EcoClearProx® for drinking water treatment

1. Introduction

Advanced Biological Technologies Belgium (abbreviation: ABT Belgium) has developed a new hydrogen peroxide (H_2O_2) product which is marketed under the brand EcoClearProx®. ***Bio H2O2*** is a company that is commercializing ecoclearprox worldwide.
In EcoClearProx® the depletion of H_2O_2 is made controllable by a patented and unique way of stabilization (sugar alcohol) which is remarkable different from stabilization using silver nitrate, acetic acid or other stabilizers. Consequently, EcoClearProx® is, just as non-stabilized H_2O_2, 100% foodgrade and environment friendly. EcoClearProx® is authorized for several applications and is under investigation for some applications, applications which are defined in the European biocide regulation (98/8/EC). The complete list of applications, authorized or under investigation, includes the product types 1, 2, 3, 4, 5, 6, 11 and 12. Product type 5 includes products used for the disinfection of drinking water (for both humans and animals).

2.Protocol for adjustment and control of the EcoClearProx® dosage during the disinfection of drinking water

This paragraph provides an illustration of how to implement EcoClearProx® in the drinking water production (in this case there is a double EcoClearProx® dosage, in oxidation basin and in supply water), of course more simplified as well as more complex models are possible. For example, the dosage of EcoClearProx® in drinking water production can be limited to the oxidation basin for oxidation and disinfection purposes, or it can be limited to a dosage in the drinking water supply basin, e.g. for providing a residual H_2O_2 concentration.

Water, in this case originating from bore holes (1), is pumped into an oxidation basin (3). In this basin EcoClearProx® (active substance: H_2O_2) is dosed from a EcoClearProx® reservoir (6) using a dosing pump (7). The dosage of EcoClearProx® is in the first place regulated based on the flow rate (2a) of the water supply to the oxidation basin. The dosing pump (7a) which is controlled by the controller (9) will then dose EcoClearProx® proportional with the flow rate (2a), e.g. ≤17 mg H_2O_2/l[1,2]. Next to this the actual H_2O_2 concentration, is constantly measured, for example, using a H_2O_2 measurement probe (ampèrometric or photometric). The oxidation basin which is filled with raw water (3), and to which EcoClearProx® is dosed, figures as a pre-oxidation buffer. The H_2O_2 concentrations which are measured by the H_2O_2 measurement probe (4a) are send to the controller (9) which, if needed, in turn will activate the dosing pump (7a) until the desired H_2O_2-concentration is achieved.

The water is then pumped through a filtration unit (sand filter) (5) from which it is pumped to the drinking water supply basin (8). During this process the flow rate (2b) is measured and communicated to the controller (9). The residual H_2O_2 concentration in this drinking water

[1] Max permitted H_2O_2 content in drinking water based on EN 902:2009 is 17 mg/l water
[2] Of course, when the sand filter also figures as a biological filter, then the EcoClearProx® dosage should be adapted to the tolerance of the bacterial populations which are active in the filter.

basin[3], is constantly measured using a H_2O_2 measurement probe (4b). The data (e.g. H_2O_2 concentrations) are send to the controller (9) which, if needed, in turn will activate the dosing pump (7b) until the desired H_2O_2-concentration in the drinking water supply basin is achieved. Of course, when there is already a residual H_2O_2-concentration coming through the filtration unit (sand filter) which is nearby the targeted residual H_2O_2 concentration the H_2O_2 measurement probe (4b) in this basin will detect this and will communicate it with the controller (9) which, if needed, in turn will lower the dosage of EcoClearProx® by dosing pump (7a) in the oxidation basin (3) and will deactivate the dosing pump (7b) in the drinking water supply basin.

The level of the drinking water in the water tower (11) will lower when drinking water is consumed by the end-users (12). To compensate this drinking water is pumped from the water supply basin (8) to the water tower. The concentration of H_2O_2 in this water is checked in this water by means of a final H_2O_2 measurement (4c). Also these data are communicated with the controller (9). The data of both H_2O_2 measurement probes, 4b and 4c, are compared by the controller (9) which depending on the concentrations eventually will result in a extra dosage of EcoClearProx® in the water supply basin. All necessary precautions are foreseen in the protocol of the measurement and regulation technique to avoid any overshoot of the target residual H_2O_2 concentration.

