

For your beer -
more safety





Your partner for water treatment

Since 1996 the Dr. Küke GmbH stands for its successful development of innovative solutions for sustainable water treatments of all kind. Whether drinking water and soak water, process water or gray water – the aim of the Dr. Küke GmbH is always the safe and permanent control of pathogenic microorganisms such as bacteria, germs, fungi, algae and viruses and the safe disposal of hazard bio-films. Pioneering products – such as the in many countries patented two-component-process product DK-DOX® for the manual production of chlorine dioxide – are the basis for our success. We are therefore specialists in all aspects of chlorine dioxide as well as the application of this highly

efficient oxidant in drinking water and disinfection systems. Our proximity to science puts us in the position, to always incorporate the latest state of research in our development work. You can also profit by this knowledge advantage. We would like to advise you in all questions around the theme of sustainable water treatment.





Chlorine dioxide – the right way

Chlorine dioxide has been known for years as an effective disinfectant for use in breweries. However, the production and its application puts the particular operators of small and medium-sized breweries in a number of problems. In these days Chlorine dioxide is prepared by the help of generating plants, which are not only expensive in acquirement but also higher the cost through service and maintenance. Furthermore, the law requires, because of the basis of explosion danger, that the housing of the chlorine dioxide generating plants has to be in a fire-resistant room. This in turn not only binds valuable production space in small breweries, but also provides significant additional costs on top of that (for example fire doors). Moreover, the special housing conditions require an exclusively central generation of chlorine dioxide. Therefore it often has to be transported over a long, branched piping system to the location of each application. Due to diffusion, a loss of efficacy is not uncommon. With DK-DOX aktiv BEV, the manual generation of highly effective chlorine dioxide without using common and cost intensive generator systems, these problems are now a thing of the past.

duce chlorine dioxide, are to TVO 2011 (Drinking Water Regulation 2011), due the adverse by product formation, not allowed. Therefore rely on the proven purity of our chlorine dioxide product DK-DOX® aktiv BEV.



Legal on the safe side

Important: The production of chlorine dioxide for fresh water/ production water disinfection in the food production operation, is strictly regulated in the Drinking Water Regulation 2011 §11. The peroxodisulfate-chlorite method DK-DOX® aktiv BEV represents such a use. Manufacturing process offered on the market, which need acids or acid salt, such as sulfuric acid, citric acid, nitric acid, sodium hydrogen sulfate or phosphoric acid to pro-



Simple generation of chlorine dioxide by manual production

With DK-DOX® aktiv BEV the Dr. Küke GmbH especially offers small and medium-sized breweries and brew pubs a simple chlorine dioxide generator system. Due to this manual, safe method of preparation, no costly generation plants are needed. As part of the in many countries around the world patented, two-component-system, chlorine dioxide is generated through the manual association of the reactant components. The result is an aqueous, neutral pH and very stable chlorine dioxide solution. It is approved by the Drinking Water Regulations 2011 and is suitable for versatile use as a can and container product. The DK-DOX® aktiv BEV system enables the cost-efficient, safe use of chlorine dioxide in many areas of the brewery.

Scientifically confirmed efficacy

The disinfecting power of DK-DOX® aktiv BEV was studied in Weihenstephan Research as part of a disinfectant test. The result: Even a concentration of 3,1 ppm DK-DOX® aktiv Bev chlorine dioxide is sufficient to eliminate the pests of beer *Pediococcus damnosus*, *Lactobacillus brevis* and *Sacc. cerevisiae* in a minute by 99.995 %. This shows that DK-DOX® aktiv BEV is a safe disinfectant in the brewery. In addition, DK-DOX® aktiv BEV is absolutely effective against germs, bacteria, fungi, algae, viruses and reliably degrades biofilms in pipes and system components and carries them out.



Tested in the famous University of Weihenstephan: disinfectant test approved!



DK-DOX[®] aktiv BEV – make the smart choice

DK-DOX[®] aktiv BEV, its in many countries around the world patented two-component-system for the manual production of effective chlorine dioxide, offers as compared to other manufacturing process, a number of advantages. In

relation to the manufacturing processes on acid-chlorite-base they are particularly clear. The following comparison lists the differences clearly.

