

# **GENOX<sup>TM</sup>**

## **SMART DIGITAL**

### **CHLORINE DIOXIDE**

### **GENERATORS**

- 
- IIoT Ready
  - Industry 4.0 Ready
  - IIoT Ready
- 

**“GENOX”- Smart Digital Chlorine Dioxide Generators**  
**Safe, Reliable Easy to install, configure, operate and monitor!**

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 **IONIC**  
Engineering Technology Pvt Ltd



# INTRODUCTION TO IONIC

Ionic Engineering Technologies Pvt. Ltd. is an ISO-9001/2015 certified Indian water and wastewater technology company founded in 2005 with more than 20 years of experience in the treatment and re-use of hard-to-treat waters. We design and offer equipment to operate in the most challenging conditions, offering a cost-effective and environmentally friendly solution by means of our innovative and state-of-the-art technologies. We carry out projects and solutions for Industrial and Municipal Applications, like Pharmaceuticals, Chemical, Cosmetics, FMCG, Aero Space, Automotive, Metalworking, Steel, Refinery and Petrochemical, O&G Upstream, Downstream, Food & Beverage, Pulp and Paper, Sea Water Desalination, etc. to name a few. Our value engineered “Quality by Design” systems are working in several diverse industries for many years and is helping our customers move towards “Cleaner Production”

**Motivation & Vision:** Our main goal is to create value and make a difference for our clients and partners as well as deliver tailored-made solutions to satisfy the requirements of our clients, respecting the environment. At Ionic Engineering Technologies we believe that making water and wastewater reuse an affordable and sustainable water source is essential to the future development of mankind in terms of economy, environment, and society. All our systems are designed and engineered based on sound engineering practice and offer value for money and bring “Peace of Mind” to our customers.

**Why Ionic?** Good advice is half the battle won. Ionic Engineering is a technology neutral company and focused on providing “Quality by Design” engineered systems. We have technology associates based in Europe and USA for some of the cutting-edge disruptive technologies. The first step to the perfect water treatment solution: Understanding your wastewater analysis. We design the plant based on the water analysis sent by our customer.

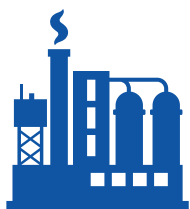
We are dedicated to using our professional expertise accumulated over many years, to providing the solution you want, when you want it. We also take great pride in ensuring that every client is satisfied with the operating efficiency of the systems we design and the overall level of service that we provide, whether during the initial contract phase or later, throughout the life of the plant.

- Providing expert advice, tailored to meet your requirements.
- Supplying high quality, good value-for-money systems, and equipment.
- Supporting all our clients for the lifetime of their water & wastewater treatment systems.
- Developing and deploying the best, most economic solutions for your needs
- Listen to our customers as well as our suppliers on products and technologies feedback and updates.
- Continuous improvement in all that we do!

Find the best solution for your processes: Let our competent team from the application technology team advise you now! We look forward to hearing from you.

**Customers:** We have many reputed Multinational companies such as Unilever, Coca-Cola, L'Oréal, John Deere, Tata Hitachi, Bajaj, Tata Motors, Century rayon, GACL to name a few as our customers





## Applications

- Cooling Water Treatment.
- Iron & Manganese Oxidation in water.
- Process water treatment.
- Phenol destruction.
- Reverse Osmosis sanitization.
- Oduor control.
- Drinking water treatment.
- Food and Beverage processing.
- Sea water disinfection for SWRO desalination.
- Cyanide destruction in waste water.
- Waste water advanced oxidation.
- Hydrogen Sulphide destruction.
- Brewing.
- Bleaching in Pulp and Paper.
- Poultry and Farming.
- Vegetable washing .
- Colour removal.

## Preface O=Cl=O

Chlorine dioxide ( $\text{ClO}_2$ ) is used in water treatment for domestic and industrial uses to reduce unpleasant odours, flavours and colours and remove mould and algae as well as to help remove iron and manganese from untreated water.

Specifically for water purification, chlorine dioxide has the major advantage of ensuring disinfected clean water from the tap where the action of other disinfectants such as ozone and ultraviolet light is only temporary.

This brochure presents the components that constitute a uniquely tailored chlorine dioxide underwater production system, noting the features and benefits of using an innovative chlorine dioxide generator from Ionic Engineering. Ionic is highly specialised in delivering chlorine dioxide in large-scale applications.

