

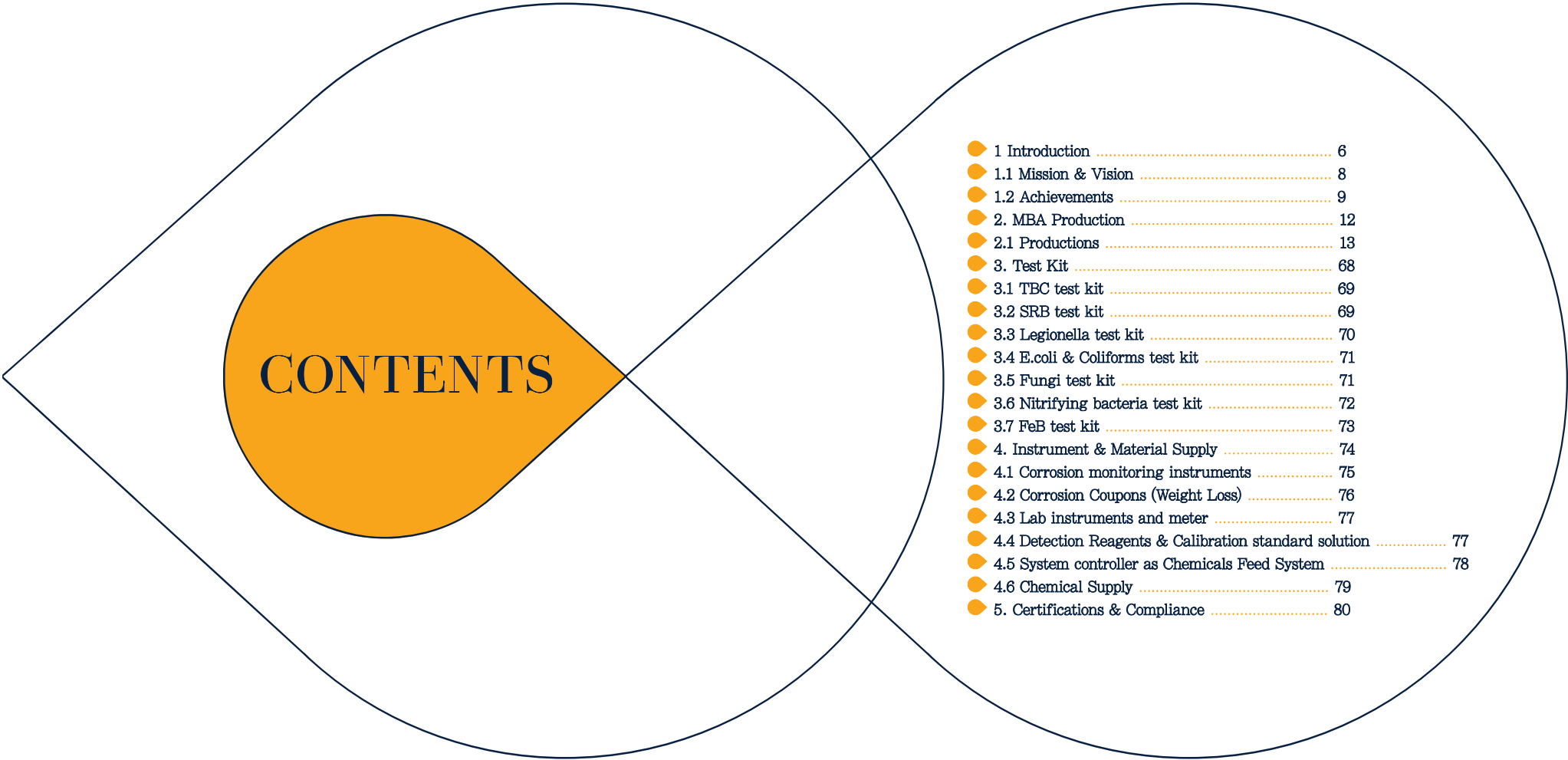
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MBA WATER TREATMENT CHEMICALS 2023



2023





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MBA
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1 Introduction



Mohafezan Behboud Ab (MBA) Co., was established in 2000 in response to the high demand of Iranian Industries for Water Treatment Chemicals (Corrosion Inhibitors/ Scale Inhibitors/ Biocides / Coagulant & Flocculants etc.), Corrosion Monitoring Instruments, Probes, Weight loss & Scale Coupons and related Engineering, Procurement & Sales /After Sales Services.

After more than 20 years of launching MBA Company, we are pleased to be able to control corrosion in industrial waters and to relieve the country's needed to import. We have been able to localize the knowledge of producing green (environmentally friendly) corrosion inhibitors and have successfully achieved our goal of saving water during a time when the area has experienced drought and a shortage of water resources.

MBA Co. is one of the few knowledge-based chemical producers that received approval of the science & technology vice presidency to produce & localize chemical additives for industrial water in Iran.

Our Company has been able to save water whilst minimizing scales in critical parts of systems such as exchangers, condensers and jacket reactors. The main MBA customers are steel industries, petrochemicals, copper industries, power plants and plastic industries.

Our modern, holistic and practical approach to tightening up these essential business processes resulted in a great profitability and punctuality for all major projects undertaken by the company.

Our Responsibilities & Commitments with Engineering Backbone has resulted in us being considered a reliable company for Control / Revamp and Providing the Know-How and Engineering Services of the Water Treatment Chemicals.

Our goals for localization of high demand Water Treatment Chemicals Production resulted in MBA Production Complex in Saveh, Iran.

1 Mission & Vision

The global shortages of water and energy resources have become critical as industries continue to consume them at shocking rates.

In creating all of our products, we have paid close consideration to the total impact to both human health and the environment. Our Impacts That Matter criteria and packaging principles ensure that Ecolab products are sustainable whilst never compromising safety and performance. We ensure that our team keeps customers ahead of the curve on product information to make the right choices for both themselves and the planet.

Industry-leading water technology and process expertise to solve your toughest water, wastewater and process challenges.

- Delivering innovative products, processes, and solutions across the globe
- Meeting the needs of your industry, your region, and your business
- Reaching your performance and compliance goals with sustainable solutions

We engage with stakeholder groups on an ongoing basis in a variety of ways. Our strategic framework guides us to keep our operations sustainable over the long-term, help customers to be sustainable in their businesses, promote global best practices within our supply chain, attract, develop and retain the best employees, and follow governance best practices.



1 Achievements

● Technology Transfer & Manufacturingz

Water Treatment Chemical Production Complex; in Industrial City of Kaveh Special Economic Zone, Iran. The Phase I completed to produce different types of water treatment chemicals.

● Research & Development

Several studies and researches performed on development / replacement of new water treatment chemicals for Severe Process Conditions to improve process performance.

New & High Technology Materials Developed and Supplied to the concerned industries with successful operational results fulfilling the required Process Guarantees.

The Technical Articles for successful researches / developments published in reputable international journals.

● Material Supply

Professional Supply of High Quality Chemicals with and Competitive Price.

● Sales & after Sales Services

Mechanized and Integrated Sales and after Sales Services to fulfill and satisfy the Client's Requirements.



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2 MBA Production



2 MBA Production

Cooling Water Treatment Chemicals

In laboratory tests a maximum tolerable microbial population limit in systems is determined. When these data are known in many cases the number of bacteria and other microorganisms needs serious reduction. This can be accomplished by the addition of biocides; chemical compounds that are toxic to the present microorganisms. Biocides are usually slug fed to a system to bring about rapid effective population reductions from which the microorganisms cannot easily recover. There are various different biocides, some of which have a wide range of effects on many different kinds of bacteria. They can be divided up into oxidizing agents and non-oxidizing agents.



Oxidizing Biocides

Oxidizing biocides include those chemicals that have the ability to kill microorganisms through an electrochemical process of oxidation. The oxidizing agent such as chlorine gains electrons in the process while the substance becoming oxidized loses electrons.

Depending upon the oxidizer being used, a new compound is created and in the case of microorganisms, some life function is changed that causes the organism to die or at least to not proliferate.

Some oxidizing biocides used in cooling tower systems include:

- Chlorine
- Bromine
- Iodine
- Chlorine dioxide
- Ozone
- Hydrogen peroxide

There are differences based upon how they are introduced into the water, how they react with water, how they react with various compounds found in the water, their stability, their oxidizing power, their ability to penetrate biofilms, and their effectiveness.



Non-oxidizing Biocides

This class of chemicals works through various poisoning processes such as interfering with reproduction, stopping respiration, or lysing the cell wall.