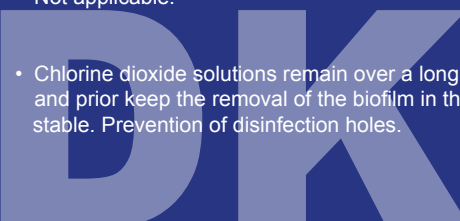
Comparison of ClO₂ chlorine dioxide production

based on hydrochloric-acid-chlorite

- strong acid, caustic and chloride containing chlorine dioxide.
- Highly corrosive. Corrosive consequential damage to water installations is possible.
- Stability of chlorine dioxide is due to acid degradation (catalyzed by chlorine ions) in the range of a few hours. Increased risk of high chlorate concentrations.
- Chlorine dioxide solutions containing free chlorine. Impairment of water possible through odor and taste.
- Manual process is extremely dangerous in the preparation by spontaneous reaction to toxic chlorine dioxide in handling and mixing of the components of a hydrochloric acid, strong gas solution.
- Preparation of the solution of reactor solutions containing between 10 and 20g of chlorine dioxide/L. Contact with the air of these solutions, leads to an explosion.
- Maintenance of the facilities due to the potential hazard can be performed only by qualified personnel for chlorine dioxide. Maintenance contracts!
- Investment costs for a chlorine dioxide plant.
- Dioxide systems must be housed in fireproofed rooms according to UVV-chlorination of water.
- Chlorine dioxide solutions, which remain in operation in reactor shutdown are useless after a few hours by decay. Disinfection holes form, if not rinsed before re-commissioning of the entire reactor.

based on sodium-chlorite

- neutral-pH (pH about 6-7), little chloride concentration in generated chlorine dioxide solutions
- slightly corrosive
- Stability of the chlorine dioxide solution lies, in dark storages, T=22°C and in closed containers, at 30 days. Possible use as container goods.
- Chlorine dioxide solutions contain no free chlorine after manufacture. No taste or odor.
- Because of the 24 hour response time, no spontaneous formation of chlorine dioxide is possible. pH-neutral, non-corrosive solution. Safety in terms of work, safety confirmed by the employer's liability insurance coverage.
- Chlorine dioxide solutions contain 3g of chlorine dioxide/L. An explosion is not possible.
- Not applicable.
- Not applicable.
- Not applicable.
- Chlorine dioxide solutions remain over a long period in the dark and prior keep the removal of the biofilm in the pipes longer stable. Prevention of disinfection holes.





Many areas of application – broad impact

Thanks to its outstanding properties, DK-DOX® aktiv BEV can be used without major technical effort in many areas of the breweries. The application is ideally used with a simple, dosing system with suction lance. Due to the high stability of the chlorine dioxide solution, DK-DOX® aktiv BEV can be kept at any location for a longer time.

Clean in place (CIP)

By the direct addition of the stable, aqueous DK-DOX® aktiv BEV chlorine dioxide solution in the used CIP acid, an operation is saved. The cleaning and disinfection of pipes, tanks and parts of the plant in a single step is possible due to DK-DOX® aktiv BEV. The highly effective chlorine dioxide is completely degraded to chloride ions (common salt) during the acid CIP phase. Then the pipes are simply rinsed with fresh water. An additional disinfection in a third step, as previously done, is not required thanks to DK-DOX® aktiv BEV.

Bottle and barrel washing

DK-DOX® aktiv BEV is also the right decision for the secure disinfection in the bottle and barrel washing. The simple and decentralized production of the chlorine dioxide, used in the bottle washer or rinser, is given. The dangerous bottling and transporting of chlorine dioxide at central generation through conventional production plants, the subsequent decentralized application and the use of costly pumping and metering technology for the production of customary chlorine dioxide is eliminated by DK-DOX® aktiv BEV. The use of chlorine dioxide in the Pasteur, which has also proven itself, provides a secure sterility even at low temperatures. This saves energy too.





Bottlers

Of course DK-DOX® aktiv BEV can also be used for the save destruction of germs and beer pests. After cleaning the filler, a safe disinfection with DK-DOX® aktiv BEV is secured. The fresh water for rinsing can also be disinfected. By the way: The use of DK-DOX® aktiv BEV is free of unwanted side reactions such as the generation of trihalo-methanes and chlorophenols and completely odorless and tasteless. In order of that your beer tastes as it is supposed to.