H_2O_2 measurement probes

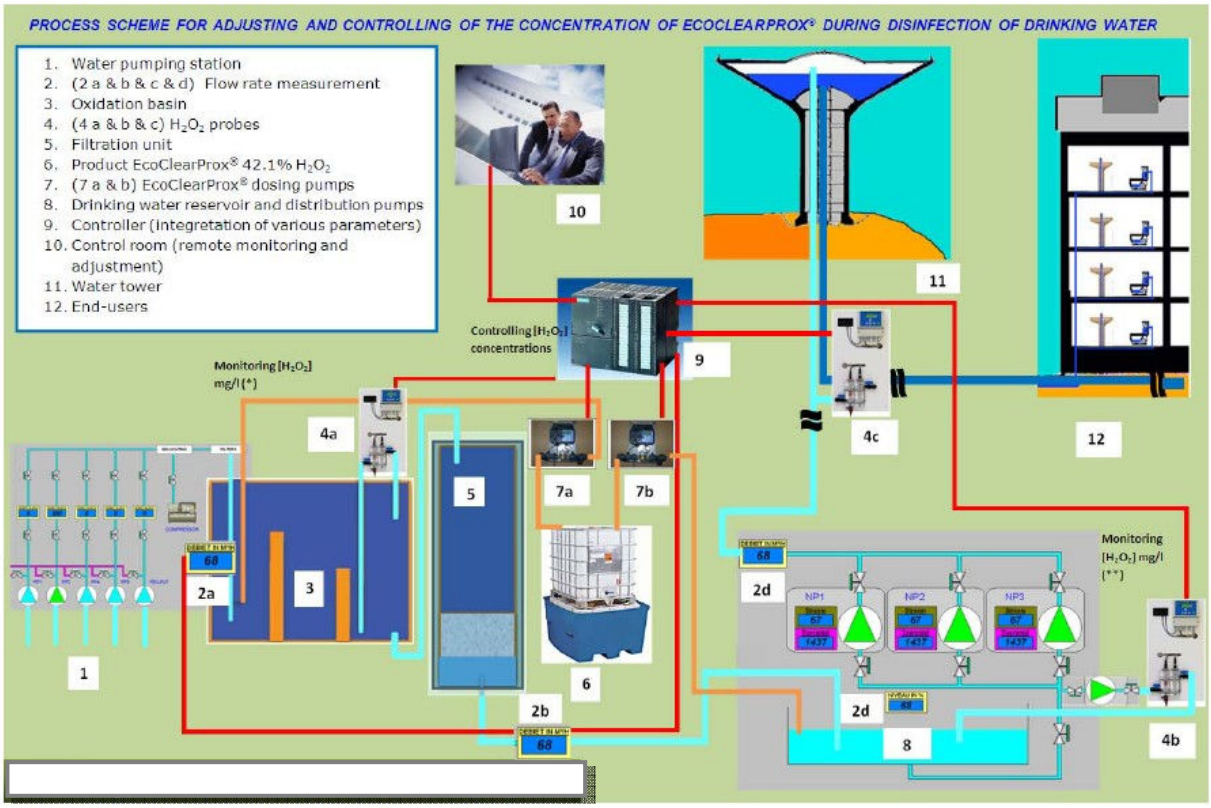
The H_2O_2 measurement probes which are used should operate continuously with manual or preferably automatic cleaning. For cleaning and maintenance reasons it is advisable always to install a double probe at each measurement unit so that at the time of (automatic) cleaning or maintenance H_2O_2 measurements are not possible and maybe the cleaning process itself can disturb an accurate measurement for a while.

Safety precautions

As additional safety precaution, the controller will calculate which are the quantities of EcoClearProx which are dosed in function of the flow rates at any time and for each dosing point (in this text basins 3 and 8). If the EcoClearProx® dosage per time unit exceeds a setpoint concentration, than the dosage will be interrupted and an alarm message will released. Each alarm is locally visualized (alarm contact) by connection with a central control room or other monitoring systems. Optionally, alarms can be forwarded by MMS to the responsible operators.

The controller (9) stores the data concerning EcoClearProx® dosages, H_2O_2 measurements and alarm messages with date and time information. This information can be send to a central server in the control room (10) for supervision and follow up, for example, via internet.

[3] H_2O_2 concentrations of water supply (end-users) may vary according to national legislations.



(*,**) H_2O_2-concentrations of oxidation basin (*) and water supply basin (end-users) (**) may vary according to national legislations; Max permitted H_2O_2 content in drinking water based on EN 902:2009 is 17 mg H_2O_2/l water