They are generally shot fed to achieve a high enough concentration for a long enough period of time to kill the bacteria, algae, or fungi. Kill time generally requires several hours up to a day.

Some non-oxidizing biocides include:

- Isothiazolines
- 2,2 Dibromo-3-nitrilopropionamide (DBNPA)
- Carbamates
- Gluteraldehyde
- Methylene bithiocyanate (MBT)
- Polyquaternary amines
- Tetrahydro3,5-, dimethyl2-H1,3,5- thiadiazine-2-thione
- -2(tert-butylamino)-4-chloro-6-(ethylamino)-S-triazine

Selection of a non-oxidizing biocide depends upon water pH, available retention time, efficacy against various bacteria, fungus, and algae, biodegradability, toxicity, and compatibility with the other chemicals.





Biodispersants

Biodispersants are chemicals that can penetrate and loosen the complex matrix of biofilms allowing the biocides to reach the organisms for more effective kill and control. These chemicals are typically shot fed at dosages that break down polysaccharides, emulsify oils, release minerals and foulants, or disperse the biopolymers.

Some biopenetrants or biodispersants include:

- DTEA II (-2Decylthio ethanamine)
- DMAD (Fatty acid amide)
- Dodecylamine acetate
- Polyquaternary amines
- DOSS (Diocylsulfosuccinate)
- Polyoxyalkylenes
- Enzymes





Corrosion Inhibitors for Cooling (Opened Circulation)

- ◆ **Corrosion inhibitors based on polyphosphate.** Can be a source of inorganic phosphate in cooling water treatments. Suitable for large systems.
 - ◆ **Combination of zinc, organic phosphorous and polymers.** Corrosion and scale inhibitor (dispersant). Suitable for cooling towers working in neutral-alkaline pH range. Suitable for large systems.
 - ◆ **Combination of zinc, organic and inorganic phosphorous.** Corrosion inhibitor for cooling towers working with corrosive/aggressive water. Suitable for large systems.
 - ◆ **Combination of zinc, organic phosphorous and polymers.** Corrosion and scale inhibitor (dispersant). Suitable for cooling towers working in neutral pH range. Suitable for large systems.
 - ◆ **Combination of zinc, copper inhibitors, organic phosphorous and polymers.** Protects alloys of steel and copper. Corrosion and scale inhibitor (dispersant). Suitable for cooling towers working in neutral pH range. Suitable for large systems.
 - ◆ **Phosphate Inhibitor.** This method of corrosion control is based on the theory that the addition of phosphate to a finished water will result in the formation of low-solubility lead-phosphate complexes on interior pipe surfaces. The protective layer acts as a barrier to corrosion, reducing dissolution of lead into the water. Copper solubility is not significantly affected by phosphate inhibitors at reasonable dosages. Phosphate inhibitor products applied to drinking water treatment can be separated into three categories:
 - **Orthophosphates:** This is the most common form used for lead control. The simplest source of orthophosphate is phosphoric acid.
 - **Polyphosphates:** Polyphosphates are commonly considered for use as sequestering agents for treatment of groundwater with low to moderate levels of iron and/or manganese. Their use for lead control is not recommended.
 - **Orthophosphate/polyphosphate blends:** A variety of proprietary blends are available, and are typically applied when multiple treatment objectives need to be met.
- The pH range at which orthophosphate is most effective for minimizing lead solubility is 7.4 to 7.8. Above pH 7.8, metal phosphate precipitation can become problematic.
- Orthophosphates can interact with other cations such as calcium or magnesium which may be present in the water. These interactions represent an orthophosphate demand, which reduces the amount of orthophosphate available to complex with lead.
- Because phosphates are most effective over a defined pH range, maintaining stable pH throughout the distribution system is critical to the success of a phosphate-based corrosion control program.
- Commercial phosphate-based inhibitors tend to be acidic solutions, and their effect on finished water pH must also be considered.



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Multi-Function Products for Cooling Systems

- ◆ Blend of inorganic and organic phosphates, azoles and organic polymers.

Protects ferrous and non-ferrous materials such as cast iron, copper alloys and aluminum. Multifunctional corrosion and scale inhibitor / dispersant for cooling towers with corrosive waters, where neither zinc nor heavy metals can be used.

- ◆ Blend of molybdate, organic phosphorous, azole and polymers.

Protects alloys of steel and copper. Multifunctional corrosion and scale inhibitor (dispersant) for cooling towers working with corrosive water or softened highly alkaline water.

- ◆ Blend of molybdate, inorganic and organic phosphorous, azole and polymers.

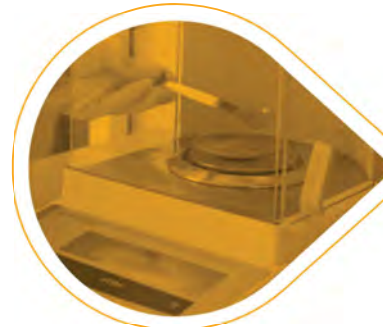
Protects alloys of steel, cast iron, aluminum and copper. Multifunctional corrosion and scale inhibitor (dispersant) for cooling towers. Appropriate for corrosive waters.

- ◆ Combination of organic phosphorous, azoles and polymers.

Protects alloys of ferrous and copper. Corrosion and scale inhibitor for cooling towers appropriate for soft-alkaline water, where neither zinc nor inorganic phosphate function properly.

- ◆ Blend of molybdate, inorganic and organic phosphorous compounds and polymers.

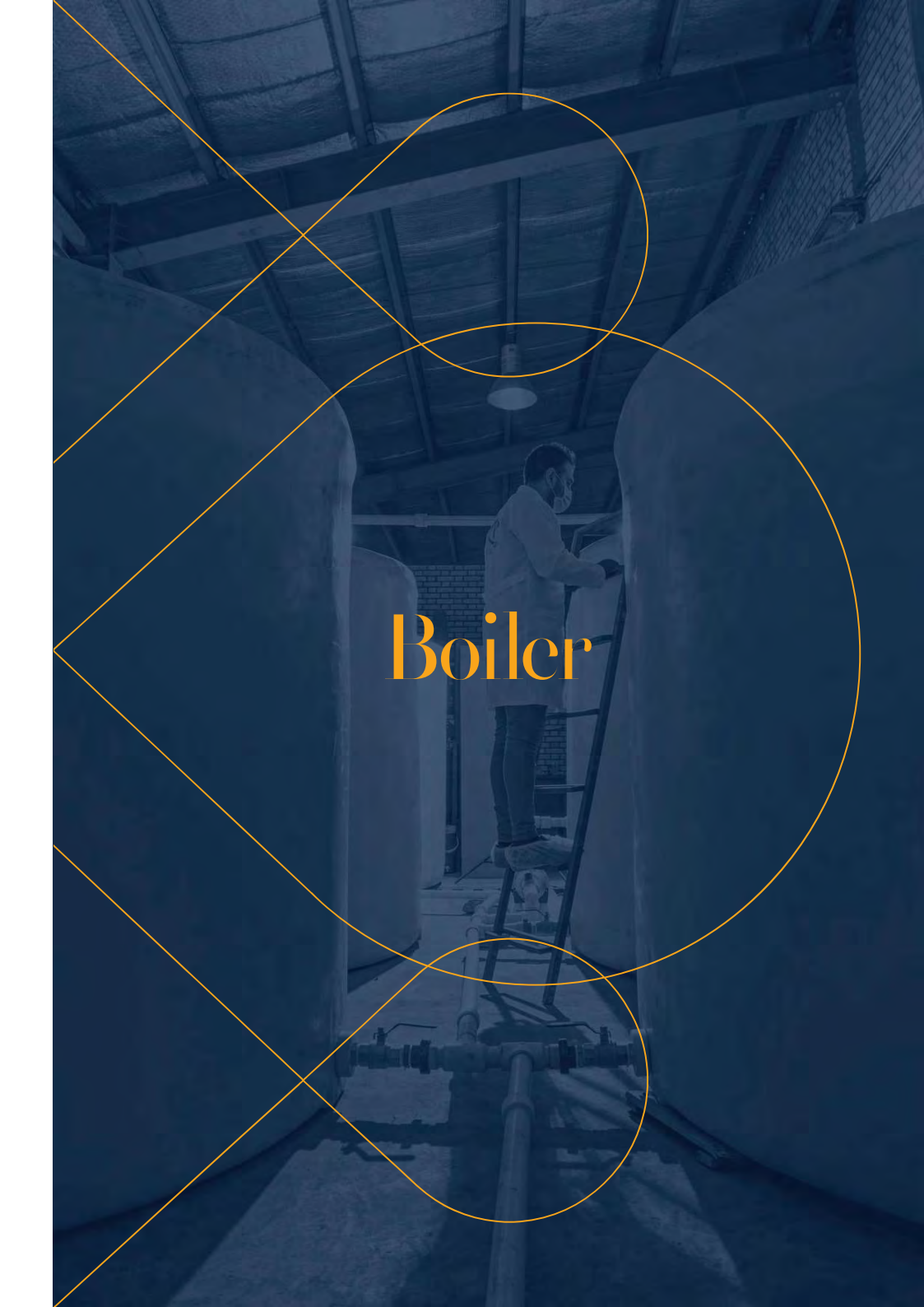
Protects alloys of steel, cast iron, aluminum and galvanized materials. Multifunctional corrosion and scale inhibitor (dispersant) for cooling towers with corrosive to aggressive and scaling water. Appropriate for problematic circuits.



