DISPERSOL – 2030

Molybdate – Phosphonate – Organic – Corrosion & Scale Inhibitor for open recirculating cooling water systems

USAGE:

DISPERSOL–2030 is an exceptionally effective, concentrated liquid scale and corrosion inhibitor. It is designed for use in a wide range of open recirculating cooling water systems where clean, scale and deposit-free surfaces are required for maximum system life and efficiency.

DISPERSOL–2030 accomplishes this with one easy to use product, without the need of the synergistic use of a scale inhibitor.

DISPERSOL–2030 contains a special blend of anodic and cathodic corrosion inhibitors, designed to inhibit corrosion of ferrous metals by creating a passivating barrier. A specific inhibitor is included also to protect copper alloys from corrosion.

DISPERSOL–2030 is used for corrosion and scale control in systems with corrosive or high scaling makeup water and system operating conditions.

DESCRIPTION:

DISPERSOL–2030 contains no chromate, phosphate, polyphosphate, zinc or heavy metals. It is a blend of molybdate and dispersants designed to provide minimum environmental impact while providing a highly effective corrosion control alternative.

DISPERSOL–2030 is very effective in high hardness, highly alkaline scaling waters. It contains a proprietary blend of organic and polymeric sequestrants, penetrants and dispersants to minimize system fouling from contaminants such as calcium, silica, iron, sludge and organics. It also contains a unique blend of organic and actives to corrosion sites.

DISPERSOL–2030 is very effective also in low hardness, low alkalinity corrosive waters. It contains special filming ingredients to establish protective barriers against corrosion on ferrous metal surfaces. It also contains special filming ingredients to establish a protective barrier against corrosion and pitting on both yellow metal and ferrous metal surfaces.

DISPERSOL–2030 is environmentally safe for discharge with the cooling system bleedoff. The formulation contains no heavy metals, chromates, or other pollutants requiring removal or treatment prior to discharge at normal usage rates.

Molybdate does not provide a nutrient source as do many other corrosion inhibitors. This eliminates a food source for algae and bacteria in the water system and makes control of microorganisms easier at lower microbiocide dosage rates.

DISPERSOL–2030 may be used alone as a single product for control of corrosion in systems where hardness and alkalinity does not pose a scaling problem, or in high hardness and/or high alkalinity waters where higher cycles of concentration and lower bleed rates are desired.

DISPERSOL–2030 offers superior corrosion protection for all metals typically found in cooling water systems. The blend of cathodic and anodic inhibitors provides a durable corrosion inhibitive film for maximum system protection and minimal corrosion rates.

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ADVANTAGES:

- **DISPERSOL–2030** does not contain chromate, phosphate, polyphosphate, zinc or heavy metals.
- **DISPERSOL–2030** anti-fouling properties maximize heat transfer, minimize under-deposit corrosion.
- **PROTECTS against galvanic corrosion in mixed-metal systems.**
- EXCEPTIONALLY EFFECTIVE control of pitting of ferrous metals.
- Controls corrosion of both ferrous and non-ferrous metals. Protects most metals, including sweated copper lines from corrosive attack.
- Superior corrosion inhibition.
- Scale control agent
- Minimizes heat-absorbing sludge and mineral scale deposits in system.
- Remains effective at skin temperatures of 300º C and above.
- Helps extend equipment life.
- Reduces maintenance time and costs.
- Does not affect non-metallic materials in cooling systems.
- Low toxicity, easy to handle and apply.
- EFFECTIVE corrosion control at stability indexes as high as 10.
- CONVENIENT single-package treatment for corrosion and fouling.

TECHNOLOGY BEHIND:

Open recirculating cooling systems can include mild steel, galvanized steel, stainless alloys, copper and copper alloys, and aluminum. These metals are subject to a range of corrosion problems such as generalized corrosion, galvanic attack, pitting, crevice attack and stress cracking.

DISPERSOL–2030 is designed for systems using makeup water of moderate hardness and alkalinity, and discharging to a city sewer or other treatment plant.

Corrosion protection is provided through the use of molybdate, phosphonate, and azole compounds which have been shown in tests to be superior to most corrosion inhibitors available, and throughout a broad pH range.

