder component (Part B). The Powder (Part B) should be slowly added to the liquid Binder (Part A) whilst stirring with a mechanical agitator. DO NOT ADD LIQUID TO POWDER. Material should be filtered prior to application and should be constantly agitated in the pot during spraying. Once the unit has been mixed it should be used within the working pot life specified.

Mix Ratio

3.17 part(s) : 1.00 part(s) by volume

Working Pot Life

5°C (41°F) 12 hours
15°C (59°F) 8 hours
25°C (77°F) 4 hours
40°C (104°F) 2 hours

Airless Spray

Recommended
Tip Range 0.38-0.53 mm (15-21 thou)
Total output fluid pressure at spray tip not less than 112 kg/cm² (1593 p.s.i.)

Air Spray (Pressure Pot)

Recommended
Gun DeVilbiss MBC or JGA
Air Cap 704 or 765
Fluid Tip E

Brush

Suitable - small areas only
Typically 25-50 microns (1.0-2.0 mils) can be achieved

Roller

Not recommended

Thinner

International GTA803
(Recommended)
International GTA415
Do not thin more than allowed by local environmental legislation

Cleaner

International GTA803 or International GTA415

Work Stoppages

Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA803. Once units of paint have been mixed they should not be resealed and it is advised that after prolonged stoppages work recommences with freshly mixed units.

Clean Up

Clean all equipment immediately after use with International GTA803. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays.

All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation.
Interzinc 22 is available in various low lead zinc dust versions dependent upon local legislation/project specification. When utilising the ASTM D520 Type II specification, the appropriate zinc dust grade must be used. Contact International Protective Coatings for further details.

Prior to overcoating, Interzinc 22 must be clean, dry and free from both soluble salts and excessive zinc corrosion products.

Surface temperature must always be a minimum of 3°C above dew point.

When applying Interzinc 22 in confined spaces ensure adequate ventilation.

The minimum overcoating interval is dependent upon the relative humidity during cure. Below 65% relative humidity the minimum recoat period will normally be at least 24 hours, but will be dependent upon the ambient temperature and relative humidity during the application and curing period.

If thinning is required to assist spray application in warmer climates, (typically >28°C (82°F)), it is recommended that International GTA803 thinners are used.

It is recommended that prior to overcoating a solvent rub test to ASTM D4752 should be undertaken. A value of 4 indicates a satisfactory degree of cure for overcoating purposes.

At relative humidities below 50%, curing will be severely retarded and humidity may need to be increased by steam or water spraying. Alternatively, the use of Interzinc accelerator solution may be necessary. Please consult International Protective Coatings for further details in this situation.

Excessive film thickness and/or over-application of Interzinc 22 can lead to mudcracking, which will require complete removal of the affected areas by abrasive blasting and re-application in accordance with the original specification.

Care should be exercised to avoid application of dry film thickness in excess of 125 microns (5 mils).

For high temperature systems the thickness of Interzinc 22 should be restricted to 50 microns (2 mils) d.f.t. Continuous dry temperature resistance of Interzinc 22 is 400°C (752°F) if left untopcoated, however, if this product is used as a primer for Intertherm 50, the dry temperature resistance will be 540°C (1004°F).

Untopcoated Interzinc 22 is not suitable for exposure in acid or alkaline conditions or continuous water immersion.

This product has the following specification approvals:
- SSPC Paint Specification No. 20 Type 1C
- BS5493 (1977): EP2A
- Shell Specification 40.48.00.30 V1(g)
- ASTM A490 Class B Slip Coefficient
- BS4604 Friction Grip

Note: VOC values are typical and are provided for guidance purpose only. These may be subject to variation depending on factors such as differences in colour and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also affect VOC values determined using EPA Method 24.

When it is necessary for Interzinc 22 to be overcoated by itself due to low dry film thickness, the coating surface must be fresh and unweathered. A minimum of 50 microns (2 mils) d.f.t of any subsequent coat of Interzinc 22 is needed to ensure good film formation.

Before overcoating with recommended topcoats ensure the Interzinc 22 is fully cured (see above) and if weathering has occurred all zinc salts should be removed from the surface by fresh water washing, and if necessary scrubbing with bristle brushes.

Typical topcoats and intermediates are:
- Intercryl 530
- Intergard 475HS
- Intercure 200
- Intergard 420
- Intercure 420
- Intergard 251
- Intergard 269
- Intertherm 50
- Intertherm 715

In some cases it may be necessary to apply a mist coat of suitable viscosity to minimise bubbling. This will depend upon the age of the Interzinc 22, surface roughness and ambient conditions during curing and application. Alternatively, an epoxy sealer coat, such as Intergard 269, can be used to reduce bubbling problems.

For other suitable topcoats/intermediates, consult International Protective Coatings.
Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following documents available at www.international-pc.com:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given on this sheet, the Material Safety Data Sheet and the container(s), and should not be used without reference to the Material Safety Data Sheet (MSDS) which International Protective Coatings has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards and regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes will be emitted which will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult International Protective Coatings for further advice.

### PACK SIZE

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Part A</th>
<th>Part B</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 litre</td>
<td>10.64 litre</td>
<td>15 litre</td>
</tr>
<tr>
<td>5 US gal</td>
<td>3.8 US gal</td>
<td>5 US gal</td>
</tr>
</tbody>
</table>

For availability of other pack sizes, contact International Protective Coatings.

### SHIPPING WEIGHT

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Part A</th>
<th>Part B</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 litre</td>
<td>11.7 kg</td>
<td>25.8 kg</td>
</tr>
<tr>
<td>5 US gal</td>
<td>37.5 lb</td>
<td>66.1 lb</td>
</tr>
</tbody>
</table>

### STORAGE

Shelf Life

- Part A: 6 months minimum at 25°C.
- Part B: 12 months minimum at 25°C (77°F).

Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition.

---

**Important Note**

- The information in this data sheet is not intended to be exhaustive; any person using the product for any purpose other than that specifically recommended in this data sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at their own risk. All advice given or statements made about the product (whether in this data sheet or otherwise) is correct to the best of our knowledge but we have no control over the quality or the condition of the substrate or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability at all for the performance of the product or for (subject to the maximum extent permitted by law) any loss or damage arising out of the use of the product. We hereby disclaim any warranties or representations, express or implied, by operation of law or otherwise, including, without limitation, any implied warranty of merchantability or fitness for a particular purpose. All products supplied and technical advice given are subject to our Conditions of Sale. You should request a copy of this document and review it carefully. The information contained in this data sheet is liable to modification from time to time in the light of experience and our policy of continuous development. It is the user’s responsibility to check with their local International Paint representative that this data sheet is current prior to using the product.

Issue date: 07/07/2009

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www.international-pc.com
PRODUCT DESCRIPTION

A single component, high temperature coating, based on a moisture curing silicone binder. The moisture curing crosslinking mechanism allows multiple coats to be applied without heat curing. Suitable for temperatures up to 540°C (1004°F).

INTENDED USES

For the protection of steel from corrosion on areas including flare stacks, chimneys, exhausts, vents and pipework, at temperatures up to 540°C (1004°F).

Where maximum corrosion protection is required, application should be over a zinc silicate primer (e.g. Interzinc 22).