MBA



MBA



Boiler



Boiler Water Treatment Chemicals

Mohafezan Behboud Ab (MBA) Co. specializes in steam boiler water treatment. MBA is a leading manufacturer and supplier of a comprehensive range of boiler water treatment chemicals and offer high quality on-site technical services.

When water is converted to steam it expands in volume many times. Steam can therefore move energy and heat where it is most needed. However, without the right boiler feed water treatment, a steam-raising plant will suffer from scale formation and corrosion.

Consequently, it increases energy costs and can lead to downgradation of steam, reduction of productivity and a shorter plant life. An inadequately treated boiler is a potential bomb and exposure to steam will cause severe burns and scalding and may accelerate more serious complexities at plant and operation. The two most frequently encountered water problems - scale formation and corrosion - are common to cooling, heating, and steam-generating systems. Hardness (calcium and magnesium), alkalinity, sulfate, and silica all form the main source of scaling in heat-exchange equipment, boilers, and pipes. Scales or deposits formed in boilers and other exchange equipment act as insulation, preventing efficient heat transfer and causing boiler tube failures through overheating of the metal. Free mineral acids (sulfates and chlorides) cause rapid corrosion of boilers, heaters, and other metal containers and piping. Alkalinity causes embrittlement of boiler steel, and carbon dioxide and oxygen cause corrosion, primarily in steam and condensate lines. Low-quality steam can produce undesirable deposits of salts and alkali on the blades of steam turbines; much more difficult to remove are silica deposits which can form on turbine blades even when steam is satisfactory by ordinary standards. At steam pressures above 600 psi, silica from the boiler water actually dissolves in the gaseous steam and then re-precipitates on the turbine blades at their lower-pressure end.

In the operation of every cooling, heating, and steam-generating plant, the water changes temperature. Higher temperatures, of course, increase both corrosion rates and scale-forming tendency.

Evaporation in process steam boilers and in evaporative cooling equipment increases the Total Dissolved-Solids (TDS) concentration of the water, compounding the problem.

In addition to the formation of scale or corrosion of metal within boilers, auxiliary equipment is also susceptible to similar damage. It should be noted that attempts to prevent scale formation within a boiler can lead to makeup line deposits if the treatment chemicals are improperly chosen.

In order to keep the plant operating safely, efficiently and economically, MBA has developed a comprehensive range of products and technical services to protect boiler and the whole steam system including the feed-tank, feed-lines, steam and condensate system.

Boiler Water/Steam Treatment Chemicals

- Boiler compound for scale and corrosion inhibitor.
- Types of Oxygen scavengers to prevent corrosion.
- Multifunctional boiler compound.
- Neutralizing Amine
- Non-silicon antifoam

Boiler compound for scale and corrosion inhibitor

Deposition in boiler water involves the formation and precipitation of both crystalline and amorphous (non-crystalline) scales and the ultimate adherence of these mineral salt scales onto a heat transfer surface.

Corrosion may also occur under deposits, and the removal of a deposit from a heat transfer surface typically may expose a pit or other form of metal wastage.

Scales may originate at some distant point within the steam water circuit and only deposit at a point of high heat transfer. Or they may simply originate and concentrate locally on boiler surfaces, especially if the boiler is highly rated.

The MBA boiler water treatment chemicals programming as scale and corrosion inhibitor include:

A. MBA4110- is effective in preventing sludge deposition and corrosion through the boiler and condensate system. MBA4110- is a blend of phosphate-polymer and antifoam treatment.

This product contains an amino carboxylate sequestering agent that disperses scale and metal oxides deposits.

- Very efficient scale inhibitor and metal oxides deposit.
- Prevent corrosion in feed and boiler system.
- Minimizes iron pick-up.

B. Tribasic Sodium Phosphate (TSP) is effective in preventing sludge deposition and corrosion through the boiler and condensate system. It is a blend of Sodium Phosphate Tribasic and Sodium Phosphate Dibasic and they prevent calcium and magnesium salts from baking on boiler evaporative surfaces.

They are all converted into trisodium phosphate and as such react with the calcium to form tricalcium phosphate, a rather flocculent precipitate. It should be noted that maintaining sodium to phosphate molar ratio between 2:1 to 3:1 typically will keep the pH and phosphate concentration of the system within an acceptable range. The sodium to phosphate molar ratio within

MBA4120- is about 2.6:1.

- Very efficient scale inhibitor and metal oxides deposit.
- Prevent corrosion and scale in-feed and boiler system.
- Minimizes iron pick-up.



C.MBA4130- is effective in preventing sludge deposition and corrosion through the boiler and condensate system. MBA4130- is formulated based on a Sodium Phosphate Tribasic and prevents calcium and magnesium salts from baking on boiler evaporative surfaces. MBA4130- is the most common compound for lower pressure boilers. MBA4130- also scavenges (or removes) any remaining oxygen and creates a pH buffer to minimize corrosion potential in boilers. It should be noted that maintaining sodium to phosphate molar ratio between 2:1 to 3:1 typically will keep the pH and phosphate concentration of the system within an acceptable range. The sodium to phosphate molar ratio within MBA4130- is about 3.0:1.

- Very efficient scale inhibitor and metal oxides deposit.
- Prevent corrosion and scale in-feed and boiler system.
- Minimizes iron pick-up.
- Appropriate for low pressure boilers.





Types of Oxygen scavengers to prevent corrosion

Oxygen scavengers are best fed to the storage section of the deaerator or feed water tank. In most low pressure industrial boiler systems, if oxygen remains in the feed water and enters the boiler, it is too late to remove all of the oxygen and protect the boiler and condensate from oxygen corrosion. A residue of sulfite or other oxygen scavengers in the boiler cannot chemically reduce all of the oxygen before it escapes with the steam or reacts with the metal surfaces.

The oxygen scavenger should be pumped either continuously or paced with makeup into the deaerator so that there is a positive residue at all times in the deaerator. Consideration should be given to see where the makeup and condensate enter the deaerator. Often the high pressure condensate enters directly into the storage section. If the condensate contains oxygen, intermittently highly dissolved oxygen levels in the feed water may occur. Also sudden load changes can allow temporary highly dissolved oxygen levels. Even with sulfite feed to the deaerator, but especially if sulfite is fed to the boiler, the boiler sulfite residue may not show a big change as oxygen is released into the steam or corrodes the boiler before it is reduced chemically. Dissolved oxygen testing in the feed water would be the best tool to ensure consistently low dissolved oxygen levels and adequate chemical feed and control.



Carbohydrazide is an oxygen scavenger in liquid. It helps to instantly remove oxygen from the boiler feed water. Carbohydrazide is a volatile oxygen scavenger, contributes no to the system, reacts readily with oxygen at low temperatures and pressures, and passivates solids the metal of the boiler system. Carbohydrazide can (and does) break down into hydrazine above temperatures of 350 F (180 C) to scavenge oxygen, but this conversion is not necessary for oxygen scavenging activity because it reacts directly with oxygen.



Diethylhydroxylamine (DEHA) is a superior quality-based oxygen scavenger developed for boiler water treatment. DEHA is catalyzed with Hydroquinone and provides outstanding protection from oxygen corrosion together with excellent feed water and boiler system passivation. It can be used as a direct replacement for HYDRAZINE in any boiler up to 125bar without the associated health and safety hazards, and handling precautions. It is free of Hydrazine and Carbohydrazide. The product is volatile and alkaline, contributing no dissolved solids or ammonia to the boiler system.