- **Corrosion Inhibition**

Sodium molybdate has been used for decades as a substitute for chromates for the inhibition of corrosion in mild steels over a wide range of pH. Molybdates have a very low toxicity and are less aggressive oxidants toward organic additives that are often used in corrosion inhibiting formulations. The protection of mild steel used in the construction of air-conditioning cooling water and heating systems is a prime application. Molybdate solutions protect against rusting of steel parts during machining, and are used in water based hydraulic systems. It is also used as an additive in automobile engine anti-freeze.

Molybdate, usually in the form of Sodium Molybdate, is used as an anodic corrosion inhibitor in a number of aqueous systems, such as cooling water treatments, and automobile anti-freeze/coolant products.

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Molybdate ($MoO_4^{=}$) is a good corrosion inhibitor for open systems because it neither reacts with oxygen nor evaporates. Molybdate bonds tightly to metal atoms, especially in the presence of dissolved oxygen. The tenacious molybdate-metal complex is continuous over the entire surface and impervious to oxygen, so oxidative corrosion (rusting) is inhibited.
In the presence of nitrogen was found to enhance the formation of molybdate oxyanions. These oxyanions deposited back onto the anode surfaces as insoluble salts formed with iron cations released from the anion electrode. The increased formation of oxyanions is postulated to be the result of deprotonation of electrolyte in contact with the anion electrode, and a subsequent shift in pH to higher values. In addition to acting as a kinetic barrier, the oxyanionic species act as an electrostatic barrier to the ingress of the Cl- anions which cause pitting. So **DISPERSOL–2030** is particularly effective against pitting corrosion.
Molybdate inhibits steel, cast iron, aluminum, copper, brass, cadmium and solder, and is usually used synergistically with other corrosion inhibitors.

- **Yellow Metal Inhibitors**

Control of copper corrosion is critical. While copper and its alloys are quite corrosion resistant, the impact of even low corrosion rates can be dramatic. When copper corrodes, soluble copper ions plate out onto mild steel components.
When this happens, the more inert copper metal becomes a “permanent” cathode on the metal surface. At this point, the corrosion process, which had been spread over the entire steel surface, now becomes localized and continues at an accelerated rate. As this proceeds, instead of having a low general corrosion rate, high local corrosion rates will be seen.
Azoles are used to prevent the initial corrosion of copper alloys, as well as to inhibit copper deposits on mild steel surfaces. MBT (mercaptobenzothiazole) used in **DISPERSOL–2030** is an effective inhibitor, and has been used for many years with good results.
In contrast to precipitating agents, the nitrogen atoms in the azoles bond to the copper metal via copper oxide molecules on the surface. The protective layer that is formed enhances the natural corrosion resistance of copper and copper alloys.
Polymers can distort the crystal growth of the scale by disrupting the crystalline lattice which causes the hard dense adherent nature of scales. With the inclusion of a relatively large, irregularly shaped polymer in the crystalline lattice, scale does not develop or adhere to surfaces where it could cause heat transfer problems.
The polymer prevents normal scale development and disperses the more amorphorus material which may form. The effectiveness of polymers in scale control has changed the nature of many cooling water treatment programs by allowing high cycles and/or high pH conditions to be used.

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DOSAGE:
DISPERSOL–2030 dosages may vary somewhat according to operating conditions, but generally 30-100 ppm of **DISPERSOL–2030** should be maintained in the system water.
This dosage should be tripled for a two-week period when initiating treatment, whenever the system is refilled with fresh water, and after any major system upsets, in order to establish effective corrosion control.
If the stability index of the recirculated water is higher than 10.5, an alkalinity booster such as soda ash should be fed to reduce the index to less than 10.5.
DISPERSOL–2030 should not be used when the stability index of the system water is below 3.0.
DISPERSOL–2030is controlled by a molybdate test, which provides easy and accurate control readings. Maintain 2 to 5 ppm $MoO_4^{=}$ at all times.

FEEDING:
DISPERSOL–2030 must be fed continuously to the system by a positive displacement chemical feeder. For maximum results, feed should be linked to makeup of bleedoff through the use of a flowmeter or conductivity controller.
Residuals are adjusted and maintained by chemical test of the system to provide a residual of 2-5 ppm $MoO_4^{=}$.

HANDLING:
Avoid contact with skin and eyes. Wear suitable protective equipment (refer to MSDS for further information).

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