PRACTICAL INFORMATION FOR INTERTHERM 50

<table>
<thead>
<tr>
<th>Colour</th>
<th>Aluminium, Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloss Level</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Volume Solids</td>
<td>45%</td>
</tr>
<tr>
<td>Typical Thickness</td>
<td>25 microns (1 mils) dry equivalent to 56 microns (2.2 mils) wet</td>
</tr>
<tr>
<td>Theoretical Coverage</td>
<td>18 m²/litre at 25 microns d.f.t and stated volume solids</td>
</tr>
<tr>
<td></td>
<td>722 sq.ft/US gallon at 1 mils d.f.t and stated volume solids</td>
</tr>
</tbody>
</table>

Practical Coverage

Allow appropriate loss factors

Method of Application

Air Spray, Brush, Roller

Drying Time

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Touch Dry</th>
<th>Hard Dry</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°C (41°F)</td>
<td>90 minutes</td>
<td>5 hours</td>
<td>24 hours</td>
<td>Extended¹</td>
</tr>
<tr>
<td>15°C (59°F)</td>
<td>60 minutes</td>
<td>3 hours</td>
<td>16 hours</td>
<td>Extended¹</td>
</tr>
<tr>
<td>25°C (77°F)</td>
<td>30 minutes</td>
<td>2 hours</td>
<td>12 hours</td>
<td>Extended¹</td>
</tr>
<tr>
<td>40°C (104°F)</td>
<td>15 minutes</td>
<td>1 hour</td>
<td>6 hours</td>
<td>Extended¹</td>
</tr>
</tbody>
</table>

¹ See International Protective Coatings Definitions and Abbreviations

Overcoating Interval with recommended topcoats

REGULATORY DATA

<table>
<thead>
<tr>
<th>Flash Point</th>
<th>25°C (77°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Weight</td>
<td>1.1 kg/l (9.4 lb/gal)</td>
</tr>
<tr>
<td>VOC</td>
<td>4.13 lb/gal (495 g/l) USA - EPA Method 24</td>
</tr>
</tbody>
</table>

See Product Characteristics section for further details
All surfaces to be coated should be clean, dry and free from contamination. Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000.

Oil or grease should be removed in accordance with SSPC-SP1 solvent cleaning.

Abrasives Blast Cleaning

Abrasives blast clean to Sa2½ (ISO 8501-1:1988) or SSPC-SP6. If oxidation has occurred between blasting and application of Intertherm 50, the surface should be reblasted to the specified visual standard.

Surface defects revealed by the blast cleaning process should be ground, filled, or treated in the appropriate manner.

A surface profile of 25-50 microns (1-2 mils) is recommended.

Hand or Power Tool Preparation

Any coatings present on the surface must be removed prior to the application of Intertherm 50. Hand or power tool clean to a minimum St3 (ISO 8501-1:1988) or SSPC-SP3.

Note, all scale must be removed and areas which cannot be prepared adequately by chipping or needle gun should be spot blasted to a minimum standard of Sa2½ (ISO 8501-1:1988) or SSPC-SP6. Typically this would apply to C or D grade rusting in this standard.

Primed Surfaces

Intertherm 50 is suitable for application to unweathered steelwork freshly coated with zinc silicate shop primers.

If the zinc shop primer shows extensive or widely scattered breakdown, or excessive zinc corrosion products, overall sweep blasting will be necessary. Other types of shop primer are not suitable for overcoating and will require complete removal by abrasive blast cleaning.

Weld seams and damaged areas should be blast cleaned to Sa2½ (ISO 8501-1:1988) or SSPC-SP6.

Aluminium Metal Spray

Metal sprayed surfaces should be fresh, clean and free from moisture, or surface contamination.

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>Mix Ratio</th>
<th>Airless Spray</th>
<th>Air Spray (Pressure Pot)</th>
<th>Air Spray (Conventional)</th>
<th>Brush</th>
<th>Roller</th>
<th>Thinner</th>
<th>Cleaner</th>
<th>Work Stoppages</th>
<th>Clean Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing</td>
<td>Not applicable</td>
<td>Not recommended</td>
<td>Recommended</td>
<td>Recommended</td>
<td>Suitable - small areas only</td>
<td>Suitable - small areas only</td>
<td>International GTA007</td>
<td>International GTA007</td>
<td>Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with International GTA007. Partially filled containers may show surface skimming and/or a viscosity increase of the material after storage.</td>
<td></td>
</tr>
<tr>
<td>Cleaner</td>
<td>International GTA007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clean all equipment immediately after use with International GTA007. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency of cleaning will depend upon amount sprayed, temperature and elapsed time, including any delays.</td>
<td></td>
</tr>
<tr>
<td>Thinners</td>
<td>International GTA007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All surplus materials and empty containers should be disposed of in accordance with appropriate regional regulations/legislation.</td>
<td></td>
</tr>
</tbody>
</table>
Intertherm® 50
High Temperature Silicone

PRODUCT CHARACTERISTICS

Intertherm 50 is moisture curing, and does not evolve water vapour during the heat curing mechanism as with standard silicones. Application at thicknesses of 25 microns (1 mil) are therefore possible rather than normal thicknesses of 15 microns (0.6 mil).

Maximum thickness which can be applied in a single coat without subsequent blistering on heating is 40 microns (1.6 mil).

Up to 3 coats at a maximum of 25 microns (1 mil) per coat can be applied without the requirement of heating between coats. This provides maximum corrosion protection when it is not possible to use a zinc silicate priming system.

Intertherm 50 is available in an aluminium or black version. It is recommended that the aluminium version is always used where possible due to its superior performance. The black version should only be used for specialist applications / requirements. For further information contact International Protective Coatings.

Intertherm 50 Aluminium version is suitable for the protection of abrasive blast cleaned steel operating at continuous dry temperatures up to 540°C (1004°F). However, the maximum service temperature over hand prepared substrates is 400°C (752°F).

Intertherm 50 Black version is suitable for the protection of abrasive blast cleaned steel operating at continuous dry temperatures up to 400°C (752°F). However, the maximum service temperature over hand prepared substrates is 300°C (572°F).

When using high heat coatings over inorganic zinc primer, the products should be applied in strict accordance with film thickness specifications, since application of excessive thicknesses may cause blistering. Determine that the inorganic zinc primer is thoroughly cured prior to application of the high heat coating by following the curing instructions given on the relevant product data sheet.

When using a zinc silicate primer to obtain maximum corrosion resistance the recommended thickness of zinc silicate is 50 microns (2 mils) dry film thickness to ensure maximum surface strength for any subsequent temperature cycling and to avoid flaking of topcoats.

It is preferable to overcoat zinc silicate before weathering but in cases where this is not possible then the zinc silicate surface should be clean and free of zinc corrosion products.

In corrosive environments, the use of Intertherm 50 Black directly over zinc silicate primer can lead to a marked colour change from black to grey due to the 'salting' of the underlying primer. This colour change can be significantly reduced by first sealing the zinc silicate primer with a single coat of Intertherm 50 Aluminium prior to the application of Intertherm 50 Black. The maximum dry temperature resistance of this system is 400°C (752°F).

Intertherm 50 is not suitable for exposure in acid or alkaline environments.

Intertherm 50 Aluminium version has the following specification approvals:
- BS5493 (1977) : CP7
- Shell Specification DEP 40.48.00.30 Gen. Chapter VI (h)

Note: VOC values are typical and are provided for guidance purpose only. These may be subject to variation depending on factors such as differences in colour and normal manufacturing tolerances.

Low molecular weight reactive additives, which will form part of the film during normal ambient cure conditions, will also affect VOC values determined using EPA Method 24.

SYSTEMS COMPATIBILITY

This specialist coating is only compatible with a very limited number of products.

Suitable primers are:
- Interzinc 22

Suitable topcoats are:
- Intertherm 50

For other suitable primers, consult International Protective Coatings.
High Temperature Silicone

ADDITIONAL INFORMATION

Further information regarding industry standards, terms and abbreviations used in this data sheet can be found in the following documents available at www.international-pc.com:

- Definitions & Abbreviations
- Surface Preparation
- Paint Application
- Theoretical & Practical Coverage

Individual copies of these information sections are available upon request.

SAFETY PRECAUTIONS

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given on this sheet, the Material Safety Data Sheet and the container(s), and should not be used without reference to the Material Safety Data Sheet (MSDS) which International Protective Coatings has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards and regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes will be emitted which will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult International Protective Coatings for further advice.

