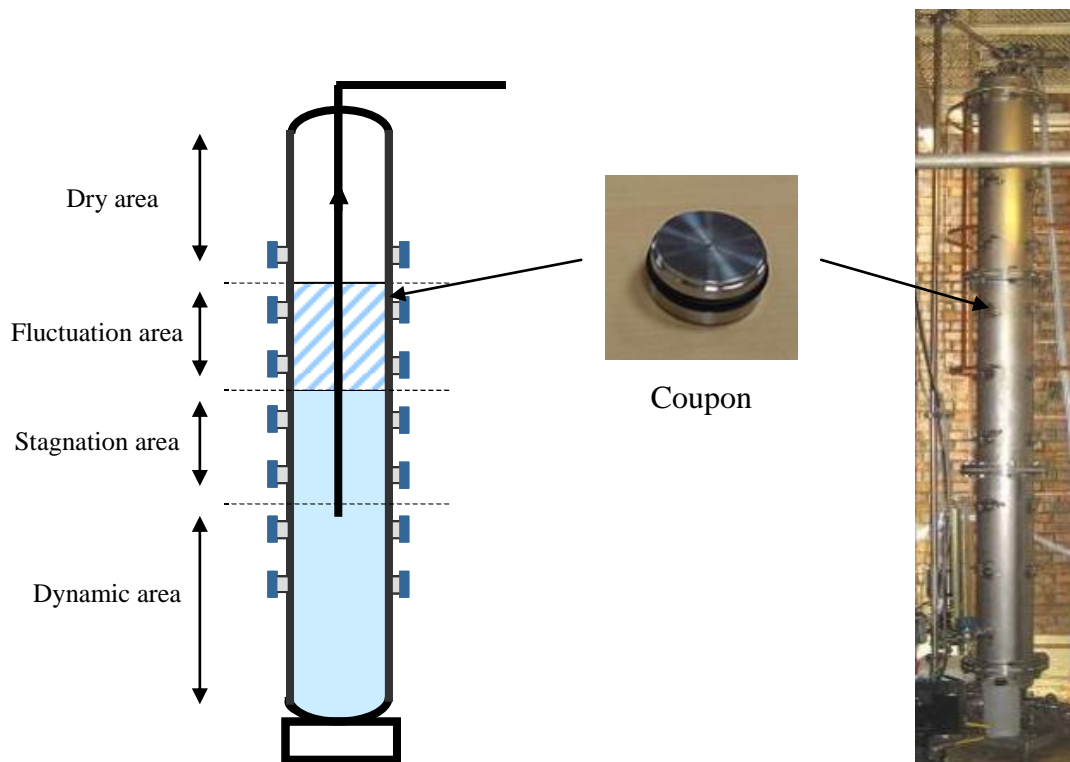


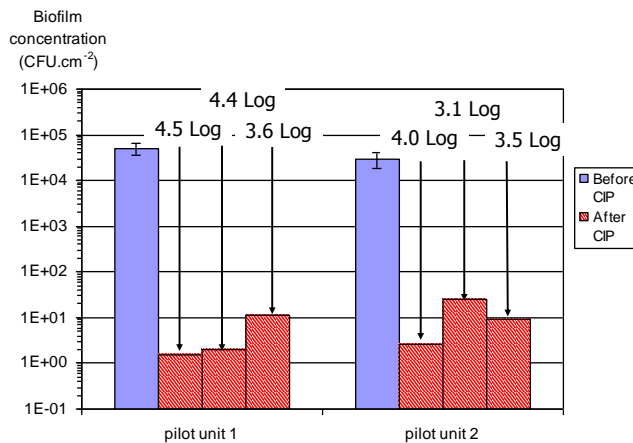
Tools for biofilm detection:

In industrial water processes, the presence of biofilm can promote several problems such as loss of process efficiency, scale formation and particulate deposition or microbial influenced corrosion. Therefore, the challenge in the industrial use of water is to control and reduce the development of biofilm on the surfaces of the equipment.

Within this objective, specific methods and tools have been developed to take and analyse biofilm samples at different steps of water processes. Nestlé Waters have carried out pilot tests to evaluate biofilm formation in water processes and to evaluate the efficiency of cleaning and disinfection procedures on biofilm. Two different pilot units have been used: 1) part of stainless steel pipe with coupons that can be installed in parallel of existing water processes, 2) stainless steel column with coupons that simulates a well column.



Schematic diagram and picture of the “well column”



The main results of the tests carried out with both pilot units show that biofilm formation occurs shortly after the start-up of the pilot units with significant increase during the first 2 to 3 weeks to achieve constant biofilm concentrations. The results of the pilot tests also show that the tested cleaning and disinfection procedures do not totally remove cultivable bacteria in biofilm (no total disinfection). The observed disinfection efficiency was comprised between 3 and >5 log reduction on cultivable

bacteria in biofilm for the most efficient CIPs. These results confirm that CIP procedures with cleaning disinfection steps seem to be more efficient than disinfection step alone.