Catalyzed Sodium Sulfite is used in low temperature systems for oxygen removal and also finds application in boiler systems where the feed water temperature is low, where mechanical deaeration is not complete or where it is essential to obtain rapid reaction for prevention of pitting in feed lines, closed heaters and economizers. As boiler operating pressures have increased, some disadvantages in use of sodium sulfite as a chemical deaerant have become evident. The product of the sodium sulfite-oxygen reaction is sodium sulfate (Na_2SO_4) which increases the dissolved solids concentration of the boiler water. While the increase in dissolved solids in low or medium pressure boilers is generally of little consequence, it can be significant in high pressure boilers. Also, at high pressure, the sulfite in the boiler tends to decompose to form acidic gases, return system.



Hydrazine is a reducing agent which does not possess mentioned disadvantages for catalyzed sodium sulfite at high pressure operation. Hydrazine removes dissolved oxygen. Since the products of Hydrazine reaction with Oxygen are water and nitrogen, no solids are added to the boiler water. The decomposition products of hydrazine are ammonia and nitrogen. The ammonia is alkaline and therefore will not attack steel. However, if present in sufficient quantity, it can attack copper-bearing alloys when oxygen is present. With proper application, the concentration of ammonia in the steam can be controlled so that the danger of attack of copper-bearing alloys will be minimized. Hydrazine is a toxic liquid and therefore must be handled with the usual care observed in the handling of all toxic materials. Pure hydrazine has a low flash point so a %35 solution, which has no flash point, is usually employed. Theoretically, 1.0 ppm Hydrazine is required to react with 1.0 ppm of dissolved Oxygen.

MBA4320- is a superior quality boiler water treatment product. MBA4320- comprises a mixture of morpholine and neutralizing amine for condensate line treatment in boiler systems up to 170 bar. MBA4320- neutralizes carbon dioxide within the condensate system.

MBA4320- returns to boiler feed tank with condensate so will raise the feed pH slightly.

Neutralizes acid gases at the point of condensate.

High corrosion inhibited effect in the steam boiler and condensate line.



Waste Water Treatment Chemicals



Flocculent

Cationic polyelectrolyte

Cationic polyelectrolytes such as cationic polyacrylamide can be used in industrial waste water treatment and municipal sewage treatment. It is generally suggested that low or medium ion degree and medium or high molecular weight products be applicable to industrial waste water treatment or the mixture of industrial and municipal waste water treatment, medium or high ion degree and medium or high molecular weight products be applicable to municipal sewage treatment, respectively. Besides, high ion degree products work better in digested sludge treatment. If proper cationic polyacrylamide products are employed after concentration and flotation, organic matter in wastewater can be effectively removed.

Anionic polyelectrolyte

Anionic polyelectrolytes such as anionic polyacrylamide have a wide range of uses such as in Petroleum, metallurgy, electric power, chemical industry, papermaking, printing and dyeing, coal, tanning, pharmaceutical, food, stone, etc., in which APAM can be used in solid-liquid separation, industrial waste water treatment and the recycling of waste water.

Non-Ionic polyelectrolyte

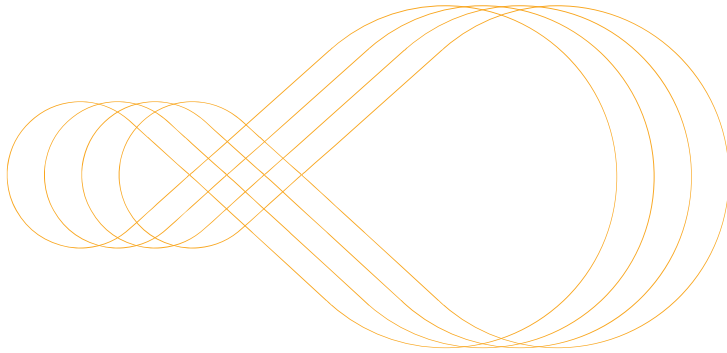
Non-Ionic Polyelectrolyte is basically water soluble polymers that carry ionic charges. They are organic high molecular weight products with a polyacrylamide base, which are completely soluble in water. It has got a specific application for a wide range of industries from water purification, color recovery, etc. in different processes.

FEATURES:

- Can be used as slurry treatment agent
- Used also for purification and recycling of water
- Reduces the fluid friction and also turbidity

Drinking water grade polyelectrolyte

Drinking water grade PAM is mainly used in raw water treatment, sugar making, fermentation, etc. PAM can be added in raw water for the purpose of settling and flocculating, which can effectively reduce the additive quantity of poly-aluminum, thus avoiding producing too much sludge.



Coagulant

Organic coagulants

These are generally used to separate solids from liquids and to generate sludge. There are two types of organic water treatment chemicals involved; the first being polyamines (e.g. polydiallyldimethyl ammonium chloride, or polyDADMAC), which are the most widely used organic coagulants. Most effective at treating waste water and high turbidity raw water, they work by simply neutralizing the charges of particles so they can bond together.

The second type of organic wastewater chemicals are melamine formaldehydes and tannins, which are used to coagulate colloidal material in water. These are especially well-suited to treating hazardous sludge, as they absorb organic materials like oil and grease very effectively.

Inorganic coagulants

Inorganic coagulants are often more cost-effective than their organic counterparts, and they can be applied to a wide variety of water treatment operations, but they are acidic by character and hence demand due care when handling and storing. Inorganic coagulants are particularly effective at treating raw water with low turbidity, and can be used to treat this kind of water when organic coagulants prove insufficient. Inorganic coagulants are largely aluminium or iron-based. Aluminium sulphate is the most commonly used chemical to treat waste water globally, though other examples include aluminium chloride, polyaluminium chloride, aluminium chlorohydrate, copper sulphate, ferric and ferrous sulphate, and ferric chloride.



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Reverse Osmosis (RO) Treatment Chemical

At MBA Co we understand how critical managing corrosion and scale is, and how important it is to minimize equipment degradation and prevent system failures.

So no matter what your corrosion, scale, or fouling challenge is, MBA Co can help. Our expertise in corrosion inhibitors, antiscalants, and antifoulants ranges across a wide variety of industries and applications to provide you with a solution customized to your facilities, processes, and equipment.

We provide customized corrosion inhibitors, antiscalants, and antifoulants for both ferrous and non-ferrous metal equipment across a wide range of process applications.

We also provide ongoing monitoring and customer service, to help maximize production capabilities.

MBA Co products can help:

- Keep water-side equipment surfaces clean
- Reduce equipment blockages
- Maximize heat transfer capability
- Maximize operating efficiency
- Minimize costs
- Reduce risks of unscheduled downtime
- Prolong equipment life

Regardless of the type, difficulty, or urgency of your corrosion, scale, or fouling issue, MBA Co can solve it economically. We welcome the opportunity to help protect your assets, improve your operational efficiencies, and maximize your production.

What is Reverse Osmosis?

Reverse osmosis (RO) is a special type of filtration that uses a semi-permeable, thin membrane with pores small enough to pass pure water through while rejecting larger molecules such as dissolved salts (ions) and other impurities such as bacteria. Reverse osmosis is used to produce highly purified water for drinking water systems, industrial boilers, food and beverage processing, cosmetics, pharmaceutical production, seawater desalination, and many other applications. It has been a recognized technology for more than a century and commercialized since the 1960's.



How does Reverse Osmosis work?



Reverse osmosis systems work by applying a high pressure pump to a concentrated solution of unfiltered water, which can be in the form of seawater, brackish, or tap water. The system forces the water through a semipermeable membrane, leaving virtually all of the dissolved salts and other substances behind. The type of water you're looking to purify using reverse osmosis systems will determine which pump will be needed to use in order to see effective results. Seawater requires larger and higher pressure pumps compared to brackish or tap water since it has a higher content of total dissolved solids (TDS). Pretreatment is necessary when working with reverse osmosis systems to protect the membranes from fouling and failing prematurely. This degradation of the reverse osmosis membrane occurs due to a buildup of foulants such as silica, iron, manganese, calcium carbonate, dead and living organisms, and magnesium carbonate.



Advantages of Using RO

Simple to operate

Modular design for ease of installation

Does not require hazardous chemicals

Reduces water and sewage use costs

Energy efficient, especially when used instead of distillation to produce high-purity water

Can be integrated with an existing membrane filtration system or ionexchange system to achieve up to %80 rinse water cycle





About RO Membranes

A reverse osmosis system is built around its individual membranes. Each membrane is a spiral wound sheet of semi-permeable material. Membranes are available in 2-inch, 4-inch, and 8-inch diameter with the 4 and 8-inch diameter sizes most commonly used in industry.

