CHLORINE DI OXIDE GENERATOR SYSTEM: CHEMGEN

CHEMiON™

Efficient water for you

AN ISO 9001:2015 CERTIFIED COMPANY

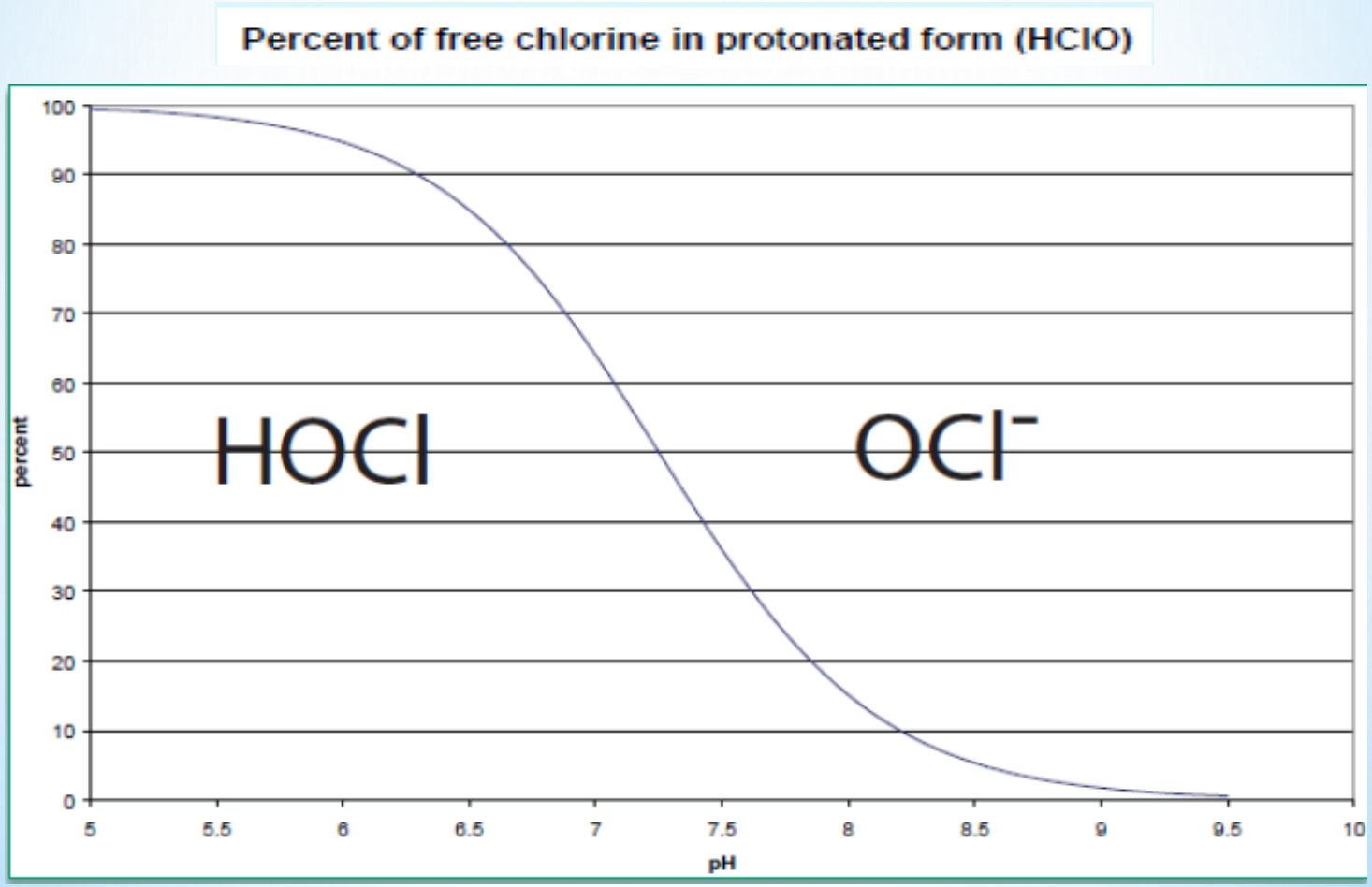
Background

- CLO2-FIRST DISCOVERED BY SIR HUMPHREY DAVEY IN THE YEAR 1811
- CHLORINE DI OXIDE HAS BEEN USED FOR OVER 100YEARS. IT IS MORE SELECTIVE THAN CHLORINE OR BROMINES AND REMAINS EFFECTIVE AT LOW CONCENTRATIONS. CHLORINE DIOXIDE IS A WIDE SPECTRUM BIOCIDE ,EFFECTIVE OVER A BROAD PH RANGE, AND IS A SUPERIOR PRODUCT FOR THE CONTROL OF MICRO-ORGANISMS.
- CHLORINE DI OXIDE PENETRATES THE BACTERIAL CELL WALL AND REACTS WITH AMINO ACIDS TO KILL THE ORGANISM.
- THIS IS ABROAD SPECTRUM MICRO BIOCIDE AS EFFECTIVE AS CL2 AGAINST VIRUSES, BACTERIA AND CRYPTOSPORIDIUM. THIS IS ALSO EFFECTIVE CONTROL STRATEGY FOR TASTE, ODOUR, COLOUR, IRON AND MANGANESE REMOVAL.

CHLORINE DI OXIDE VS CHLORINE

- MANY TREATMENT PROCESS OPERATED WITH PH IN THE RANGE OF 8-8.5. AT PH 6.0, CHLORINE HYDROLYZES TO HYPOCHLORUS ACID (HOCL) WHICH IS ITS EFFECTIVE FORM . AT A PH OF 8.5 ONLY 8% GOES TO HOCL , THUS REQUIRING HIGHER DOSAGE TO CONTROL ALGAE , SLIME AND MICROBES. CLO2 RETAINS EFFICACY OVER A WIDE PH RANGE AND PROVIDE SUPERIOR BIOCIDE CONTROL.
- UNLIKE CHLORINE, CLO2 DOES NOT COMBINE WITH HUMIC AND FULVIC ACID IN WATER TO FORM TRI HALOMETHANES (THM'S), SUSPECTED CARCINOGENS ETC.

HOCL DISSOCIATION CURVE



CLO2–PHYSICAL PROPERTIES

- CHEMICAL FORMULA :CLO2.
- A True Dissolved Gas In Solution.
- 2.5 Times The Oxidizing Capacity Of Chloirne.
- A Strong Oxidiser.
- A potent Microbiocide.

Criteria	Chlorine	ChemGen
Bio film eradication in the water circuit.	In drinking water concentration only limited eradication due to lack of penetration of the bio film	**ChemGen** penetrates the Bio film completely and eradicates very well.
Deodorization	Production of smell and taste influencers by reaction with Phenols,Amines and Algae.	Deodorization characteristics and therefore Smell and Taste causers in water like Phenols, Amines and, Algae are avoided or not produced!
