Corrosion Inhibitors

US Industry Study with Forecasts for 2020 & 2025

Study #3409 | April 2016 | $5300

Corrosion inhibitors demand impacted by water use

The corrosion inhibitor industry is being impacted by a number of changes. For water treatment applications, key issues include increased water recycling, the use of lower quality water in cooling systems, operating under higher temperatures and at greater cycles of concentration, and the need for compatibility with other water treatment chemicals. As a result, users are increasingly selecting more advanced, multifunctional products that can minimize corrosion and extend equipment lifetimes in such challenging environments.

Environmental concerns influencing trends

A further concern affecting the industry is the environmental impact of corrosion inhibitors, particularly in wastewater. End users are continuing to shift toward less toxic products that do not contain metals and can be discharged without causing eutrophication, aquatic toxicity, or other harmful effects on the environment. Similarly, corrosion inhibitors used as product additives are increasingly required to provide higher performance, allowing for longer product lifetimes while reducing volatile organic compound (VOC) emissions and other negative impacts on human health and the environment.

Organic inhibitors largest product segment

Because of the greater challenges placed on corrosion inhibitors, water treatment companies and other suppliers will continue having success with higher value products that integrate multifunctional additives and protect equipment in challenging operating conditions. As a result of these trends, organic inhibitors are the largest product segment in the industry and will continue to grow at the fastest pace in volume terms, gaining market share at the expense of other product types. Organic inhibitors are often less toxic than corrosion inhibitors that contain metals, and frequently of lesser concern when discharged in wastewater. The use of higher value organic inhibitors is central to many high performance water treatment chemical programs and product additive packages.

Oil price fluctuations drive growth

The oil and gas industry became one of the largest markets for the industry's products prior to the collapse of oil prices in 2014 and 2015, and as oil prices eventually recover, this market will again see above average growth relative to its 2015 base.

Study coverage

This study analyzes US demand for corrosion inhibitors. It presents historical demand data (2005, 2010 and 2015) plus forecasts (2020 and 2025) by application (process and product additives, water treatment), market (e.g., utilities, petroleum refining, chemicals, pulp and paper, metals, oil and gas production, other) and product (organics, molybdates, nitrites, phosphates, phosphonates, silicates, other). The study also assesses key market environment factors, examines industry structure, evaluates company market share and profiles 37 US industry players such as Ashland, Chemtura, Ecolab, GE and Lubrizol.

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Demand for molybdates is projected to rise 4.1 percent per year through 2020 to $430 million, providing most of these advances as volume demand remains around 60 million pounds. Molybdates have been an important corrosion inhibitor historically, especially in closed-loop water treatment systems. However, environmental concerns and high prices throughout most of the past decade have resulted in the development of alternatives to molybdate corrosion inhibitors, which has constrained volume demand. Molybdenum prices decreased substantially in 2014 and 2015 and are expected to remain low high historical levels during the forecast period, which will provide some opportunities for molybdates to regain market share going forward.

Pricing has been a key restraining factor to molybdate market growth, especially between 2005 and 2015. China, the world’s leading producer of molybdenum, restricted exports in order to satisfy domestic demand in the fast growing construction and steel industries. Since molybdenum is the key raw material in the molybdate corrosion inhibitor production chain, prices of molybdates skyrocketed, rising from around $2 per pound in 2005 to a high of $10 per pound in 2007. This added cost, along with growing environmental and health concerns, led to a significant decline in product volume. While prices have since receded, they remain high relative to product performance when compared to available alternatives.

Molybdate chemicals, in particular sodium molybdate, act as anodic inhibitors, preventing corrosion through the chemical’s ability to be absorbed by a metal surface, filling gaps and promoting the formation of an adherent oxide layer. Corrosion of the underlying substrate is then prevented as it becomes passivated. Sodium molybdate is largely used in a variety of cooling and boiler water treatments for its ability to prevent 

TABLE III-12
UTILITIES MARKET FOR CORROSION INHIBITORS BY PRODUCT & SECTOR
(million dollars)

<table>
<thead>
<tr>
<th>Item</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
</tr>
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<tbody>
<tr>
<td>Total Utility Water Usage (tril gal) lb corrosion inhibitor/mil gal water</td>
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<tr>
<td>Corrosion Inhibitor Demand (mil lb) $/lb</td>
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<tr>
<td>Corrosion Inhibitor Demand By Sector: Municipal Water Treatment Power Generation &amp; Other</td>
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<tr>
<td>By Type: Phosphates Organics Molybdates Silicates Other</td>
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</tbody>
</table>

Source: The Freedonia Group

TABLE IV-6
MOLYBDATE CORROSION INHIBITOR DEMAND (million dollars)

<table>
<thead>
<tr>
<th>Item</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
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<tr>
<td>Total Corrosion Inhibitor Demand (mil lb) % molybdate</td>
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<tr>
<td>Molybdate Corrosion Inhibitors (mil lb) $/lb</td>
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<tr>
<td>Molybdate Corrosion Inhibitor Demand Utilities Metals Chemicals Petroleum Refining Pulp &amp; Paper Other</td>
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</table>

Source: The Freedonia Group
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Freedonia’s methods

- Establishing consistent economic & market forecasts
- Using input/output ratios, flow charts & other economic methods to quantify data
- Employing in-house analysts who meet stringent quality standards
- Interviewing key industry participants, experts & end users
- Researching a proprietary database that includes trade publications, government reports & corporate literature

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- Energy & Petroleum
- Industrial Components
- Healthcare & Life Sciences
- Machinery & Equipment
- Metals, Minerals & Glass
- Packaging
- Plastics & Other Polymers
- Security
- Services
- Textiles & Nonwovens
- Water Treatment

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