The industry has accepted a 40-inch length as a standard size so that membranes from different manufacturers are interchangeable in equipment systems. One of the primary measurements of a membrane is its square footage. Membranes are available in the range of 450-350 square feet of surface area. Semi-permeable membranes were first constructed using cellulose acetate (CA) but later the industry switched primarily to the use of a thin film composite (TFC) being placed on top of a stronger substrate.

How Do Reverse Osmosis Membranes Work?

Reverse osmosis membranes can be considered as the core of the reverse osmosis systems. These elements are responsible for the actual filtration process within these systems and therefore must be ensured to be of the highest quality. Many RO operators choose to utilize lower quality membranes for the purposes of saving operational costs. While this decision works in saving immediate plant expenses, the overall productivity and long-term costs are substantially affected. The difference in performance among high quality and low quality reverse osmosis membranes is stark, with the former producing far more effective filtration results.

Greater rejection percentage, energy saving, and fouling resistance are the three primary benefits bestowed upon RO operators who make the effort of acquiring and utilizing superior membrane elements. Quality reverse osmosis membranes can be attained from major brands such as Dow Filmtec, Hydranautics, and Toray.



RO Membrane Fouling and Scaling

The concentration of all materials in the feed water - dissolved and suspended - is highest near the membrane surface. As the permeate is removed through the membrane, all impurities are left behind near the membrane surface. The layer of water next to the membrane surface (boundary layer) gets increasingly concentrated in the dissolved and suspended materials. These concentrations reach a certain steady level depending on feed velocity; element recovery and membrane permeate flux (gallons per square foot of permeate produced per day).

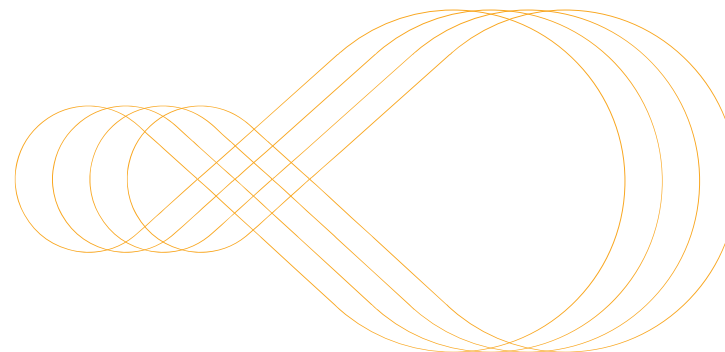
It is important to follow membrane manufacturers' recommendations on minimum feed flow, maximum element recovery and maximum element flux. These recommendations are based on the element size and quality of feed water being treated. The concentrations of the dissolved and suspended solids in the boundary layer control the performance of the membrane.

Higher concentrations mean higher osmotic pressure, higher tendency of suspended solids to coagulate and coat the membrane surface, and higher likelihood of scaling to take place. Maintaining proper operating conditions for the membrane is the key preventative step to minimizing membrane fouling.

Organic Fouling can be identified by the following symptoms:

- The RO Membrane will likely exhibit low permeate flow
- Salt rejection will usually be as good if not better than original test
- The membrane may have strong odor
- Possible mold growth on the membrane scroll end.

Regular cleaning of the membrane elements minimizes the loss of performance and extends membrane life. Membrane elements should be cleaned whenever the normalized permeate water output rate drops by 10% from its initial flow rate (the flow rate established during the first 24 to 48 hours of operation), when salt passage in the product water increases over 10-15%, or when normalized pressure drop across the membrane increases by 15-10%.



Reverse Osmosis (RO) disinfecting cleaner

MBA Co, RO membrane cleaners are simple to use, all you need to do is:

- 1) Mix the powdered concentrate with water according to the Membrane Cleaning Procedures (supplied with the product).
- 2) Circulate the cleaning solution through the system for 20 minutes.
- 3) Flush the system to rinse out the chemical before returning to service.

Benefits of regular use of MBA acid and alkaline membrane cleaners:

- ◆ Maintains system performance and product water quality at a higher level
- ◆ Reduces operating costs by reducing energy requirements to reach required product flow
- ◆ Reduces maintenance costs by prolonging membrane life, and reducing strain on other components in the system.

RO Membrane Cleaning Sequence:

It is recommended to start with the alkaline cleaning then follow with the acid cleaning after the system has been flushed.

1. Alkaline Cleaning
2. Flush
3. Acid Cleaning
4. Flush

Note: Acid cleaning may be performed alone, but alkaline cleanings should always be followed by an acid cleaning after the system has been flushed.

Acid Membrane Cleaners in RO system:

Since many fouling compounds are more soluble in acidic solutions, a cleaning solution with a low pH value may be beneficial in removing them. Although the foulant may not be completely dissolved, the solid precipitate may be partially dissolved to the extent that it can be flushed out of the membrane element feed space.



Chloridric acid-based product has been developed for the cleaning of reverse osmosis (RO) membranes. It has a low pH liquid formulation which designed specifically to remove iron fouling. It also effectively removes existing hard calcium carbonate scale, barium or strontium sulfate scale and inorganic colloidal foulants. This highly effective product is compatible with polyamide membranes and provides superior cleaning resulting in longer system running time. It has been approved for use in drinking water applications. It is available in 20 kg pail and 250 kg drum. Its shelf life is 24 months under normal storage conditions.



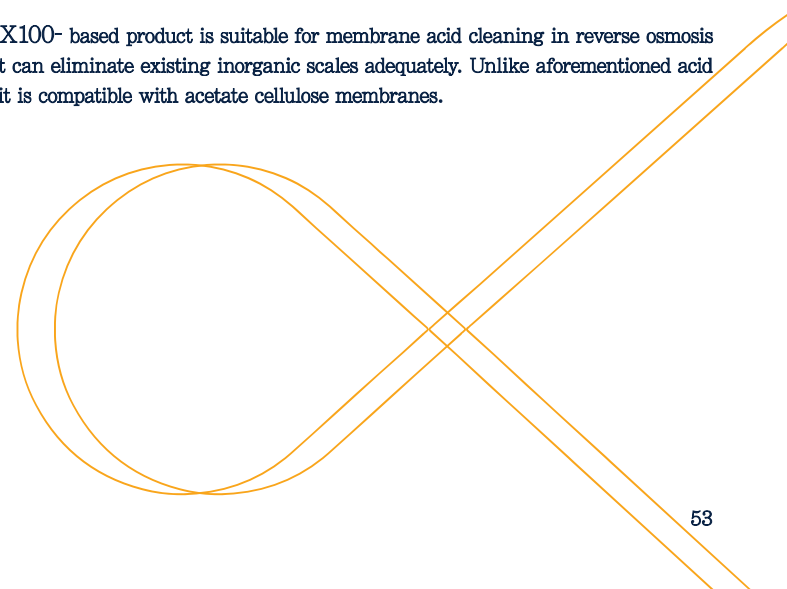
Citric acid-based product has been formulated for the acid cleaning of reverse osmosis (RO) and Nanofiltration (NF) membranes. It is a low pH membrane cleaner liquid that designed specifically to remove existing light calcium carbonate scale, inorganic colloidal foulants in reverse osmosis brane systems. It is also effective against hard metal oxides/hydroxides (such as: Fe, Mn, Zn, Cu, Al). This remarkably productive crop is suitable for the polyamide membranes. It is available in -20liter pail or -220liter drum. shelf life is 24 months under normal storage conditions.



Sodium hydrosulfide-based product is suitable as a membrane acid cleaner in RO systems. It adequately eliminates light metal (like: Fe, Mn, Zn, Cu, Al) oxides/hydroxides. This highly effective product is compatible with polyamide membranes.



Citric acid, triton X100- based product is suitable for membrane acid cleaning in reverse osmosis systems. This product can eliminate existing inorganic scales adequately. Unlike aforementioned acid membrane cleaners, it is compatible with acetate cellulose membranes.



Alkaline Membrane Cleaners in RO systems

In the case of reverse osmosis (RO) membranes, a high pH cleaning solution will alter the membrane itself. Acidic groups on the membrane molecule will dissociate at high pH and result in a more hydrophilic membrane. This may aid in membrane cleaning, depending upon the chemical nature of the fouling substance. Removal of organic fouling materials can be accomplished successfully by using a combination of high pH and detergents.