pH–Value dependability during disinfection.	Disinfection only at pH–Values <7,5. Limited disinfection of concrete based pipeline circuits.	Disinfection is pH-Value independent within a bandwidth of pH 4 < x < 10. Effective disinfection of concrete based pipeline circuits.
Building of cancer causing THM's and AOX.	Strong building due to reaction with organic material in water.	No THM building in drinking water. Only very limited AOX Building.
Building of mucous glands or mucous membranes irritating chloramines.	All Amines are transformed to chloramines when reacting with chlorine.	No reaction with primary of secondary Amines and therefore NO chloramines are built. The typical swimming pool odor is disturbed by oxidation.
Biocide and anti-virus working.	Good biocide characteristics. Bad anti-virus characteristics. The biocide characteristics decrease strong when the pH-Value exceeds > 7,5.	Excellent biocide and anti-virus characteristics. When pH-values exceed > 7,5 ca. 20 - 30x stronger disinfectant working compared to chlorine.
Algicidal working.	Only when using high concentrated dosages of Chlorine.	Excellent algicidal working by permanent disinfection (0,2 – 0,5 mg/L) dosage.
Oxidizing working.	Strong oxidation that only oxidizes by AOX-building.	Up to 2,6 times stronger oxidation compared to chlorine. Oxidation takes place by oxygen.
Net Stability.	Temperatures > 30 °C disturb chlorine very fast. Less selective reaction then chlorine dioxide.	**ChemGen** is still stabile in closed systems at temperatures 30°C < x < 45°C Reacts more selective than chlorine.
Level of corrosion.	High corrosion level.	**ChemGen** contains hardly any chlorine and therefore the level of corrosion is very limited.
Rinsing capacity	Water containing chlorine has a strong adhesion characteristic and therefore a lot of rinsing water is required for the desired effect.	Excellent rinsing capacities and therefore less rinsing water required for the desired effect.