# WHY IONIC?



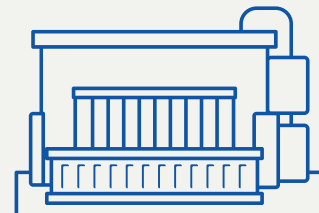
Feature	Benefit	What this means to you
Smart Digital Metering pumps for precise chemical dosing.	Reliable and accurate chemical dosing with large turndown capability.	Low chemical consumption per kg (pound) of ClO <sub>2</sub> and accurate dosing of ClO <sub>2</sub> for your process.
Production capacity variation 10-100%.	Accurate dosing based on actual demand.	Better process control.
Integrated dilution water, precursor chemical flow measurement, monitoring and control.	In the event of dilution water and chemical pump failure the process is interrupted. If dosing pumps are operating and flow is not registered, an alarm will be raised and the generator stopped.	If a dosing pump loses prime, the generator won't continue to operate and dose either acid or chlorite into your water circuit. This feature will save chemical and prevent corrosion.
By-pass assembly for dilution of chlorine dioxide with inbuilt static mixer.	The safety of chlorine dioxide dosing is increased with the GENOX generators by immediately diluting the chlorine dioxide solution produced in the generator to 1000-3,000 ppm. This dilute solution is safe to transport to the dosing point.	Operator and environmental safety is maximized so the safety risk of the installation is low. You can sleep easy knowing that the generator is operating safely.
Integration of online high concentration ClO <sub>2</sub> online sensor to monitor ClO <sub>2</sub> concentration at the reactor outlet.	This unique feature exclusive to our design allows continuous monitoring of the process	Process safety and reliability
Optimized reaction chamber.	Ensures full conversion of chlorite to chlorine dioxide.	You can be assured that excess chlorite will not enter your water. You will comply with regulatory guidelines and minimize chemical consumption.
Encapsulated Reaction chamber is water submerged and flushed using the dilution water flow to ensure safe generation of ClO <sub>2</sub> .	Ensures that any leaks from the reaction chamber are dissolved in the dilution water and transported away from the operator. No possibility of chlorine dioxide gas leak at generator	Risk of operator contact with chlorine dioxide is removed. The reduced risk provides your operators with a safer work place.
PVDF reaction chamber with PVDF injection valves and tube.	Complete chemical resistance ensures long life for components and high purity for chlorine dioxide produced	You don't need to worry about the life time of the reaction chamber.
Complete system fabricated on PP skid and frame fully plumbed and wired ready for installation on site	Quick and easy installation process so you can be up and running quickly.	Your cost of installation and commissioning is low and there will be minimal disruption to your production.







# Salient Features of GENOX Smart Digital Chlorine Di Oxide Generator



## DILUTION WATER SKID



Dilution water is a must in this process from a safety point of view the dilution water line is designed to guarantee always no more than 1g/l concentration of chlorine dioxide during the re-action.

For safety reasons, there is always at least double redundant Instruments on this line (flow meter, flow switch) connected to the control system depending on the plant design and water availability, the dilution water can be pumped, filtered or both.



## REAGENT DOSING SKID



The Reagent Dosing Skids are designed based on User Specific Requirement:

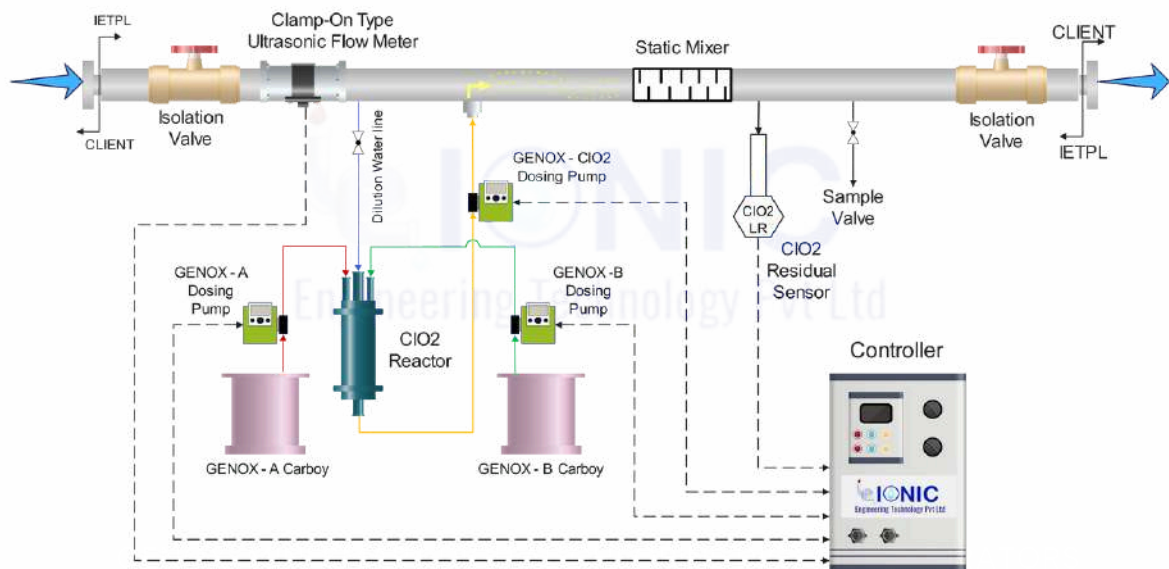
- Complete redundancy (2 skids for 1 dosing point)
- Partial redundancy (3 skids for 2 dosing points)
- Single (1 skid for each dosing point)

Our skid solution characteristics are:

- Pre installation in a container
- PP frame
- Smart Metering Pumps for Precise Dosing of Precursors
- Fail Safe Instrumentation
- Leakage containment basin with detector (PP)
- Pipe material: C-PVC, U-PVC, PP, PVDF

Flow control with selective fault diagnosis prevents process break downs – like Over pressure, Discharge line burst, air bubbles in the dosing head, cavitation at the suction side, suction valve leakage, discharge valve leakage.