Sodium tri-poly-phosphate (STPP), Tetrasodium-EDTA based product has been developed for membrane alkaline cleaning in RO systems. It has an inherent ability to remove existing light calcium, barium or strontium sulfate scale and mixed inorganic/organic colloidal foulants in reverse osmosis brane systems. This product is also suitable for light NOM organic material. This kind of alkaline membrane cleaner is compatible with all membrane elements based on Polyamide chemistries including Thin Film Composite (TFC) membranes when used as directed. It is available in 20 liters or 220 liter drums. Its shelf life is 24 months under normal storage conditions.



Another kind of our alkaline cleaners which is suitable for polyamide membranes in RO systems is based on sodium hydroxide. This good product can effectively eliminate existing hard polymerized silica coating.



Sodium dodecyl sulfate (SDS), sodium hydroxide based alkaline cleaner. It has an extraordinary ability to pretermit existing light mixed inorganic/organic colloidal foulants and is also suitable for light NOM organic material. This is compatible with polyamide membranes.



Sodium tri-poly-phosphate, Sodium dodecyl benzenesulfonate based product has been developed for the cleaning of reverse osmosis (RO), nano-filtration (NF) and ultra-filtration (UF) membranes. It is formulated based on an anionic surfactant and is highly effective in removing colloidal and other organic matter. This should always be used as recommended by the membrane manufacturer or equipment supplier, in respect to cleaning pH and temperature.



In normal operation, the membrane sheet in reverse osmosis membrane elements can become fouled by suspended solids, microorganisms, and mineral scale. Sodium tri-poly-phosphate, Sodium dodecyl benzenesulfonate based Alkaline RO membrane cleaner is specifically formulated to clean biological growth (also known as organic fouling) from RO membranes and compatible with polyamide membranes. It is available in 20 liter or -220liter drum. Its shelf life is 24 months under normal storage conditions.



Unlike aforementioned kinds of alkaline cleaners Sodium tri-phosphate, EDTA, Triton X100- based product is suitable for acetate cellulose membranes in reverse osmosis systems. This product effectively removes existing organic materials. It is available in 20 kg pails and 250 kg drums. Its shelf life is 24 months under normal storage conditions.

MBA Co alkaline membrane cleaner is a result of over 20 years of hands-on experience of water quality engineers and chemists. We offer technical expertise and assistance in troubleshooting and cleaning of RO membranes to give you an optimum system performance.





Antiscalant

Aqueous solution of an organo-phosphorus based product has been developed as a general-purpose antiscalant for use in Reverse Osmosis and Nano-Filtration membrane systems with:

1. Brackish feed
2. Seawater feed

This is highly effective against all common scales, including calcium, barium and strontium sulfate and calcium fluoride. It also has some remarkable features such as:

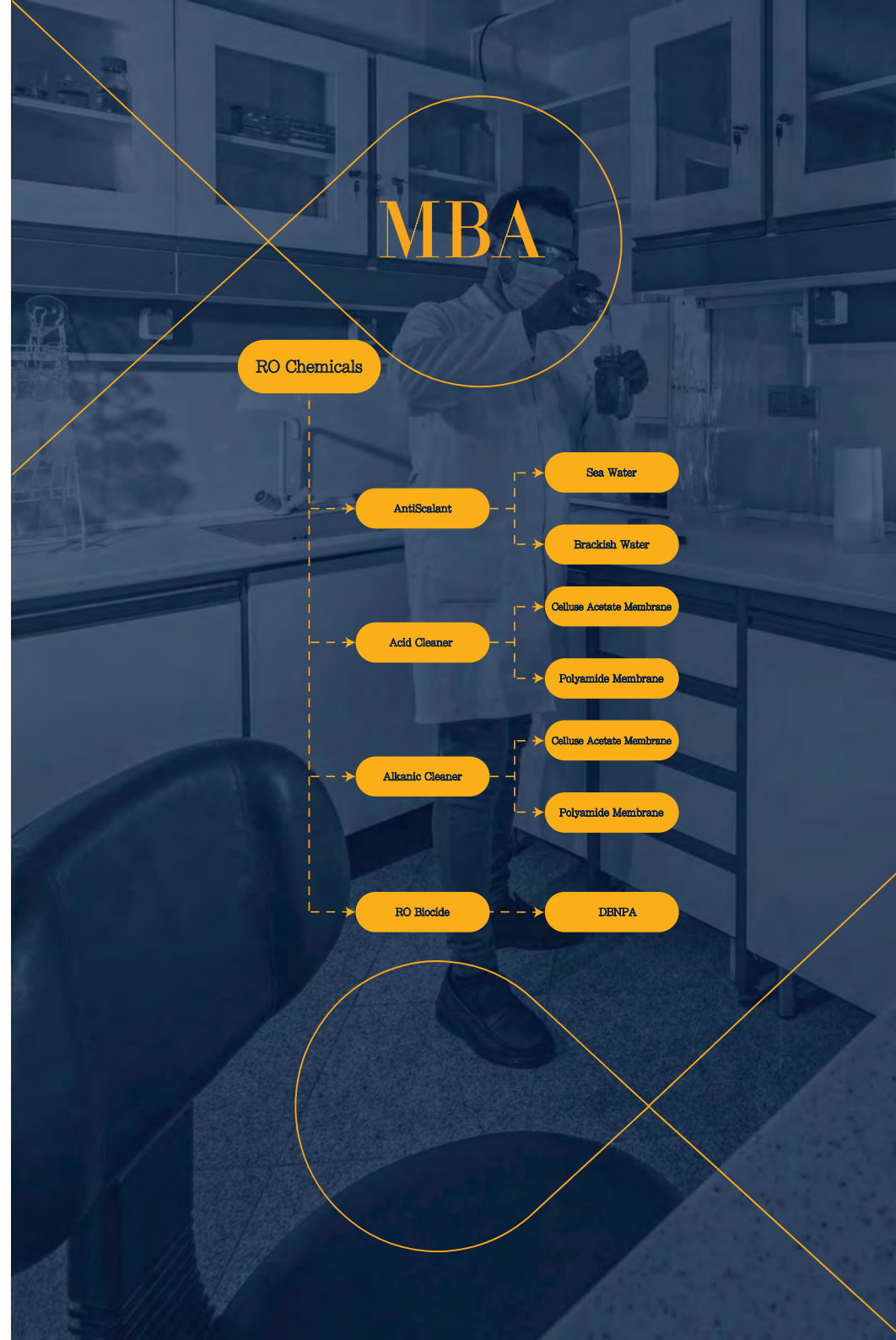
- negligible impact on levels of assailable organic carbon (AOC)
- inhibits iron fouling
- has been approved for use in drinking water applications
- compatible with all membrane types
- can replace acid addition
- enable membrane systems to operate at their highest possible recovery rates, cost effective

RO Biocides

Polyethylene Glycol, -2,2Dibromo-3-nitrilopropionamide based product has been developed as a non-oxidising biocide. These are used widely in the industrial circulating water systems, Oilfield water, Industrial air washer systems etc. It has extraordinary ability to penetrate rapidly in the membrane of bacterial cells and also reduce microbial and biological fouling in Reverse Osmosis (RO) systems for industrial water production.

It reaches high efficacy at low concentrations due to the fact that the fast reaction between DBNPA and sulfur-containing organic molecules in microorganisms such as glutathione or cysteine.

It should be noted that this product is biodegradable under both aerobic and anaerobic conditions.





Other Chemicals

- ◆ Antifoam Agent
- ◆ Acid Cleaner
- ◆ Oil Dispersant
- ◆ Hydrotest
- ◆ Descaler



Antifoam Agent

Foams are produced in the production processes of many industries, for example, soap manufacture, sugar processing, and the treatment process of starch wastewater. Foam causes a lot of problems for industrial production; therefore, the prevention of foaming or the destruction of existing foams is often a matter of practical importance. Foam inhibitors and antifoaming agents act against the various factors that promote foam stability (described earlier), thus eliminating foams. All antifoaming agents added to foam made of an aqueous solution contain, or form after addition, hydrophobic particles, generally emulsion droplets.

MBA Co. provides highly efficient antifoaming agent programs. Defoaming agents immediately displace the foam stabilizer and locally burst bubbles. This reduces the wall viscosity and lowers the electrostatic surface potential. Defoaming agent characteristics are that they are non-toxic and not harmful to products. Chemically non-reactive properties are required. The antifoam should be easy to feed with non-volatile characteristics.