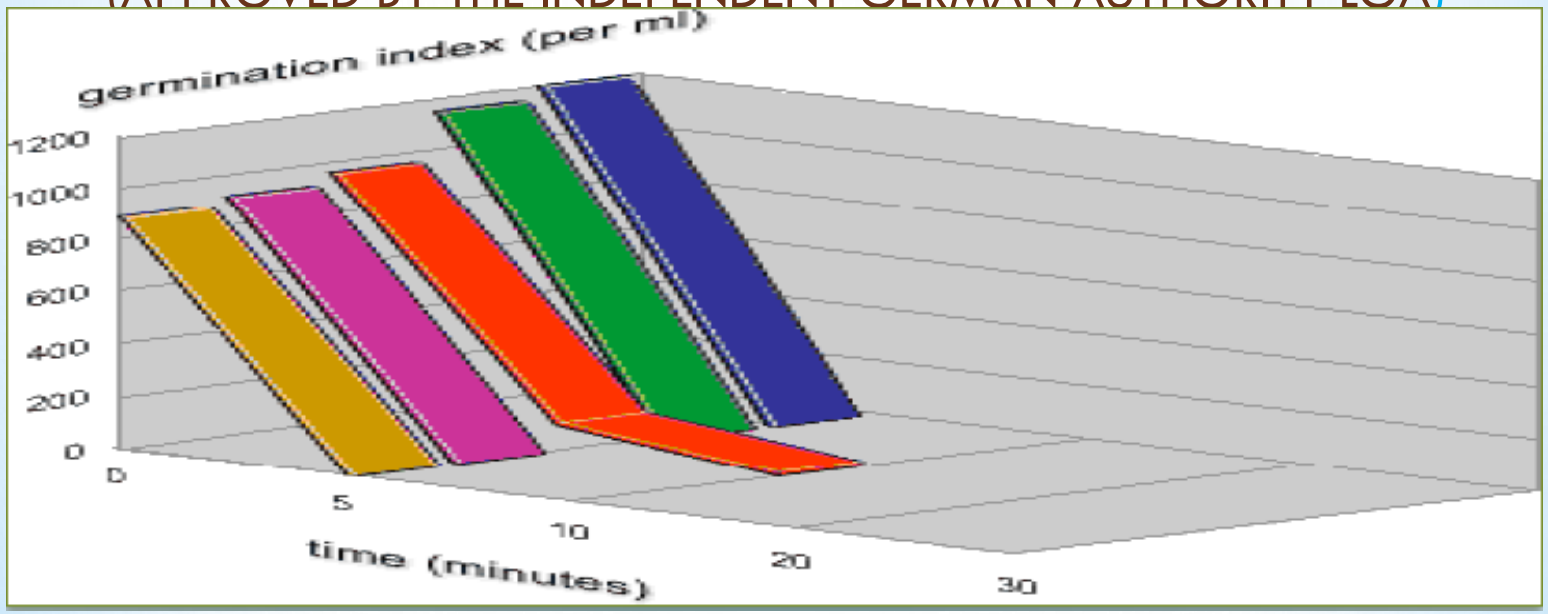
CHLORINE DI OXIDE BENEFITS

- Selective disinfecting oxidant.
- Rapid kill rate @ low ppm.
- Broad range bacteria fungi &virus destruction.
- Penetrates and sluffs biofilm, killing resident organisms.
- Do not form tri halo methanes (thm's).
- Does not react with ammonia or chlorinated organics.
- Does not form hypochlorus acid or free chlorine.
- Is less corrosive than chlorine.
- Oxidizes manganese, iron, phenols, sulfides, cyanides.
- Able to oxidize odor causing substances.
- Remains effective across broad pH range.

CHLORINE DI OXIDE EFFICACY

DISINFECTION WITH CHLORINE DIOXIDE (0.3 MG/L)

(APPROVED BY THE INDEPENDENT GERMAN AUTHORITY LGA)



COMPARING CHLORINE DIOXIDE TO OTHER DISINFECTANTS

- **CHLORINE GAS**

Nature of Problem	Chlorine Gas	Advantage Of ChemGen
Formation of AOX / THM:	Yes: • possible carcinogenic properties • irritation of the mucous membranes	No formation of AOX / THM: • no carcinogenic properties • no irritation of the mucous membranes
Formation of chloramines: Yes:	Yes: • significant reduction of the disinfection effect • bad taste and bad smell	No formation of chloramines • constant disinfection capacity • no bad taste and bad smell
Dependency on pH-value:	Yes: • significant reduction of the disinfection effect	Disinfection independent from the pH value • large field of applications in the treatment of drinking and industrial water
Safety risks:	High standards • in handling and storing chlorine gas	With ChemGen ,chlorine gas storage handling eliminated
Problems with certain pathogens:	Problems with chlorine resistant pathogens	Effective even against chlorine resistant pathogens • even spore-forming chlorine resistant pathogens are reliably deactivated or killed
Redox potential (oxidation performance):	Relatively small redox potential	Higher redox potential • better oxidation performance with similar process conditions

OZONE

Nature of Problem	Ozone	Advantage Of ChemGen
