

A method and equipment for the treatment of water, that contains arsenic, using multi-step pre-oxidation and ozone oxidation

We have our own patented method and apparatus to clean water that contains arsenic. The above invention is a technique and equipment that treats subterranean water, which contains iron and arsenic. Part of this technology is a multi-stage pretreatment, collectively referred to as pre-oxidation, an ozone oxidation thereafter, and - an apparatus for removing solid pollution - performing solid phase separation.

While conventional technologies dose excess coagulant,¹ the process patented by our Company uses an oxidant, which does not form additional precipitate. By not using iron coagulant the negative environmental impact is reduced. Moreover as a consequence of pre-oxidation, the amount of ozone used, which is a costly oxidant, is minimized.

As a result of our R & D project we established, that the proportion of iron-arsenic can be reduced by efficient oxidation, therefore this process requires less coagulant or it can be omitted altogether. The absence of a coagulant reduces the impact on the environment, but also has many other advantages as well.

Why do we recommend our method?

- As it is not necessary to use coagulant, oxidation can increase efficiency of water treatment.
- The environmental impact can be significantly reduced.
- Arsenate is removed more efficiently.
- The water waste is reduced with the lower demand for rinse water.
- Smaller decanting² vessel is required.
- The concentration of arsenic is below 10 µg / l limit allowed in the EU.

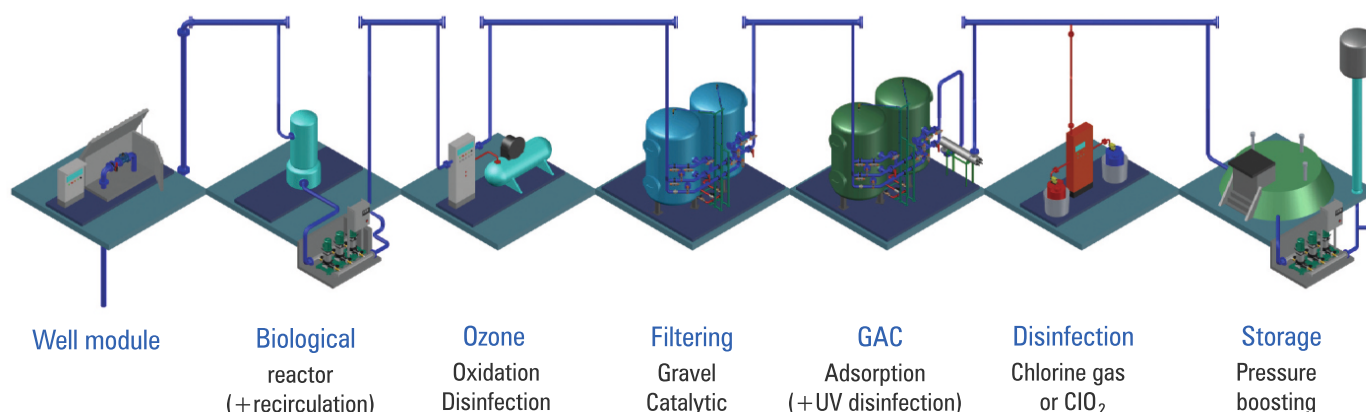
The following table contains the many advantages of our patented technology:

| | Traditional method | Licensed method |
|------------------------|--|--|
| Demand for chemicals | O ₂ , Cl ₂ , KMnO ₄ , FeCl ₃ | O ₂ , possibly KMnO ₄ and O ₃ |
| Hazardous waste | natural iron content, surplus coagulant and arsenic | natural iron content and arsenic |
| Environmental pressure | increased quantities of hazardous waste | minimum quantities of hazardous waste |
| Rinsing cycle | Rinsing cycle | in 48h-cycle |
| Demand for rinse water | 24h or less | low |
| Rinse water placement | high, water reuse is difficult | in 48h-cycle, settler size based on traditional calculation |

¹ Coagulation: a method used in water treatment, which aims at removal of pollutants from water through sedimentation of the oxidized and precipitated flakes. When using coagulation, the colloidal particles stick together and turn into larger flakes, aggregate.

² During decanting the liquid - water - from the settled precipitate is removed by gravity or pump, then are flakes are collected.

Biological nitrification



By application/using the method and the equipment it is feasible to make the pretreatment, the treatment and to do the phase separation of the groundwater containing dissolved ammonium, iron, manganese and arsenic. Thanks to the several steps in the pre-oxidation and oxidation, it is possible to achieve effective purification and complex water treatment including arsenic removal in any case. Developed the vacuum, gravity and pressure boosting degassing methods, the technology can be matched to biological as well as to chemical processes.

Results

Up to the compilation of our introductory material the technology has been implemented within the framework of 4 projects in 6 settlements (Pély, Hajdúdorog, Görbeháza, Hajdúnánás-Tedej, Inke, Tiszajenő) which generated sales revenues as follows:

- The 2nd step of drinking water quality improvement program in small regional towns of Heves (Heves, Kömlő, Pély): 797,900,000 Ft
- Improving drinking water quality in Inke: 149.700.000 Ft
- Drinking water quality improvement in Tiszajenő-Tiszavárkony: 531.400.000 Ft
- Drinking water quality improvement project in North-Hajdúság: 237.000.000 Ft

References

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