PACK SIZE

<table>
<thead>
<tr>
<th>PACK SIZE</th>
<th>Intertherm 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Litre unit</td>
<td>Intertherm 50</td>
</tr>
<tr>
<td>5 Gallon unit</td>
<td>Intertherm 50</td>
</tr>
</tbody>
</table>

For availability of other pack sizes, contact International Protective Coatings.

SHIPPING WEIGHT

<table>
<thead>
<tr>
<th>SHIP. WEIGHT</th>
<th>U.N. Shipping No. 1263</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Litre unit</td>
<td>6.2 kg (13.7 lb)</td>
</tr>
<tr>
<td>5 Gallon unit</td>
<td>22.9 kg (50.5 lb)</td>
</tr>
</tbody>
</table>

STORAGE

<table>
<thead>
<tr>
<th>STORAGE</th>
<th>Shelf Life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum 12 months at 25°C (77°F). Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat and ignition.</td>
</tr>
</tbody>
</table>

Important Note

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Issue date: 01/08/2007

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www.international-pc.com
APPENDIX 4

SUPPLIER’S DOCUMENTATION *
provided by

JOTUN

* also consult paint supplier’s Internet home page
Technical specification

Paul Wurth S.A.
Paul Wurth Paint Systems Standard/ FOR 519E / Rev 6
06.09.2011
Technical specification

Customer: Paul Wurth S.A.
Version: 
Location: 
Position: Paint System Type F/ near slag pit(s) and in coastal area
Area: 10 m²
System: 

Date: 06.09.2011
Prepared by: Christian Boge
Checked by:
Issued by Jotun

Pretreatment: All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
<th>Wet spec.</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Epoxy HR, aluminium</td>
<td>100</td>
<td>63</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
</tr>
<tr>
<td>2</td>
<td>Epoxy HR, light grey</td>
<td>100</td>
<td>63</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
</tr>
</tbody>
</table>

Remarks:

Unless otherwise agreed in writing, all product supplied and technical advice given by us are subject to our standard terms and conditions of sale. In the event that supplies are made and technical advice is given by one of our associated companies or dealers, then such supplies and technical advice shall be subject to the standard terms of sale of that company, a copy of which is available upon request. The given data must be considered as guidelines only, the figures in some columns may be rounded. Drying times and paint consumptions may vary depending on actual conditions.

For updated information about our products please refer to our web site at www.jotun.com

* please refer to the relevant technical datasheets for recoating and curing conditions.

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**Technical specification**

Customer: Paul Wurth S.A.  
Version:  
Location:  
Position: Paint System Type G  
Area: 10 m²  
System:  

<table>
<thead>
<tr>
<th>Date: 06.09.2011</th>
<th>Prepared by: Christian Boge</th>
<th>Checked by:</th>
<th>Issued by Jotun</th>
</tr>
</thead>
</table>

**Pretreatment:** All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
<th>Wet spec.</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Resist 78, grey</td>
<td>100</td>
<td>72</td>
<td>75</td>
<td>105</td>
<td>0</td>
<td>4 h</td>
<td>*</td>
<td>*</td>
<td>4/25</td>
<td>0</td>
</tr>
</tbody>
</table>

Remarks:  

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Technical specification

Customer: Paul Wurth S.A.  
Version:  
Location:  
Position: Paint System Type F/ in coastal area but not near slag pit(s)  
Area: 10 m²  
System:  

Date: 06.09.2011  
Prepared by: Christian Boge  
Checked by:  
Issued by Jotun

Pretreatment:  
All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>%</th>
<th>Vol. solids</th>
<th>%</th>
<th>Dry spec.</th>
<th>μm</th>
<th>Wet spec.</th>
<th>μm</th>
<th>Loss (%)</th>
<th>15°C Min</th>
<th>15°C Max</th>
<th>23°C Min</th>
<th>23°C Max</th>
<th>40°C Min</th>
<th>40°C Max</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Epoxy HR, aluminium</td>
<td>100</td>
<td>63</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
<td>3 d</td>
<td>23</td>
<td>0</td>
<td>5,3</td>
</tr>
<tr>
<td>2</td>
<td>Epoxy HR, light grey</td>
<td>100</td>
<td>63</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
<td>3 d</td>
<td>23</td>
<td>0</td>
<td>5,3</td>
</tr>
</tbody>
</table>

Remarks: Unless otherwise agreed in writing, all product supplied and technical advice given by us are subject to our standard terms and conditions of sale. In the event that supplies are made and technical advice is given by one of our associated companies or dealers, then such supplies and technical advice shall be subject to the standard terms of sale of that company, a copy of which is available upon request. The given data must be considered as guidelines only, the figures in some columns may be rounded. Drying times and paint consumptions may vary depending on actual conditions. For updated information about our products please refer to our web site at www.jotun.com
Technical specification

Customer: Paul Wurth S.A.
Location: Paint System Type F/ near slag pit(s) but not in coastal area
Position: Area: 10 m²

Date: 06.09.2011
Prepared by: Christian Boge

Pretreatment: All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
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<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Epoxy HR, aluminium</td>
<td>100%</td>
<td>63%</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
</tr>
<tr>
<td>2</td>
<td>Epoxy HR, light grey</td>
<td>100%</td>
<td>63%</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
</tr>
</tbody>
</table>

Remarks:

* please refer to the relevant technical datasheets for recoating and curing conditions

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For updated information about our products please refer to our web site at www.jotun.com

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Printed 06.09.2011 17:31:37
Technical specification

Customer: Paul Wurth S.A.  
Version:  
Location:  
Position: Paint System Type F/ not near slag pit(s) and not in coastal area  
Area: 10 m²  
System:  
Location:  
Date: 06.09.2011  
Prepared by: Christian Boge  
Checked by:  
Issued by Jotun  

Pretreatment: All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
<th>Wet spec.</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Epoxy HR, aluminium</td>
<td>100</td>
<td>63</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
</tr>
<tr>
<td>2</td>
<td>Epoxy HR, light grey</td>
<td>100</td>
<td>63</td>
<td>120</td>
<td>190</td>
<td>0</td>
<td>20 h</td>
<td>14 d</td>
<td>10 h</td>
<td>7 d</td>
<td>4 h</td>
</tr>
</tbody>
</table>

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Technical specification

**Customer:** Paul Wurth S.A.  
**Project:** Paul Wurth Paint Systems Standard/ FOR 519E / Rev 6  
**Version:**  
**Location:**  
**Position:** Paint System Type C  
**Area:** 10 m²  
**System:**  
**Date:** 06.09.2011  
**Prepared by:** Christian Boge  
**Checked by:**  
**Issued by:** Jotun

**Pretreatment:** All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
<th>Wet spec.</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Barrier 80, grey</td>
<td>100</td>
<td>61</td>
<td>50</td>
<td>80</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>1.5 h</td>
<td>40 min</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Penguard Express, buff</td>
<td>100</td>
<td>74</td>
<td>80</td>
<td>110</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>2 h</td>
<td>1 h</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Penguard FC, Please consult Paul Wurth for the final colour shade of the top coat.</td>
<td>100</td>
<td>62</td>
<td>70</td>
<td>115</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>7.5 h</td>
<td>4 h</td>
<td>17</td>
</tr>
</tbody>
</table>

Remarks:  

*please refer to the relevant technical datasheets for recoating and curing conditions

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Technical specification

Customer: Paul Wurth S.A.
Location: Paint System cooling tower
Position: Paint System cooling tower
Area: 10 m²

Date: 06.09.2011
Prepared by: Christian Boge

Checked by:

Issued by Jotun

Pretreatment: All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
<th>Wet spec.</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tankguard Storage, light red</td>
<td>100</td>
<td>63</td>
<td>125</td>
<td>200</td>
<td>0</td>
<td>20 h</td>
<td>10 h</td>
<td>30 d</td>
<td>4 h</td>
<td>5,0</td>
</tr>
<tr>
<td>2</td>
<td>Tankguard Storage, red</td>
<td>100</td>
<td>63</td>
<td>125</td>
<td>200</td>
<td>0</td>
<td>20 h</td>
<td>10 h</td>
<td>30 d</td>
<td>4 h</td>
<td>5,0</td>
</tr>
</tbody>
</table>

Remarks:

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For updated information about our products please refer to our web site at www.jotun.com
Technical specification

Customer: Paul Wurth S.A.
Location:
Position: Paint System Type J
Area: 10 m²

Date: 06.09.2011
Prepared by: Christian Boge

Checked by:
Issued by Jotun

Pretreatment: All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. %</th>
<th>Dry spec. (%)</th>
<th>Wet spec. (%)</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Barrier 80, grey</td>
<td>100</td>
<td>61</td>
<td>50</td>
<td>80</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>1.5 h</td>
<td>40 min</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Penguard Express, buff</td>
<td>100</td>
<td>74</td>
<td>120</td>
<td>160</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>2 h</td>
<td>1 h</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Penguard FC, Please consult Paul Wurth for the final colour shade of the top coat.</td>
<td>100</td>
<td>62</td>
<td>70</td>
<td>115</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>7.5 h</td>
<td>4 h</td>
<td>17</td>
</tr>
</tbody>
</table>

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For updated information about our products please refer to our web site at www.jotun.com

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* please refer to the relevant technical datasheets for recoating and curing conditions
## Technical specification

**Customer:** Paul Wurth S.A.  
**Project:** Paul Wurth Paint Systems Standard/ FOR 519E / Rev 6  
**Location:**  
**Position:** Paint System hot water tank  
**Area:** 10 m²  
**System:**

| Date: 06.09.2011 | Prepared by: Christian Boge | Checked by: | Issued by Jotun |

**Pretreatment:** All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

<table>
<thead>
<tr>
<th>Coat no.</th>
<th>Product</th>
<th>Area to paint</th>
<th>Vol. solids</th>
<th>Dry spec.</th>
<th>Wet spec.</th>
<th>Loss (%)</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>Thinner</th>
<th>Consumption incl. loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tankguard Storage, light red</td>
<td>100</td>
<td>63</td>
<td>125</td>
<td>200</td>
<td>0</td>
<td>20 h</td>
<td>30 d</td>
<td>10 h</td>
<td>30 d</td>
<td>4 h</td>
</tr>
<tr>
<td>2</td>
<td>Tankguard Storage, red</td>
<td>100</td>
<td>63</td>
<td>125</td>
<td>200</td>
<td>0</td>
<td>20 h</td>
<td>30 d</td>
<td>10 h</td>
<td>30 d</td>
<td>4 h</td>
</tr>
</tbody>
</table>

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For updated information about our products please refer to our web site at [www.jotun.com](http://www.jotun.com)
Technical specification

Customer: Paul Wurth S.A.

Location: Paint System stack
Position: Area: 10 m²

Date: 06.09.2011
Prepared by: Christian Boge
Issued by Jotun

Pretreatment: All areas to be cleaned thoroughly with strong detergents and high pressure fresh water to remove oil, grease, salt and contaminations. All areas to be blastcleaned to Sa 2½ (ISO 8501-1:1988).

| Coat no. | Product                        | Area to paint | Vol. sols | Dry spec. | Wet spec. | Loss (%) | 15°C Min | 15°C Max | 23°C Min | 23°C Max | 40°C Min | 40°C Max | Thinner   | Consumption incl. loss |
|----------|--------------------------------|---------------|-----------|-----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------------------|
| 1        | Chemflake Special, red         | 100           | 96        | 600       | 625       | 0        | 8 h       | 36 h     | 4 h       | 24 h     | 2 h       | 12 h     | Styrene   | 1,6/ltre              |
| 2        | Chemflake Special, white       | 100           | 96        | 600       | 625       | 0        | 8 h       | 36 h     | 4 h       | 24 h     | 2 h       | 12 h     | Styrene   | 1,6/ltre              |

| 1200     |                               |              |           |           |           |          |           |          |           |          |           |          |           | 6         |                     |

Remarks:

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For updated information about our products please refer to our web site at www.jotun.com
Technical Data
Barrier 80

Product description
Barrier 80 is a two-pack zinc rich epoxy primer with a high content of zinc that complies with the compositional requirements for SSPC Paint 20 level 2 and ISO 12944. Can also be made to order with ASTM D520 Type II zinc dust.

Recommended use
As a zinc rich primer on blast cleaned steel. Barrier 80 is used in combination with advanced coating systems to further improve protection against corrosion.

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>40</td>
<td>90</td>
<td>50</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>65</td>
<td>150</td>
<td>80</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>15,3</td>
<td>6,8</td>
<td>12,2</td>
</tr>
</tbody>
</table>

Comments
In a systems of DFT of max. 90 µm, the drying time will increase. To achieve a uniform, closed film at dry film thickness below 40 microns it will be necessary to thin Barrier 80 with Jotun Thinner No. 17.

Physical properties
- Colour: Grey
- Solids (vol %)*: 61 ± 2
- Flash point: 27ºC ± 2 (Setaflash)
- Gloss: Flat
- Water resistance: Excellent
- Abrasion resistance: Very good
- Solvent resistance: Very 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.

Bare steel
Cleanliness: Blast cleaning to min. Sa 2 ½ (ISO 8501-1:2007) or for maintenance UHPWJ to WJ2 (NACE No.5/SSPC-SP 12). Roughness: using abrasives suitable to achieve minimum grade Fine (ISO 8503-2).

Shopprimed steel
Clean, dry and undamaged approved shopprimer.
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 Use airless spray
Brush Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.

Application data
Mixing ratio (volume) 3:1
Mixing Mix 3 part Comp. A (base) thoroughly with 1 part Barrier 80, Comp. B (curing agent).
Induction time 30 minutes.
Pot life (23°C) 12 hours. (Reduced at higher temp.).
Thinner/Cleaner Jotun Thinner No. 17
Guiding data airless spray
Pressure at nozzle 15 MPa min (150 kp/cm², 2100 psi.).
Nozzle tip 0.38 - 0.53 mm (0.015 - 0.021").
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>50 min</td>
<td>20 min</td>
<td>10 min</td>
<td>4 min</td>
</tr>
<tr>
<td>Through dry</td>
<td>3 h</td>
<td>2 h</td>
<td>1,5 h</td>
<td>40 min</td>
</tr>
<tr>
<td>Cured</td>
<td>10 d</td>
<td>7 d</td>
<td>5 d</td>
<td>2 d</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>3 h</td>
<td>2 h</td>
<td>1,5 h</td>
<td>40 min</td>
</tr>
<tr>
<td>Dry to recoat, maximum</td>
<td>3 h</td>
<td>2 h</td>
<td>1,5 h</td>
<td>2 d</td>
</tr>
</tbody>
</table>

1. Recommended data given for recoating with coatings normally specified on top of zinc epoxy coatings.
2. The surface should be dry and free from any contamination prior to application of the subsequent coat.

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**

**Barrier 80**

1 x 40 - 75 µm (Dry Film Thickness)

Subsequent coating(s) by choice e.g.: epoxy, acrylic or vinyl.

Other systems may be specified, depending on area of use

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**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. Continuous stirring during application will prevent the heavy zinc pigments from settling.

---

**Packing size**

4 litre unit: 3 litres Comp. A (base) in a 5 litre container and 1 litre Barrier 80, Comp. B (curing agent) in a 1 litre container.

or

9 litre unit: 6.75 litres Comp. A (base) in a 10 litre container and 2.25 litres Barrier 80, Comp. B (curing agent) in a 3 litre container.

