

Mexel® Process an Alternative for Cooling Water Circuit Treatment

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Summary

For more than 15 years, Mexel® Industries SAS has developed a line of products (Mexel® 432, Mexel® 432/336, Mexel® irrigation) to maintain the cleanliness of the raw water circuits.

The Mexel® process treatment treats surfaces in contact with water instead of conditioning raw waters by the addition of specific substances to each problem (scaling or corrosion inhibitors, biocide...). This approach allows discontinuous treatments of short duration (*i.e.* 30 minutes per day) at low concentrations (*i.e.* 3 mgL⁻¹).

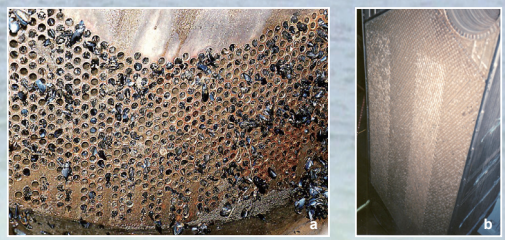
The Mexel® formulations are made up of biodegradable alkylamines and are protected by patents. Moreover, some of these products have particular administrative registrations. The product Mexel® 432 for example is registered notably by the USA EPA, APVMA, OSPAR and is quoted by the IPPC among "Best Available Techniques to Industrial Cooling".

Problems

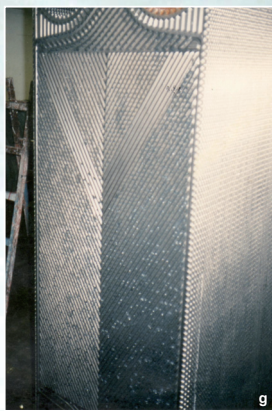
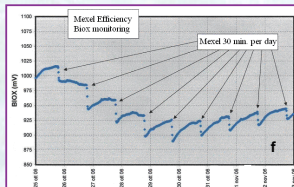
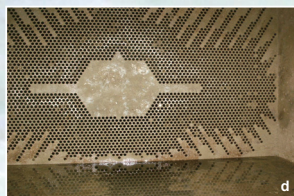
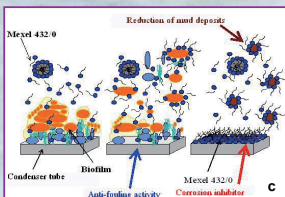
The colonization of the immersed surfaces by the sessile organisms is notably at the origin of:

- 1° the deterioration of the materials (increased risks of corrosion or biocorrosion),
- 2° the degradation of heat exchange in the cooling circuits,
- 3° fouling that interferes with instrumentation...

These deteriorations are at the origin of the reduction of the industrial performances and the life of materials, and thus, of the increase of the capital costs of installation.



Condenser (a) and plate heat exchanger (b) plug by macrofouling (bleu mussels and hydroids) or inorganic deposits



The Mexel Answers

Mexel Industries SAS, developed an **innovative process**, using the surface-active properties of Mexel® 432 to inhibit **inorganic fouling** (mud or scale deposits), **microfouling** (biofilm), and **macrofouling** (mollusks, crustaceans, hydroids) in fresh, brackish and sea water cooling circuits. This product is injected daily for 30 minutes at a residual concentration of approximately 3 mgL⁻¹. This **cost-effective solution** is an alternative to oxidizing treatments. It results the improvement of plant efficiency in the range of 1% (3% heat rate reduction) by offering continuously a cleanliness factor (HEI) close to 100% and an extension of the service life of the plant by **reducing the corrosion rates** (especially of copper alloys).

Mexel® activities on mud, biofouling and corrosion reduction (c). Industrials equipments using Mexel® : condenser (d), power plant inlet water pipe (e) and plate heat exchanger (g). Online measurement of the reduction of the surface deposits during Mexel® 432 injection with the Biox system (f).

Environmental Impact

This alternative to oxidizing treatments results in the **elimination** of discharges of **chlorinated products** and **corrosion products** (*i.e.* copper) into the environment and provides a solution to **CO₂ emissions reduction**. At the same time, supported by numerous toxicological, ecotoxicological and impacts studies, it has proven its **safety** (human and environmental) and its **cost-effectiveness**. Notably, the **absence of environmental impact** was shown by biodiversity studies carried out at the outlet of the EDF (le Havre, France) power station after 4 and 10 years of use of the Mexel® 432/0 product.



Mud sampling for biodiversity studies (h) and fishermen at the discharge canal of a power plant (i) using Mexel® process

Some References

Thermal Power Plants:

- EDF - Le Havre - 2 x 600 + 1 x 250 MW coal - sea water (> 10 years, France).
- GDF - DK6 - 2 x 400 MW CCGP - sea water (4 years, France).
- Radès (STEG): 4 x 170 MW - HFO - sea water (Tunisia);
- ENEMALTA - Delimara Steam PS (2 x 60 MW - HFO, Malta); Marsa Steam PS (2 x 12.5 + 5 x 30 + 1 x 60 - HFO, Malta), sea water.

Nuclear Power Plant: EDF - Le Bugey - 2 x 910 MW - Cooling towers.

Diesel Plant:

- EDF - Jarry Nord (Total 445 MW, Guadeloupe, France) diesel PS - sea water,
- Melilla et Ceuta (Total 360 MW, Spain) diesel PS - Sea water.

Geothermal Plant: France (Guadeloupe): Bouillante sea water.

Hydro-electric dam:

- EDF - Petit Saut (100 MW, French Guyana:),
- Castellana de Energia Renovables (Spain).

Ships:

- Ships built by ALSTOM,
- Cargo ships: CGM, SNCM, Gasocean, CMN, Les Abeilles, Delom, Genavir, Blue Star,
- France: Nuclear aircraft carrier Charles de Gaulle and others ships,
- UK: 3 nuclear submarines.

Petroleum Industry: Naphta-chimie, Shell, Socimine, Elf Petroland, Maersk Oil & Gaz, Samir, Total offshore platforms.

Water networks: Hong-Kong: sea water for air conditioning ...

Contact

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