Typical antifoaming agent applications are:

- Crude distillation tower and vacuum tower
- Delayed coker and visbreaker
- thermal cracker and bitumen (asphalt) plants
- Lube oil extraction and propane deasphalting
- Caustic scrubber, sour water strippers and amine units

MBA Co. provides types of antifoams based on:

- Silicone based
- Alcoholic based



Acid Cleaner

MBA Co., provides a wide range of various cleaning chemicals. The handling of our cleaning and decontamination additives is easy and safe for the operating personnel.

High-performing chemical cleaning agents with tailor-made cleaning are used in order to reliably achieve these targets. Cleaning of distillation columns and vessels can be done with excellent results within one day. Removal of heavy fuel oils, tars, greases and other tenacious materials are key elements of the cleaning.

Our low pH membrane cleaner liquid product specifically designed to remove iron fouling and other similar scales from RO and NF membranes. This highly effective product provides superior cleaning resulting in longer system running time. Our product has been approved for use in drinking water applications. The product should always be used as recommended by the manufacturer or equipment supplier, in respect to cleaning pH and temperature.



Oil Dispersant

Dispersants contain surfactants, which are surface-active agents with molecules composed of groups of opposing polarity and solubility; that is, surfactants usually have both an oil-soluble hydrocarbon chain and a water-soluble group. The synthetic surfactants can be anionic, cationic, nonionic, or amphoteric; however, only anionic or nonionic surfactants are utilized as crude oil dispersants. Surfactant mixtures often include other chemical agents, such as solvents, which enhance the dispersing capability of the surfactant.

Chemical surfactants are amphiphilic compounds which can reduce surface and interfacial tensions by accumulating at the interface of immiscible fluids and increase the solubility and mobility of hydrophobic or insoluble organic compounds. Our products are powerful emulsifiers containing detergent and solvent. They are an effective chemical formulated for dispersion of oil in open cooling system and are low foaming emulsifiers.



Hydrotest

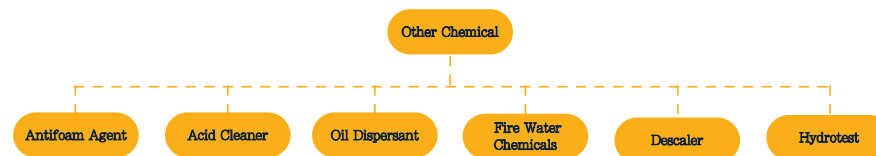
Water used for hydrostatic or leak testing is typically left in pipelines from a couple of days to years. Thus, a pipeline undergoing a hydrostatic test may become quite vulnerable to oxygen corrosion and microbiologically influenced corrosion (MIC). To control corrosion and bacterial growth in the pipeline the hydrotest water may be treated with chemicals.

Commonly used chemicals are biocides, corrosion inhibitors and oxygen scavengers. After the completion of a hydrostatic test, the water must be discharged, often with environmental constraints.



Descaler

Descaler is an inhibited liquid acid cleaning product based on hydrochloric acid which is ideal for boiler scale removal and descaling heat exchangers which are choked with lime-scale and other deposits.





MBA
WATER
TREATMENT
CHEMICALS



3 Test Kit



TBC test kit

The total bacterial count (TBC) test kits are dedicated to aerobic bacteria. This kit is composed of a hygienic layer of specific culture medium for growing variety of bacteria inside a hygienic glass container. TBC kit has been produced based on API standards and it is being used in several industries.

SRB test kit

SRB test kits can detect sulphate reducing bacteria, which are the most harmful bacteria in industry and causing microbial corrosion. These bacteria reduce the environmental sulfate biologically. SRB test kit has been produced based on API standards and it is being used in several industries.





Legionella test kit

Legionella test kit can diagnose legionella bacteria. These bacteria are widely distributed in nature and in cooling towers. These kits are composed of a hygienic layer of specific culture medium for growing Legionella bacteria inside a hygienic glass container.



E.coli & Coliforms test kit

E.coli & Coliforms test kits are being used for diagnosing E.coli & Coliforms bacteria. Coliforms can be found in the aquatic environment, soil and on vegetation, which are commonly used as indicator of sanitary quality of food and water. In water, E. coli & Coliforms bacteria have no taste, smell, or color. They can only be detected through a laboratory test.



Fungi test kit

Fungi test kits are being used for diagnosing fungi. Fungi are other problematic microorganisms in cooling towers; they can ferment the organic materials in the presence of oxygen and produce organic acids. Fungi, by forming non aerobic situations help the growth of SRB.

Nitrifying bacteria test kit

Nitrifying bacteria are those bacteria that supply the required nitrogen for growth and regeneration from nitrite. This group of bacteria is harmful for nitrite-based corrosion inhibitors, because of decomposition of nitrite to nitrate and finally neutralizing the inhibitory effect. These kits are being used for diagnosing bacteria that destroy the nitrite-based inhibitor.

FeB test kit

FeB test kits can detect ferrous oxidizing bacteria, which are aerobic and produce a lot of mud. These bacteria can oxidize bivalent iron to trivalent iron and then wrap around the cell wall. They are one of the problematic microorganisms in cooling towers. By using the FeB test kit, ferrous oxidizing bacteria can be determined inside a sample of water. These kits are composed of a hygienic layer of specific culture medium for growing ferrous oxidizing bacteria inside a hygienic glass container.



1 Instrument & Material Supply



1 Corrosion monitoring instruments

The rate of corrosion determines how long any process plant can be usefully and safely operated. Corrosion monitoring can help by providing an early warning that damaging process conditions. The measurement of corrosion and appropriate treatment permits the most cost effective plant operation to be achieved whilst reducing the life-cycle costs associated with the operation.

MBA can help customers solve their specific applications and supply pocket instrument for every water treatment engineer. Corrosion data is captured in moments, by different probes. This monitoring technique is easy to understand, implement and interpret. It provides low-cost manual monitoring for systems with relatively stable corrosion from the time water enters a facility until the moment it is returned back into the environment; it is a critical component of our customers' businesses.

Of the techniques listed above, corrosion coupons, ER, and LPR form the core of industrial corrosion monitoring systems. The other four techniques are normally found in specialized applications which are discussed later.





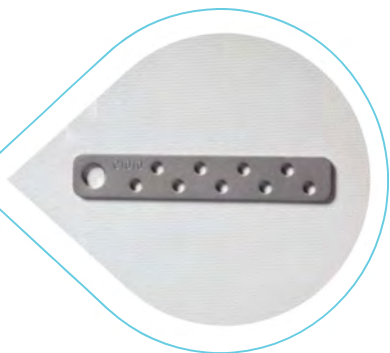
1.2 Corrosion Coupons (Weight Loss)

The Weight Loss method is the baseline and the most common of all corrosion monitoring techniques and can be undertaken as visual inspection to evaluate Inhibitor performance. The results can provide a useful correlation with other techniques and measurements.

The method involves exposing a specimen of material (the coupon) to a process environment for a given duration, then removing the specimen for analysis. The basic measurement which is determined from corrosion coupons is weight loss; the weight loss taking place over the period of exposure being expressed as corrosion rate. MBA supplies weight loss coupons fabricated from any commercially available alloy.

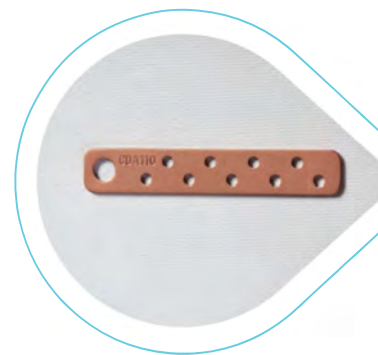
Scale Coupons

MBA is able to equip customers with scale/deposition coupons analyzing and providing a qualitative measure of relative deposition rates in industrial water and process systems.



1.3 Lab instruments and meter: pH meter, conduct meter and different probes & accessories.

Various meter and probes such as pH and conduct meters are available as accessories for MBA customers.



1.4 Detection Reagents & Calibration standard solution

MBA is able to provide high quality calibration and standard solutions, detection reagents to ensure high measurement precision.

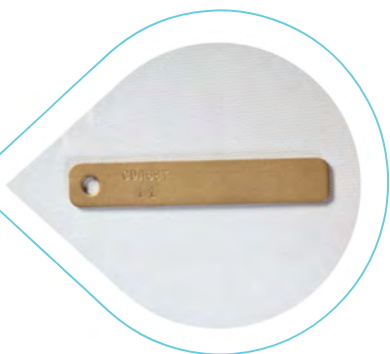
1 System controller as Chemicals Feed System .5

A well-engineered feed system is an essential part of an effective water treatment plan. If a feed system is not designed properly, chemical control will not meet specifications, program results may be inadequate, and operating costs may be excessive. Chemicals may be fed on a "shot" (batch) basis or on a continuous basis. The choice between these two methods depends upon the degree of control required, the application, and the system design.