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**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 is often used under conditions beyond our control, we cannot guarantee anything but the quality of the product itself. We reserve the right to change the given data without notice.

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 7 JANUARY 2008 BY JOTUN**

**THIS DATA SHEET SUPERSEDES THOSE PREVIOUSLY ISSUED**
Technical Data
Chemflake Special

Product description
Chemflake Special is a high build glass flake reinforced vinyl ester coating, specially designed for high temperature service.

Recommended use
Steel in aggressive environments. For maximum corrosion and chemical protection also in high temperature environment. May also be used for protection of aluminium and concrete (special designed systems).

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 mils (µm)</td>
<td>24.0(600)</td>
<td>40.0(1000)</td>
<td>30.0(750)</td>
</tr>
<tr>
<td>Film thickness, wet mils (µm)</td>
<td>25.0(625)</td>
<td>42.0(1050)</td>
<td>31.2(780)</td>
</tr>
<tr>
<td>Theoretical spreading rate ft²/gl (m²/l)</td>
<td>64(1,6)</td>
<td>38(0,96)</td>
<td>51(1,28)</td>
</tr>
</tbody>
</table>

Comments
The practical spreading rate may vary from the theoretical dependent upon film thickness and the ambient temperature, ventilation/wind during the application.

Physical properties

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Red, White</td>
</tr>
<tr>
<td>Solids (vol %)*</td>
<td>96 ± 2</td>
</tr>
<tr>
<td>Flash point</td>
<td>93°F ± 4 (34°C ± 2) (Setaflash)</td>
</tr>
<tr>
<td>VOC</td>
<td>36 gms/ltr UK-PG6/23(97), Appendix 3</td>
</tr>
<tr>
<td>Gloss</td>
<td>Semi flat</td>
</tr>
<tr>
<td>Water resistance</td>
<td>Excellent</td>
</tr>
<tr>
<td>Abrasion resistance</td>
<td>Excellent</td>
</tr>
<tr>
<td>Solvent resistance</td>
<td>Excellent</td>
</tr>
<tr>
<td>Chemical resistance</td>
<td>Excellent</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Limited</td>
</tr>
</tbody>
</table>

*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.

Bare steel
Cleanliness: Blast cleaning to min. SSPC-SP10 "Near White Blast" or Sa 2 ½ (ISO 8501 1:2007). Roughness: use suitable abrasives to achieve Grade Coarse G 3 - 5 mils (75 - 130 µm, Ry5) (ISO 8503-2).
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 59°F (15°C) and at least 5°F (3°C) above the dew point of the air. The temperature and the relative humidity should be measured in the vicinity of the substrate. Good ventilation is usually required in confined areas to ensure proper drying. The coating should not be exposed to oil, chemicals or mechanical stress until fully cured.

Application methods
<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray</td>
<td>Use normal airless spray or two-comp. airless spray equipment</td>
</tr>
<tr>
<td>Brush</td>
<td>Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.</td>
</tr>
</tbody>
</table>
Application data

Mixing ratio (volume)

Choose quantity of peroxide, accelerator and inhibitor according to the table below. Inhibitor and accelerator must be thoroughly mixed with Chemflake Special before adding the required amount of peroxide. Mechanical agitation for one minute or more.

Note:
Check temperature of pump during application. Friction in piston may cause increase in temperature. If this should happen, get the Chemflake Special out as quickly as possible.
If the temperature is ranging near the max. temperature in a zone, it is recommended to reduce the content of peroxide/accelerator respectively, or to increase the content of inhibitor.

Approved alternatives to Norpol Peroxide can be used. Please contact Jotun Technical Service Department.

Warning:
Accelerator 9802 and peroxide must never be mixed directly together.
Be sure that steel temperature is equal or higher than paint temperature.

Steel and paint temperature:

40° C
- 0.2 vol% (30 ml) NORPOL Inhibitor 9853
- 1.4 vol% (225 ml) NORPOL Accelerator 9802
- 0.6 vol% (100 ml) NORPOL Accelerator 9826
- 2.2 vol% (350 ml) NORPOL Peroxide 1 or 11

35° C
- 1.40 vol% (225 ml) NORPOL Accelerator 9802
- 0.6 vol% (100 ml) NORPOL Accelerator 9826
- 2.2 vol% (350 ml) NORPOL Peroxide 1 or 11

30° C
- 1.75 vol% (280 ml) NORPOL Accelerator 9802
- 0.6 vol% (100 ml) NORPOL Accelerator 9826
- 2.2 vol% (350 ml) NORPOL Peroxide 1 or 11

25° C
- 2.0 vol% (320 ml) NORPOL Accelerator 9802
- 0.6 vol% (100 ml) NORPOL Accelerator 9826
- 2.5 vol% (400 ml) NORPOL Peroxide 1 or 11

20° C
- 2.25 vol% (360 ml) NORPOL Accelerator 9802
- 0.6 vol% (100 ml) NORPOL Accelerator 9826
- 2.5 vol% (400 ml) NORPOL Peroxide 1 or 11

15° C

Pot life 73°F (23°C)
35 - 45 minutes.

Thinner
Jotun Thinner No. Styrene. Max 5% Styrene.

Cleaner
Jotun Thinner No. 17/23/27.

Guiding data airless spray
Pressure at nozzle
15 - 25 MPa (150-280 kp/cm², 2100-4000 psi.).
Ratio/Capacity:
> 45:1. Min. 12 l per minute. Slow moving piston.
Nozzle tip
0.86 - 1.14 mm (0.034 - 0.045").
Spray angle
40 - 80°
Filter
To be removed.

Note
For further details please see separate "Working Manual".
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>59°F (15°C)</th>
<th>73°F (23°C)</th>
<th>104°F (40°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface dry</td>
<td>8 h</td>
<td>4 h</td>
<td>2 h</td>
</tr>
<tr>
<td>Through dry</td>
<td>8 h</td>
<td>4 h</td>
<td>2 h</td>
</tr>
<tr>
<td>Cured</td>
<td>8 d</td>
<td>4 d</td>
<td>2 d</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>8 h</td>
<td>4 h</td>
<td>2 h</td>
</tr>
<tr>
<td>Dry to recoat, maximum</td>
<td>36 h</td>
<td>24 h</td>
<td>12 h</td>
</tr>
</tbody>
</table>

1. The surface should be dry and free from any contamination prior to application. If the maximum dry to recoat time is exceeded, please contact Jotun for advice.

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
On steel:

Chemflake Special 2 x 30 mils (750 µm) (Dry Film Thickness)

Holiday detector after last coat: NACE RPO 188-88 (400 volt per 100 µm)

Other systems may be specified, depending on area of use

Storage
The product must be stored below 25°C and 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.

SHELF LIFE: 4 months, at 23°C, subject to re-inspection thereafter. Shelf life very much depends on temperature. Lower temperatures (if possible below freezing point) will lengthen the shelf life considerably, while high temperature may lead to gelling in the tin.

Accelerator and peroxide must be kept in their original containers. No other materials shall be stored in the same room as peroxides.

Always consult your local/national authorities for storing peroxides!

Handling
Handle peroxide with care. Avoid that it comes in contact with flammable substances. Accelerator and peroxide must never be mixed directly together. Before handling, see safety data sheet for accelerator and peroxide.

Packing size
20 liter unit: 16 liters (4.23 gallons) in a 20 liter 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 is often used under conditions beyond our control, we cannot guarantee anything but the quality of the product itself. We reserve the right to change the given data without notice.

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ISSUED 8 JANUARY 2010 BY JOTUN
THIS DATA SHEET SUPERSEDES THOSE PREVIOUSLY ISSUED
Technical Data
Penguard Express

Product description
Penguard Express is a fast drying, high solids two-pack epoxy coating which may be applied in high film thickness and at lower temperatures.