The disinfectant has to be eliminated afterwards	Ozone has to be completely eliminated in most cases • additional activated carbon filters are needed	Elimination of ClO_2 is not necessary: chlorine dioxide has an excellent repository effect for sustainable disinfection
Influence on organic matters in water and in pipework:	Radical influence on organic components: • non-biodegradable substances can be transformed into bacteriologically disposable matters (nutrients for bacteria after ozonization)	Reduces biofilm in pipework and prevents the formation of new biofilm: • bacteria, especially legionella are deprived of their nutrients
Installation costs:	High installation costs • extensive installations with cooling unit, • oxygen method: preparation/production of pure oxygen with a downstream activated carbon filter • high and costly amount of maintenance	comparatively low installation costs • well-priced, durable components • low amount of maintenance required

ULTRAVIOLET LIGHT

Nature of Problem	UV	Advantage Of ChemGen
Problems caused by residua of disinfectants:	Only local disinfection • secondary disinfection post UV treatment is necessary to provide a residual	Sustainable disinfection effect
Dependency of the disinfection effect:	In case of non-controlled UV systems: disinfection effect depending on the flow parameters • the intensity of radiation depends on the flow (degree of turbulence) and the water quality (humic substances, general turbidity and turbidity in secondary precipitation – in case of Fe, Mn UV causes oxidation)	Sustainable disinfection effect • pathogens are definitely killed • biofilm in pipework is eliminated
Maintenance costs:	Relatively high maintenance costs of UV systems • annual exchange of the UV lamps is necessary • every three to five years the quartz sleeves of the lamps have to be exchanged – depending on the water quality	comparatively low maintenance costs • well-priced, durable components • low amount of maintenance required

FINALLY.....