A significant investment in a chemical feed system can often be justified when compared with the high cost of these control problems. When a chemical feed system is not properly engineered, chemical levels are often above or below program specifications. The use of a proper feed system can prevent this situation.

Chemicals Metering Pumps and Dosing Dumps as delivery systems are the heart of a chemical feed system. Design and selection of a metering pump are critical to ensure that pump output will match specifications. MBA equip customers 2 different interface dosing pumps:

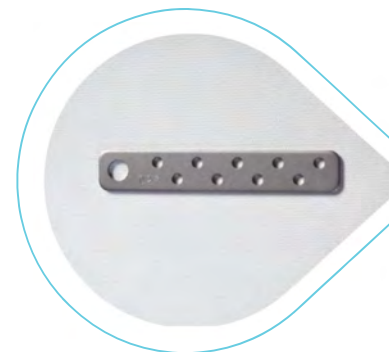
- Analogue: with constant flowrate manually adjustable by control dial on the front panel, two frequency range Power-ON led indicator, without level control input and fixing bracket.
- Digital: with constant flow rate manually adjustable, proportional flow rate according to an external analogue or digital pulse signal. This digital version of the HP, includes additional characteristics: Timer function, ppm, dosing, statistics, password and On/Off input (remote switch).



MBA is the exclusive distributor of Zaozhuang Kerui Chemicals -an advanced materials and specialty chemicals company offering a portfolio of products across various key markets worldwide and one of the Chinese leading and professional water treatment chemicals- in the territory of Iran for all kind of:

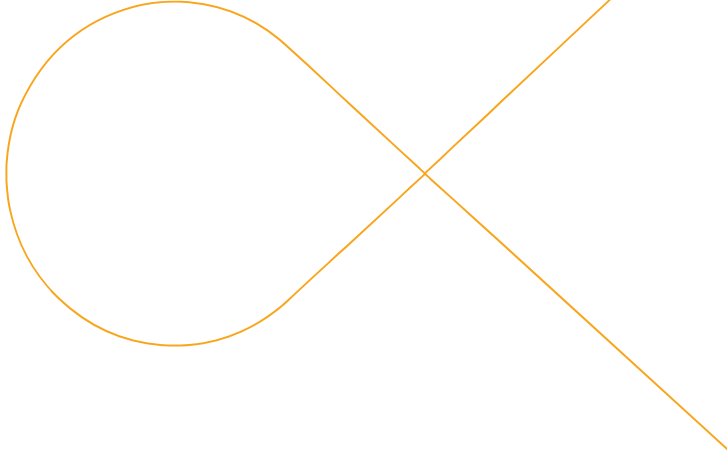
- Phosphonates Antiscalants, Corrosion Inhibitors and Chelating Agents
- Salts of Phosphonates
- Polycarboxylic antiscalant and dispersant
- Biodegradable antiscalant and dispersant
- Biocide and Algicide
- Built Scale & Corrosion Inhibitors and Pretreatment Filming Agents
- Corrosion Inhibitors
- Oxygen Scavenger
- Reverse Osmosis Chemicals
- Others

as raw chemicals with effective performance and competitive price. MBA is ready to discuss your application needs and help develop a solution to address specific requirements.



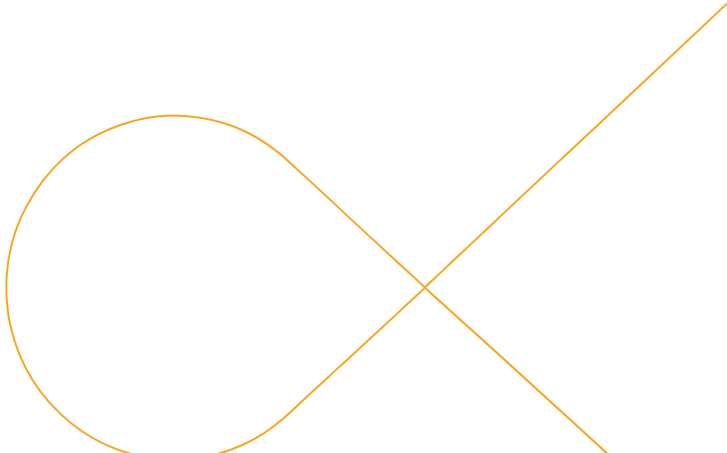


Certifications & Compliance



MBA is committed to fulfilling customer requirements and to continually improving so that we deliver exceptional customer satisfaction. To meet this commitment, we constantly identify, analyze and evaluate legal, business and customer requirements. We dedicate the same level of diligence to voluntary obligations as well.

Help make the world cleaner, safer and healthier, protecting people and vital resources. We ensure that our products are in compliance with all government regulations, including the Registration, Evaluation, and Authorization.





ISO/IEC 17025

General requirements for the competence of testing and calibration laboratories.



ISO/TS 29001:2020

Petroleum, petrochemical and natural gas industries - Sector-specific quality management systems - Requirements for product and service supply organizations.





ISO 10668:2010

Brand valuation - Requirements for monetary brand valuation.



ISO 9001:2015

QUALITY MANAGEMENT CERTIFICATES

This certification demonstrates that our manufacturing, quality assurance product development, and quality control operations are certified to ISO 9001 standards.





ISO 14001:2015

ENVIRONMENTAL MANAGEMENT CERTIFICATES

This certification demonstrates our compliance with environmental legislation, regulations, and client requirements.



45001:2018

QUALITY MANAGEMENT CERTIFICATES

OCCUPATIONAL HEALTH AND SAFETY management Systems requirements.





ISO 10002:2018

QUALITY MANAGEMENT CUSTOMER SATISFACTION GUIDELINE FOR COMPLAINTS HANDLING IN
Monitor and continually improve our complaints handling process and making sure that more
customers are satisfied with provided services.

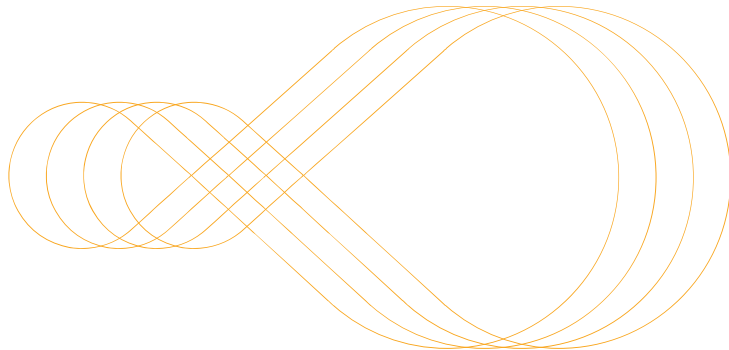


ISO 26000

SOCIAL RESPONSIBILITY

For businesses and organizations committed to operating in a socially responsible.





MBA - 1130

Corrosion Inhibitor for Closed Systems Corrosion & Scale Inhibitor for Open Cooling Systems Conformity assessment/Attestation of Compliance.



HSE- MS

Health Safety & Environment Management System Certification Services.



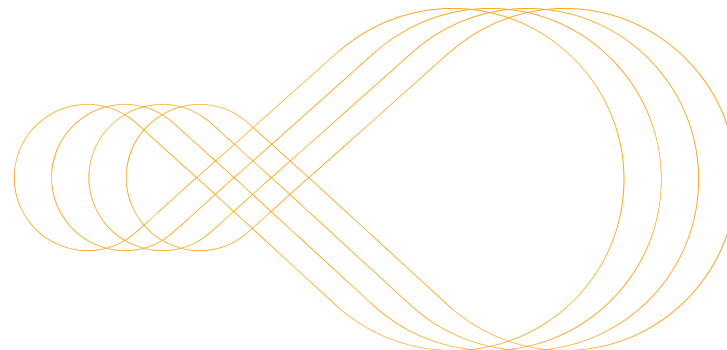
MBA - 5137

Corrosion and Scale Inhibitor for Open Cooling Systems Conformity assessment/ Attestation of Compliance.



MBA - 9511

Copper Corrosion Inhibitor Conformity assessment/ Attestation of Compliance.





MBA

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THE END ...