Recommended use
As an anti corrosive primer and/or intermediate coating for corrosion protection of steel and other substrates in atmospheric exposure where fast dry-to-recoat and/or dry-to-handle times are desired. Can be used alone or in various systems of primers and topcoats.

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>75</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>100</td>
<td>340</td>
<td>170</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>9,9</td>
<td>3</td>
<td>5,9</td>
</tr>
</tbody>
</table>

Physical properties

- Colour: Grey, Red, Buff, Light Red
- Solids (vol %)*: 74 ± 2
- Flash point: 29ºC ± 2 (Setaflash)
- Gloss: Flat
- Gloss retention: Fair
- Water resistance: Very good
- Abrasion resistance: Very good
- Solvent resistance: Excellent
- Chemical resistance: Excellent
- Flexibility: Good

*Measured according to ISO 3233:1998 (E)

Note that primers used as the final coat may fade and chalk in time when exposed to sunlight and weathering effects. Colour may vary from batch to batch. If exact match to colour standards and long term cosmetic performance is needed please see our range of topcoats and finishes.

Hong Kong rules: Category of paints - Other vessel coatings; VOC 260 gms/ltr HK EPD method (Ready to use); Exempt compound - N/A; Specific gravity: 1.51 kg/ltr (A+B); Both VOC and Specific gravity values provided are typical values, and will vary according to colour chosen.

Surface preparation

All surfaces should be clean, dry and free from contamination. The surface should be assessed and treated in accordance with ISO 8504.
Bare steel
Cleanliness: Blast cleaning to Sa 2½ (ISO 8501-1:2007). Roughness: using abrasives suitable to achieve grade Fine to Medium G (30-85 µm, Ry5) (ISO 8503-2)

Shopprimed steel
Clean, dry and undamaged approved shopprimer.

Coated surfaces
Clean, dry and undamaged compatible primer. Please contact your local Jotun office for more information.

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 proper drying. The coating should not be exposed to oil, chemicals or mechanical stress until cured.

Application methods
Spray
Use airless spray

Brush
Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.

Application data
Mixing ratio (volume)
4:1

Mixing
4 parts Comp. A (base) to be mixed thoroughly with 1 part Penguard Express, Comp. B (curing agent) for 10 min prior to use.

Pot life (23°C)
2 hours. (Reduced at higher temp.)

Thinner/Cleaner
Jotun Thinner No. 17

Guiding data airless spray
Pressure at nozzle
15 MPa (150 kp/cm², 2100 psi)

Nozzle tip
0.46 - 0.69 mm (0.018-0.027”)

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>0°C</th>
<th>5°C</th>
<th>10°C</th>
<th>23°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface dry</td>
<td>16 h</td>
<td>11 h</td>
<td>4 h</td>
<td>2 h</td>
<td>1 h</td>
</tr>
<tr>
<td>Through dry</td>
<td>38 h</td>
<td>24 h</td>
<td>10 h</td>
<td>6 h</td>
<td>3 h</td>
</tr>
<tr>
<td>Cured</td>
<td>-</td>
<td>21 d</td>
<td>13 d</td>
<td>8 d</td>
<td>4 d</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>24 h</td>
<td>14 h</td>
<td>8 h</td>
<td>4 h</td>
<td>2 h</td>
</tr>
<tr>
<td>Dry to recoat, maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Substrate temperature 40°C
Surface dry 0,5 h
Through dry 2 h
Cured 3 d
Dry to recoat, minimum 1 h
Dry to recoat, maximum ²

1. Provided the surface is free from chalking and other contamination prior to application, there is normally no overcoating time limit. Best intercoat adhesion occurs, however, when the subsequent coat is applied before preceding coat has cured. If the coating has been exposed to direct sunlight for some time, special attention must be paid to surface cleaning and mattening/removal of the surface layer in order to obtain good adhesion.

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

<table>
<thead>
<tr>
<th>Paint System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrier</td>
<td>1 x 50 µm (Dry Film Thickness)</td>
</tr>
<tr>
<td>Penguard Express</td>
<td>1 x 150 µm (Dry Film Thickness)</td>
</tr>
<tr>
<td>Har topp AS/Hardtop XP</td>
<td>1 x 50 µm (Dry Film Thickness)</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Penguard Express</td>
<td>2 x 125 µm (Dry Film Thickness)</td>
</tr>
<tr>
<td>Har topp AS/Hardtop XP</td>
<td>1 x 50 µm (Dry Film Thickness)</td>
</tr>
</tbody>
</table>

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
16 litres Comp. A (base) in a 20 litre container and 4 litres Penguard Express, Comp. B (curing agent) in a 5 litre container and
4 litres Comp. A (base) in a 5 litre container and 1 litre Penguard Express, Comp. B (curing agent) in a 1 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
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Technical Data
Epoxy HR

Product description
Epoxy HR is a two-component, high solid phenolic epoxy coating with high heat resistance.

Recommended use
Corrosion protection for external areas of pipes and other steelwork exposed to high temperatures (up to 200°C). Also suitable for application to hot substrates (up to 150°C). Note that Epoxy HR may change colour at elevated temperatures.

Epoxy HR is also suitable for prevention of corrosion under insulation up to 200°C, please contact Jotun for details of acceptable conditions.

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>100</td>
<td>200</td>
<td>125</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>160</td>
<td>320</td>
<td>200</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>6,3</td>
<td>3,2</td>
<td>5</td>
</tr>
</tbody>
</table>

Physical properties
- Colour: Aluminium, Light Grey
- Solids (vol %)*: 63 ± 2
- Flash point: 28°C ± 2 (Setaflash)
- Gloss: Flat
- Water resistance: Very good
- Solvent resistance: Excellent
- Chemical resistance: Excellent
- Flexibility: Fair
*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.

Bare steel
Cleanliness: Power tool cleaning to min. St 2, mill scale free (ISO 8501-1:2007) and a roughness between 35 - 50 microns. Improved surface treatment (blast cleaning to Sa 2½) will improve the performance.

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 10°C and at least 3°C above the dew point of the air, temperature and relative humidity measured in the vicinity of the substrate. The coating should not be exposed to oil, chemicals or mechanical stress until fully cured.

Application methods
Spray Use airless spray
Brush Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.

Application data
Mixing ratio (volume) 6,5:1
Mixing 6,5 parts Comp. A (base) to be mixed thoroughly with 1 part Epoxy HR, Comp. B (curing agent)
Induction time 20 minutes
Pot life (23°C) 4 hours (Reduced at higher temp.)

Thinner/Cleaner Jotun Thinner No. 23

Guiding data airless spray
Pressure at nozzle 15 MPa (150 kp/cm², 2100 psi)
Nozzle tip 0.46-0.69 mm (0.018-0.027”)
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>10°C</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
<th>100°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface dry</td>
<td>16 h</td>
<td>12 h</td>
<td>4 h</td>
<td>2 h</td>
<td>0,5 h</td>
</tr>
<tr>
<td>Through dry</td>
<td>26 h</td>
<td>20 h</td>
<td>10 h</td>
<td>4 h</td>
<td>1 h</td>
</tr>
<tr>
<td>Cured</td>
<td>21 d</td>
<td>14 d</td>
<td>7 d</td>
<td>3 d</td>
<td>1 d</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>26 h</td>
<td>20 h</td>
<td>10 h</td>
<td>4 h</td>
<td>1 h</td>
</tr>
<tr>
<td>Dry to recoat, maximum¹</td>
<td>21 d</td>
<td>14 d</td>
<td>7 d</td>
<td>3 d</td>
<td>1 d</td>
</tr>
</tbody>
</table>

1. The surface should be free from chalking and contamination prior to application. If the maximum dry to recoat time is exceeded, please contact Jotun for advice.