Tank and dispensing equipment

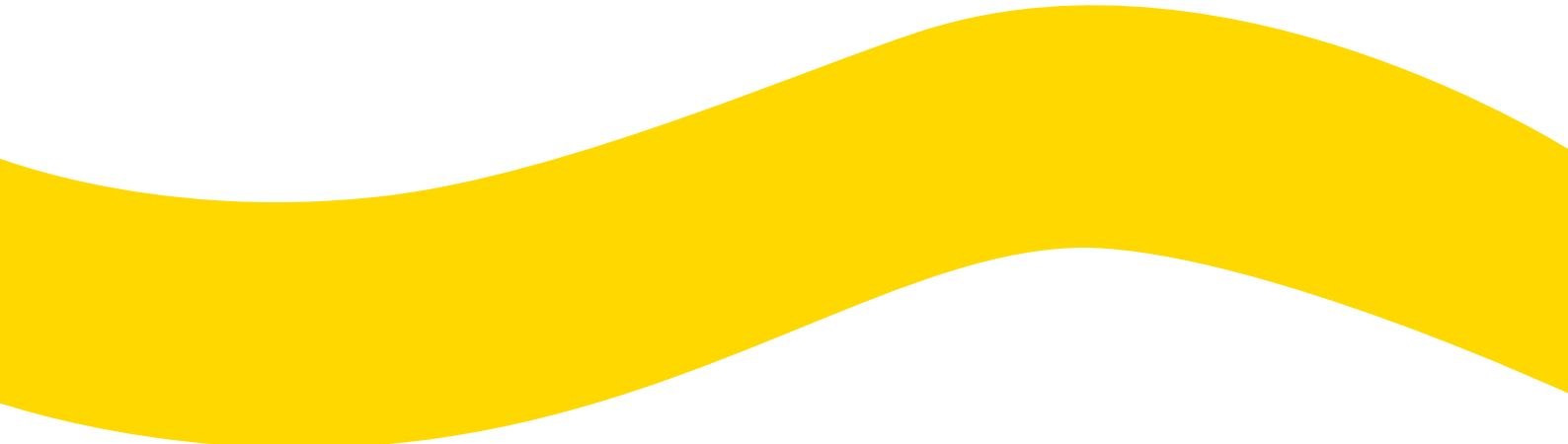
The use of DK-DOX® aktiv BEV in storage tanks is recommended in order to eliminate beer pests. Disinfection with DK-DOX® aktiv BEV chlorine dioxide is applied using a lance, spraying the chlorine dioxide solution into the storage tanks. Also transferring a chlorine dioxide-air mixture into the tank can be used. The chlorine dioxide-air mixture is produced by stripping out the chlorine dioxide gas from the already fully reacted DK-DOX® aktiv BEV

solution. For this purpose the solution is brought into the air chamber of the compressor. Also proven in practice: The use of DK-DOX® aktiv BEV for the cleaning of beer dispensing systems. In this sensitive area of disinfection, chlorine dioxide solution is filled into a KEG barrel. Connected to the pressed carbon dioxide gas bottle, DK-DOX® aktiv BEV is rinsed through the pipes and taps. Alternatively the possibility to put DK-DOX® aktiv BEV in a dilution ratio of 1:400 up to 1:800, into a circulating cleaning system is given. By the way: With DK-DOX® aktiv BEV the pigging of the pipes completely can be dispensed.



Large impact – minimal corrosion

The increased corrosiveness, generated by using chlorine dioxide solutions, which contain high amounts of hydrochloric acid and chloride ions, often prevent the use of higher chlorine dioxide concentrations. Due to its neutral pH and the absence of chloride ions in the DK-DOX® aktiv BEV chlorine dioxide solution, the corrosiveness is highly decreased. Comparative corrosion tests, presented by a leading European manufacturer of world-known aircraft types, were acidic, highly chloride corrosive chlorine dioxide solutions contrary to the pH neutral, less corrosive DK-DOX®, having the manufacturer quote: “The differences among the solutions are stunning.”



Our partner:



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