We keep on working against corrosion
We keep on working against corrosion

SPECIAL CYLINDER
Heila Anti-Corrosion Program

Heila Cranes offers multiple solutions to increase the lifetime of the marine cylinders exposed to the marine and offshore environment

INCREASE VALUE AND EFFICIENCY

THE INNOVATIVE TREATMENT
The corrosion resistance of the very hard HD4+ coating is very durable due to the unique compressive resistance characteristics that keep HD4+ coating free from micro-cracks.
The exceptional bonding high degree resistance of substrate makes HD4+ the most suitable treatment for harshest environment.
The resistance to scratches is remarkable.
Normally finished HD4+ coatings have a roughness of Ra = 0.1-0.3 µm (0.0039-0.0118”).

THE ANTI-CORROSION MATERIAL
New cylinder material H.D. FOUR STARS representing the best possible solution for longer hydraulic cylinder rod lifetime.
An innovative solution of stainless steel material with the latest combination of Nickel-chromium advantages.
The new cylinder material H.D. FOUR STARS, combines the best peculiar steel properties so far pursued to reach high performance during operation in the most severe conditions.
Specifically designed to resist under mechanical stress H.D. FOUR STARS material has also acquired the ultimate EPQ corrosion approval.

INCREASE VALUE AND EFFICIENCY
Amount of galvanic carbon steel substrate corrosion in 4% NaCl water (PH 3.5) in case of controlled damaged coating (drilled hole Ø 3 mm/.12"

Corrosion beginning - Hours (ISO 9227 NSS)

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best quality chrome bar</td>
<td>500</td>
</tr>
<tr>
<td>Ni/CR plated bar</td>
<td>1000</td>
</tr>
<tr>
<td>Heila Standard Durability</td>
<td>1500</td>
</tr>
<tr>
<td>HD4+</td>
<td>2000</td>
</tr>
<tr>
<td>HD Four Stars</td>
<td>2500</td>
</tr>
</tbody>
</table>

NOTE: Test interrupted at 3000 hours

Concentration of Fe-ions in mg/L in salt water

<table>
<thead>
<tr>
<th>Concentration (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.4</td>
</tr>
<tr>
<td>17.2</td>
</tr>
<tr>
<td>58.1</td>
</tr>
</tbody>
</table>

TECHNICAL BENEFITS HEILA DURABILITY

- **NO RUST** and no subsurface corrosion with better proved resistance to corrosion
- **NO OIL LEAKAGE** due to very high scratch resistance
- **NO PEELING PROCESS** due to accidents but only localized deformations
- **NO SEAL WEAR** due to high hardness and lower friction on seals
We keep on working against corrosion

**FOCUS ON KEY-POINTS**

Heila Anti-Corrosion Program

Integrated technical and structural solutions, with care for innovative components to guarantee proper and long lifetime of the sealings and complete crane structure for operating in harsh environments

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**SURFACE TREATMENT PROCESS**

Heila coating surface process ensures to our products the right features to prevent marine corrosion.

All external and internal surfaces are treated for a long-term corrosion resistance in accordance with CSM HIGH DURABILITY ISO 12944.

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**STRUCTURAL SOLUTIONS**

The process begin through specific design solutions adopted to facilitate the correct adhesion of the protective coating.

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**SURFACE PREPARATION**

In house sandblasting process using Garnet blast grits size 20/40 red color, able to grant a surface preparation in class SA 2,5 ISO 8501-1

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**SURFACE PAINTING PROCESS**

In house dry spray painting plant that permit a direct control of the entire process, granting an ambient with air humidity less than 60% during the whole painting phases.

Heila standard program grants a painting final treatment in respect of ISO 12944-5 C5M with a total paint thickness of minimum 280 micron.

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On request surface painting process in accordance to NORSOK M501 rev. 6 System 2B with 4 layers and total thickness of minimum 330 micron.

NORSOK M501 rev. 6 System 2B with flame metallization and total thickness of minimum 350 micron.

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Flame metallization (or thermal spraying) is a highly effective and proven method of anti-corrosion treatment obtained with a layer of Zinc and aluminum coatings applied on the steel base through a thermal spraying system.

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**STANDARD SURFACE PAINTING PROCESS**

- **First coat**: Two component, zinc rich epoxy primer
- **Second coat**: Two component, polyamide adduct cured
- **Third coat**: Two component, polyurethane topcoat

80-100 µm Hempel Hemathane HS 05610
140-160µm Hempel Hampadur Mastic 45880
60-80 µm Hempel Hampadur Pro-Zinc 17360
Corrosion is a natural process, which converts a refined metal to a more stable form, such as its oxide or hydroxide. It is the gradual destruction of materials (usually metals) by chemical reaction with their environment. [From Wikipedia, the free encyclopedia]

CYLINDER RODS TREATMENT
Heila standard cylinder rods are treated with double cross 40 microns nickel and 40 microns chrome plating with total thickness of 80 micron

HEILA STANDARD DURABILITY
High corrosion strength cylinders. These cylinders are suitable for the worst environmental conditions.

SPECIAL ANTI-CORROSION PROGRAM

ANTI-CORROSION MATERIAL - Heila Durability Four Stars: HD4*

ANTI-CORROSION TREATMENT - Heila Durability Four Plus: HD4+

LOCKING SYSTEM ACCORDING TO DIN 15058
A stainless steel plate lock the chrome treated pin and it is fastened with stainless steel screws.
HYDRAULIC FITTINGS PROTECTION
Standard fittings on flexible hoses are zinc-cadmium protected. In order to avoid the risk of corrosion a special rubber vulcanized tape is manually applied on each hydraulic connection. This ozone free special tape permits to isolate and seals the connection.

On request flexible hoses fittings can be provided in stainless steel material.

SCREWS AND BOLTS PROTECTED BY SILICONE
The silicone provides the perfect protection for outdoor environments. All screws and bolts are manually protected with silicone and later painted in order to avoid water stagnation and prevent dangerous rusting point.
SPIRAL GUARDS TO PROTECT FLUID POWER HOSES AND MULTIPLE CABLES
All electric cables and flex hoses are appositely wrapped with spiral guards. Solution for abrasion crush, UV, ozone, low temperature.

RIGID PIPES
All hydraulic pipelines are of stainless steel 316L with stainless fittings steel AISI316L, according to DIN EN ISO 8434-1

PLASTIC PROTECTIVE CAPS
The caps provide the perfect protection for outdoor environments.

STAINLESS STEEL JUNCTION BOXES AND ENCODERS
Boxes specially designed for applications in Oil & Gas sector. Standard with protection IP66

SLEW BEARING BOLTS & NUTS
GEOMET 500 B grade treatment, according to ISO 9227, increases the bolts and nuts resistance in salty environment up to 1000 hours. This permits robust, low abrasion, temperature-resistant, blow-resistant characteristics and provide good sealing features.