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

Epoxy HR 2 x 125 µm (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
20 litre unit: 16.3 litres Comp. A (base) in a 20 litre container and 2.5 litres Epoxy HR, Comp. B (curing agent) in a 3 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
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ISSUED 26 MARCH 2009 BY JOTUN
THIS DATA SHEET SUPERSEDES THOSE PREVIOUSLY ISSUED
Technical Data
Penguard FC

Product description
Penguard FC is a high build, two component polyamide cured epoxy coating. This product is tintable in a wide range of colours in Jotuns Multicolour Industry system.

Recommended use
Penguard FC is an epoxy finish coat to be used when cosmetic appearance of an epoxy finish is acceptable. It can also be used as an anti corrosive primer in mild to medium environment for steel and concrete above water areas or as an intermediate coat in more corrosive environment.

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>80</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>130</td>
<td>320</td>
<td>160</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>7,8</td>
<td>3,1</td>
<td>6,2</td>
</tr>
</tbody>
</table>

Comments
For application below typical film thickness, 160 microns WFT, up to 5% thinning may be needed to obtain proper flow and film forming.

Physical properties

Colour
Selected colours over Multicolour tinting system (MCI)

Solids (vol %)*
62 ± 2

Flash point
28°C ± 2 (Setaflash)

VOC
310 gms/tr UK-PG6/23(97). Appendix 3

Gloss
Semigloss

Gloss retention
Fair

Water resistance
Very good

Abrasion resistance
Very good

Solvent resistance
Very good

Chemical resistance
Very 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.

Bare steel
Cleanliness: Blast cleaning to Sa 2½ (ISO 8501-1:2007). Roughness: using abrasives suitable to achieve grade Fine to Medium G (30-85 µm, Ry6) (ISO 8503-2)
Shopprimed steel
Clean, dry and undamaged approved shopprimer.

Coated surfaces
Clean, dry and undamaged compatible primer. Contact your local Jotun office for more information.

Other surfaces
For aluminium and galvanized surface; degreasing, light abrading or sand sweeping.

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 0°C and minimum 3°C above the dew point of the air. The temperature and the relative humidity should be measured in the vicinity of the substrate. Good ventilation is usually required in confined areas to ensure proper drying. With forced ventilation; avoid heated air at first as this may cause surface drying and solvent entrapment. The coating should not be exposed to oil, chemicals or mechanical stress until fully cured.

---

**Application methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray</td>
<td>Use airless spray</td>
</tr>
<tr>
<td>Brush</td>
<td>Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.</td>
</tr>
<tr>
<td>Roller</td>
<td>Use a suitable roller. However when using roller application care must be taken to apply sufficient material in order to achieve the specified dry film thickness.</td>
</tr>
</tbody>
</table>

---

**Application data**

<table>
<thead>
<tr>
<th>Data</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing ratio (volume)</td>
<td>4:1</td>
</tr>
<tr>
<td>Mixing</td>
<td>4 parts Comp. A (base) to be mixed thoroughly with 1 part Comp. B (curing agent) 15 minutes prior to use.</td>
</tr>
<tr>
<td>Pot life (23°C)</td>
<td>2 hours. (Reduced at higher temp.)</td>
</tr>
<tr>
<td>Thinner/Cleaner</td>
<td>Jotun Thinner No. 17</td>
</tr>
<tr>
<td>Guiding data airless spray</td>
<td></td>
</tr>
<tr>
<td>Pressure at nozzle</td>
<td>15 MPa (150 kp/cm², 2100 psi.)</td>
</tr>
<tr>
<td>Nozzle tip</td>
<td>0.46 - 0.69 mm (0.018-0.027&quot;)</td>
</tr>
<tr>
<td>Spray angle</td>
<td>40 - 80°</td>
</tr>
<tr>
<td>Filter</td>
<td>Check to ensure that filters are clean.</td>
</tr>
</tbody>
</table>

---

**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
Substrate temperature       0°C      5°C      10°C    23°C      40°C  
Surface dry                  9 h      8 h      7 h     2,5 h     1 h   
Through dry                  36 h     24 h     15 h    7,5 h     2 h   
Cured                        -        14 d     8 d     4 d      2 d   
Dry to recoat, minimum       36 h     24 h     15 h    7,5 h     4 h   
Dry to recoat, maximum 1     -        -       -      -        -    

1. Provided the surface is free from chalking and other contamination prior to application, there is normally no overcoating time limit. If the coating has been exposed to direct sunlight for some time, special attention must be paid to surface cleaning and mattening/removal of the surface layer in order to obtain good adhesion.

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

Penguard FC can be applied direct to metal or over a wide range of primers including:

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Penguard Midcoat</th>
<th>Primastic Universal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jotamastic 87</td>
<td>Penguard Express</td>
<td>Penguard Tie Coat 100</td>
</tr>
<tr>
<td>Jotacote Universal</td>
<td>Penguard HB</td>
<td></td>
</tr>
</tbody>
</table>

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

16 litres Comp. A (base) in a 20 litre container and 4 litres Comp. B (curing agent) in a 5 litre container
or
4 litres Comp. A (base) in a 5 litre container and 1 litre Comp. B (curing agent) in a 1 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.

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ISSUED 6 DECEMBER 2007 BY JOTUN
THIS DATA SHEET SUPERSEDES THOSE PREVIOUSLY ISSUED
May be obsolete days after printing.

Please check PW-Intranet for latest edition.
Technical Data
Resist 78

Product description
Resist 78 is a two-pack, quick curing, zinc-rich ethyl silicate based coating that complies with the compositional requirements for SSPC Paint 20 level 2 and ISO 12944. Resist 78 meets Aramco specifications 09-AMSS-071 tested according to SSPC 20. Can also be made to order with ASTM D520 Type II zinc dust.

Recommended use
A general purpose, heavy duty, anti-corrosive primer:
1. As the first coat in a multiple layer system.
2. As a single coating for long term protection of steel exposed to moderately to severely corrosive environment. Resistant to cyclic dry temperatures up to 400°C.

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>50</td>
<td>90</td>
<td>75</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>70</td>
<td>125</td>
<td>104</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>14,4</td>
<td>8</td>
<td>9,6</td>
</tr>
</tbody>
</table>

Comments
There is a risk of mud-cracking if the thickness exceeds 120 µm.

Physical properties

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Grey</td>
</tr>
<tr>
<td>Solids (vol %)*</td>
<td>72 ± 2</td>
</tr>
<tr>
<td>Flash point</td>
<td>14°C ± 2 (Setaflash)</td>
</tr>
<tr>
<td>VOC</td>
<td>478 gms/ltr UK-PG6/23(97). Appendix 3</td>
</tr>
<tr>
<td>Gloss</td>
<td>Flat</td>
</tr>
<tr>
<td>Water resistance</td>
<td>Very good</td>
</tr>
<tr>
<td>Abrasion resistance</td>
<td>Excellent</td>
</tr>
<tr>
<td>Solvent resistance</td>
<td>Excellent</td>
</tr>
<tr>
<td>Chemical resistance</td>
<td>Excellent within pH-range 6-10</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Limited</td>
</tr>
</tbody>
</table>

*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.

Bare steel
Cleanliness: Blast cleaning to Sa 2½ (ISO 8501-1:2007). Roughness: using abrasives suitable to achieve grade Fine to Medium G (30-85 µm, Ry5) (ISO 8503-2)
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 min. 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. Zinc silicate paints in general requires moisture for curing. At low humidity the curing will be improved by gently sprinkling fresh water over the paint film; and/or by artificial humidification of the surrounding atmosphere. The paint must be completely cured before topcoating, otherwise the adhesion of the subsequent coat will be unsatisfactory. Use Methyl ethyl ketone (MEK) test according to ASTM D 4752-87 to verify the curing time before topcoating. Unweathered zinc silicate films are porous and the porosity may vary according to the weather condition during application and the application technique. When overcoating, the air in the pores will escape through the new coat of paint and may cause blisters or pinholes ("popping") in the coat just after application. To avoid this a mist coat/full coat technique is recommended: First apply a thin coat to fill the pores in the zinc silicate film and a few minutes later apply to full specified film thickness. In difficult cases it may be necessary to thin the next coat, or use Penguard Tie Coat 100 as first overcoat.