The **ChemGen** Chlorine di Oxide Generator Overcomes

The **Barrier** Of

- HAZARD .
- EXPENSE .
- MAINTENANCE.
- COMPLEXITY.
- SIZE .

CHLORINE DI OXIDE –OUR WAY

- The ChemGen generator safely produces a direct feed , dilute ,aqueous chlorine dioxide using sodium chlorite and hydrochloric acid .

$$5NaCLO_2 + 4\ HCl = 4\ ClO_2 + 5\ NaCl + 2\ H_2O$$

- This process activates sodium chlorite with hydrochloric acid to generate chlorine di oxide using the reaction.
- The generators are available in 2 versions. Smaller capacity models use dilute 9% HCl and 7.5% NaClO2 and the larger models use concentrated chemical of 32% HCl & 25% NaClO2. Dilution water is added to keep the concentration in the reactor low.

ChemGen BENEFITS

- REMOTE START/STOP
- EMERGENCY STOP
- DOSING MONITORS FOR ALL THREE COMPONENTS (HCL/NACLO2/H2O)
- PUMP FAILURE SIGNAL
- CHEMICAL/WATER LOW LEVEL SWITCH
- BYPASS DILUTION WATER MONITOR
- DRIP TRAY LEVEL SWITCHES
- ADJUSTABLE DOSAGE SETTINGS.
- “NO FLOW-NO FEED” DESIGN.

Why ChemGen?

- EASILY INTEGRATED IN TO YOUR CURRENT TREATMENT PROCESS.
- EFFECTIVE ELIMINATION OF BIOFILM.
- SAFE CONCENTRATION OF CHLORINE DIOXIDE.
- CAN FUNCTION AS-NEED , ACCORDING TO DEMAND.
- LESS CORROSIVE THAN OTHER GENERATION SYSTEMS.
- SMALL FOOT PRINT , SELF CONTAINED WEATHER RESISTANT CABINET.
- STRAIGHT FORWARD INSTALLATION.
- EASILY MAINTAINABLE.
- MANUAL CONTROL AND SEVERAL AUTOMATIC CONTROLS SETTABLE.

ChemGen is Ideal For ….

- POTABLE WATER DISINFECTION.
- WATER TREATMENT EQUIPMENT SANITISATION.
- HARD SURFACE SANITIZATION.
- SURFACE DISINFECTION.
- KILLING OF MOLDS AND FUNGUS.
- COOLING TOWERS.
- ODOUR CONTROL.
- COLOR REMOVAL AND BLEACHING.

ChemGen Installations

CHEMGEN CAPACITIES..

- Various models of various capacities to meet the customer requirement ie,

Using Dilute Chemicals: Sodium Chlorite (NaClO2), 7.5% & Hydrochloric acid (HCl), 9%,

S.No	"ChemGen" Model	ClO_2 Generation Capacity
01	ChemGen-30C	30gms/hr
02	ChemGen-60C	60gms/hr
03	ChemGen-120C	120gms/hr
04	ChemGen-220C	120gms/hr
05	ChemGen-350C	350gms/hr
06	ChemGen-700C	700gms/hr
07	ChemGen-1000C	1000gms/hr
08	ChemGen-1500C	1500gms/hr
09	ChemGen-2000C	2000gms/hr

Using Concentrated Chemicals: Sodium Chlorite (NaClO2), 24.5% & Hydrochloric acid (HCl), 33%,

S.No	"ChemGen" Model	ClO_2 Generation Capacity
01	ChemGen-4502C	450gms/hr
02	ChemGen-7502C	750gms/hr
03	ChemGen-13002C	1300gms/hr
04	ChemGen-25002C	2500gms/hr
05	ChemGen-40002C	4000 gms/hr

CONTACT US

CHEMiON™

Efficient water for you

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