

Services

plant analysis

biofouling assessment

biofilm real-time,
on line monitoring

biocides and chemicals
optimization

consulting & reporting

...ask us for more info!

Among the users of
ALVIM Biofilm Monitoring System:



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ALVIM Biofilm Monitoring System

- ✓ biofilm early detection
- ✓ sanitation treatments
monitoring & optimization

Developed in collaboration with

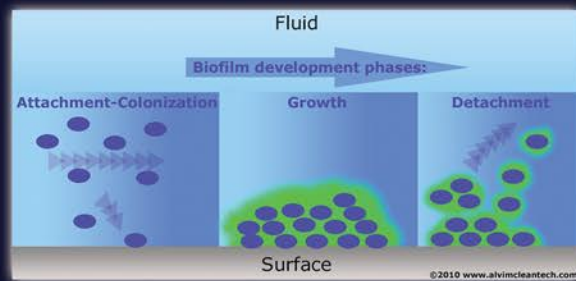


Industrial biofilm & biofouling

Microbial biofilm, the most important component of (micro) biofouling, represents a serious technological issue, particularly where water is a critical process element. The biofilm can:

- decrease thermal efficiency of heat exchangers (e.g. by 30% for a 20 microns-thick bacterial layer);
- increase inorganic fouling, producing sticky substances which increase particles adhesion;
- pave the way to bigger organisms settlement, the usually called macrofouling, which can constrict water flow, increasing energy consumption.
- cause microbially-induced corrosion (MIC), which accounts for multi-billion dollars of industrial damages all over the world.

These problems can eventually lead to pipe blockages and plant idle.



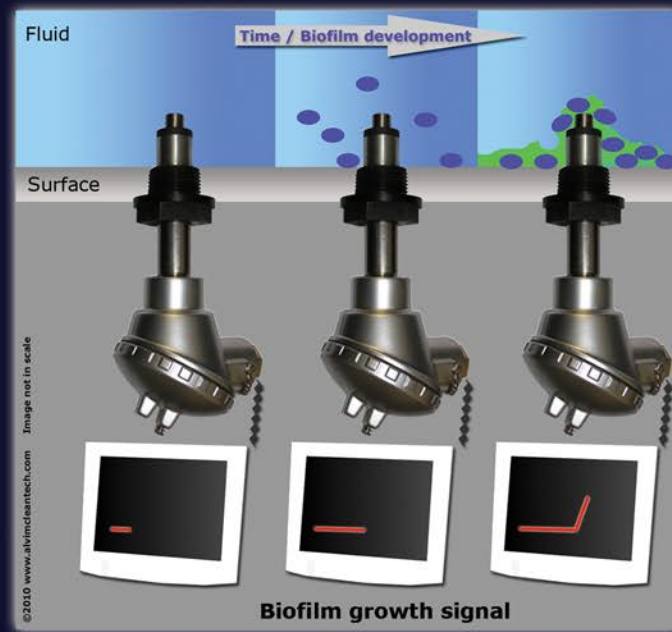
Biofilm life cycle

Biofilm cleaning treatments must be applied as soon as bacteria start to settle on water-dipped surfaces, since:

- It is much more difficult and expensive, both in terms of biocide concentration and contact time, to deal with a mature biofilm, with respect to an early-stage one. As a matter of fact, since the first growth of biofilm extracellular matrix (EPS), biofilm resistance to external agents can increase by three orders of magnitude (x1000).
- After reaching a pseudo-equilibrium condition, biofilm outmost layers tend to detach and float away. This increases the likelihood of biofilm formation in other areas of the plant.

ALVIM Biofilm Monitoring System

The ALVIM technology allows for an effective and reliable detection of early stage biofilm. Biofilm growth monitoring is proven to be stable and highly sensitive (since 1% of probe sensitive surface covered by biofilm).



Correlation between sensor signal and biofilm growth

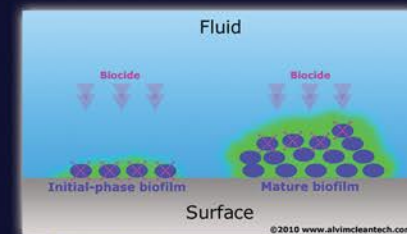
This technology allows for a simple and flexible biofilm monitoring approach, considering different applications, such as:

- analysis and characterization of biofouling growth, in terms of frequency and intensity, in industrial cooling water systems;
- assessing and comparative evaluation of different chemical biocides or water treatments;
- real-time, continuous monitoring of water treatment systems (e.g. for redundant equipment control);
- automatic and/or remote control and optimization of industrial water treatment.

More info at www.alvim.it

Applications of ALVIM Biofilm Monitoring System

- Process optimization:
 - > evaluation of disinfection system effectiveness;
 - > timely alert in case of malfunctioning of disinfection system;
 - > automated dosing of biocides as function of real needs: as soon as ALVIM sensor detects biofilm growth inside the water line, the system can automatically send a signal for triggering the cleaning treatment.



- Legionella prevention: biofilm is known to represent the ideal environment for the survival of bacterial colonies potentially very dangerous to human health as, for example, *Legionella pneumophila*. These bacteria are known to proliferate in cooling systems with direct air/water exchange (cooling towers, air conditioners, etc.) and can pass to the air during spraying. In the air, dangerous bacterial colonies can travel for kilometres, representing a possible hazard. It is therefore important to contrast biofilm formation, to minimize the risk of dangerous bacterial contamination.