Application methods
<table>
<thead>
<tr>
<th>Spray</th>
<th>Use airless spray or conventional spray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush</td>
<td>Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness. In order to avoid settling of heavy zinc, continuous mechanical stirring during application is recommended.</td>
</tr>
</tbody>
</table>

Application data

Mixing ratio (volume)
Comp. A is a liquid and Comp. B is dry zinc powder. Consists of 9 litres Comp. A plus 18.5 kg Comp. B (together 11.6 litres paint). Pour the zinc powder slowly into the liquid during mechanical mixing. The Comp. A must be well shaken before use. Stir until lump free and pass through a 60 mesh sieve.

Pot life (23°C)
8 hours. (Reduced at higher temp.)

Thinner/Cleaner
Jotun Thinner No. 4/25. Adjusting spray pattern and drying may sometimes become necessary. Use max 5% * Jotun Thinner No. 4 (fast evaporation) when temperature is low and Jotun Thinner No. 26 (slow evaporation) when temperature is high.

Guiding data airless spray

<table>
<thead>
<tr>
<th>Pressure at nozzle</th>
<th>10 MPa (100 kp/cm², 1400 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle tip</td>
<td>0.46-0.58 mm (0.018-0.023&quot;)</td>
</tr>
<tr>
<td>Spray angle</td>
<td>30-80°</td>
</tr>
<tr>
<td>Filter</td>
<td>Check to ensure that filters are clean.</td>
</tr>
</tbody>
</table>

Note
* Thinner should be added after mixing components.

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
* Relative humidity at 70%
<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>60 min</td>
<td>30 min</td>
<td>15 min</td>
<td>13 min</td>
</tr>
<tr>
<td>Through dry</td>
<td>90 min</td>
<td>45 min</td>
<td>30 min</td>
<td>25 min</td>
</tr>
<tr>
<td>Cured 1</td>
<td>18 h</td>
<td>13 h</td>
<td>4 h</td>
<td>1,5 h</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>18 h</td>
<td>13 h</td>
<td>4 h</td>
<td>1,5 h</td>
</tr>
<tr>
<td>Dry to recoat, maximum</td>
<td>18 h</td>
<td>13 h</td>
<td>4 h</td>
<td>1,5 h</td>
</tr>
</tbody>
</table>

1. Curing time to be verified by MEK test (ASTM D 4752-87).
2. Recommended data given for recoating with coatings normally specified on top of zinc ethyl silicate coatings.
3. The surface should be free of zinc salts and other contamination prior to application.

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

Resist 78  1 x 75 µm (Dry Film Thickness)

Normally overcoated with an epoxy system.

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. The component A must be stored below 25°C. The product component B is zinc dust and has no strict limitation's for storage. SHELF LIFE: 6 months at 23°C for Comp. A, 4 years for comp. B, subject to re-inspection thereafter. Higher temperatures during storage may reduce the shelf life and may lead to gelling in the tin.

### Handling

Handle with care. Stir well before use. Continuous stirring during application will prevent the heavy zinc pigment from settling.

### Packing size

9 litres Comp. A (liquid) in a 10 litre container and 18.5 kg Comp. B (zinc powder) in a 20 litre container. (Together 11.6 litres paint).

Packing may vary from country to country according to local requirements.

### 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.

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Tankguard Storage

**Product description**
Tankguard Storage is a two-component, high solid phenolic epoxy coating with high resistance to a wide range of chemicals and solvents.

**Recommended use**
Corrosion protection for the internal lining of steel storage tanks being resistant to a wide range of chemicals including, but not limited to, crude oil and aromatic and aliphatic solvents and others.

**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>100</td>
<td>200</td>
<td>125</td>
</tr>
<tr>
<td>Film thickness, wet (µm)</td>
<td>160</td>
<td>320</td>
<td>200</td>
</tr>
<tr>
<td>Theoretical spreading rate (m²/l)</td>
<td>6,3</td>
<td>3,2</td>
<td>5</td>
</tr>
</tbody>
</table>

**Physical properties**

- **Colour**: Light grey, Light Red, Red
- **Solids (vol %)***: 63 ± 2
- **Flash point**: 28°C ± 2 (Setaflash)
- **VOC**: 2.5 lbs/gal (300 gms/ltr) USA-EPA Method 24
  310 gms/ltr UK-PG6/23(97). Appendix 3
- **Gloss**: Flat
- **Water resistance**: Very good
- **Solvent resistance**: Excellent
- **Chemical resistance**: Excellent
- **Flexibility**: Fair

*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.

- **Bare steel**

- **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 10°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 proper drying. The coating should not be exposed to oil, chemicals or mechanical stress until cured.

Application methods
<table>
<thead>
<tr>
<th>Spray</th>
<th>Use airless spray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush</td>
<td>Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.</td>
</tr>
</tbody>
</table>

Application data
<table>
<thead>
<tr>
<th>Mixing ratio (volume)</th>
<th>6,5:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing</td>
<td>6,5 parts Comp. A (base) to be mixed thoroughly with 1 part Comp. B (curing agent)</td>
</tr>
<tr>
<td>Induction time</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Pot life (23°C)</td>
<td>4 hours (Reduced at higher temp.)</td>
</tr>
<tr>
<td>Thinner/Cleaner</td>
<td>Jotun Thinner No. 23</td>
</tr>
<tr>
<td>Guiding data airless spray</td>
<td></td>
</tr>
<tr>
<td>Pressure at nozzle</td>
<td>15 MPa (150 kp/cm², 2100 psi)</td>
</tr>
<tr>
<td>Nozzle tip</td>
<td>0.46-0.69 mm (0.018-0.027&quot;)</td>
</tr>
<tr>
<td>Spray angle</td>
<td>40-80°</td>
</tr>
<tr>
<td>Filter</td>
<td>Check to ensure that filters are clean.</td>
</tr>
</tbody>
</table>

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>10°C</th>
<th>15°C</th>
<th>23°C</th>
<th>40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface dry</td>
<td>15 h</td>
<td>12 h</td>
<td>4 h</td>
<td>2 h</td>
</tr>
<tr>
<td>Through dry</td>
<td>24 h</td>
<td>20 h</td>
<td>10 h</td>
<td>4 h</td>
</tr>
<tr>
<td>Cured</td>
<td>- d</td>
<td>14 d</td>
<td>7 d</td>
<td>3 d</td>
</tr>
<tr>
<td>Dry to recoat, minimum</td>
<td>24 h</td>
<td>20 h</td>
<td>10 h</td>
<td>4 h</td>
</tr>
<tr>
<td>Dry to recoat, maximum</td>
<td>30 d</td>
<td>30 d</td>
<td>30 d</td>
<td>30 d</td>
</tr>
</tbody>
</table>

1. The surface should be free from chalking and contamination prior to application. If the maximum dry to recoat time is exceeded, please contact Jotun for advice.
2. In order to achieve full product resistance, a combined total of 14 days curing at minimum 15°C is required during build period.

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**

Tankguard Storage 2 x 125 µm (Dry Film Thickness)

Other systems may be specified, depending on area of use

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**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.

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**Handling**

Handle with care. Stir well before use.

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**Packing size**

20 litre unit: 16.3 litres Comp. A (base) in a 20 litre container and 2.5 litres Comp. B (curing agent) in a 3 litre container

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**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.

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