# GENOX- SMART DIGITAL MINI-CHLORINE DIOXIDE FOR SMALL VOLUME APPLICATIONS



GENOX- MINI systems produce chlorine dioxide using GENOX-A & GENOX-B solution for applications when small quantity is required. They are available in three capacity levels, producing 100 to 500 g/h of chlorine dioxide respectively. The chlorine dioxide solution produced is stored in an integrated/external batch tank or Directly added to the Main Water Line as required using the integrated Smart Digital dosing pump or an external dosing pump as per customer choice.

- **Features and benefits**

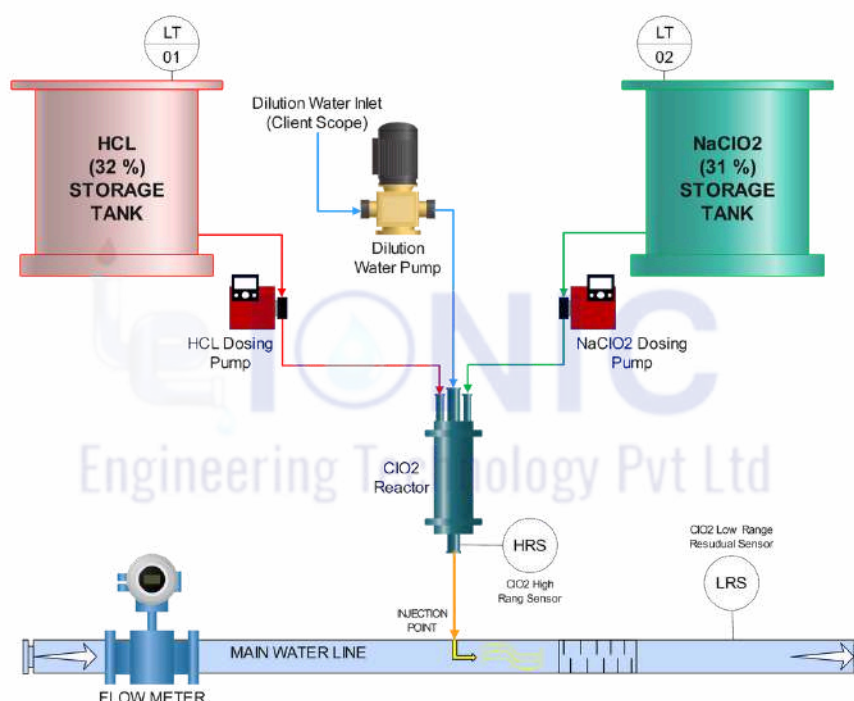
- Compact design, also for confined spaces & Easy operation.
- Precise.
- Safe & Reliable.
- Simple & Easy installation.
- Low operating costs & High operational reliability due to integrated control system.
- Adaptable for various tasks.
- Robust design.
- No leakage of toxic CIO<sub>2</sub> gas to ambient.

- **Applications** – Ideal fields of application for such as:

- Combating Legionella in building installations of hospitals, nursing homes, hotels , ETC.
- Drinking water treatment in municipal waterworks.
- Irrigation water treatment, e.g. in plant nurseries.
- Process water treatment in food & beverage industry.
- Cooling water treatment.
- Wastewater treatment.
- Lab experiments and pilot studies.
- Cleaning in Place applications.
- Sanitization and biofilm removal.



# GENOX-SMART DIGITAL CHLORINE DIOXIDE GENERATOR (IN-LINE REACTOR) FOR LARGE VOLUME APPLICATIONS



This configuration is recommended for smaller-capacity generators to ensure safety. The reactor, where the chlorine dioxide solution is produced, is enclosed in a suitable housing. The high-concentration chlorine dioxide generated is immediately mixed with dilution water to achieve a safe concentration of 1000 ppm. The above-ground in-line reactor is integrated with the acid and chlorite metering skid, eliminating the need to transport dilution water and reactants (32% HCl and 31% NaClO<sub>2</sub>) over long distances to the point of addition.

Only the 1000 ppm chlorine dioxide solution is conveyed to the point of addition via suitable chemical-resistant double-containment piping or specialized FRP (Vinyl Ester) filament-wound rigid piping. Alternative materials such as HDPE, PP, CPVC, and UPVC are not chemically compatible for long-term, trouble-free operation and should be avoided. While PVDF offers excellent chemical resistance, it is significantly more expensive than FRP-VE piping systems.

The reactor's efficiency and performance are continuously monitored by a proprietary high-range chlorine dioxide sensor installed at the reactor outlet. In case of a malfunction, the system triggers an audio-visual alarm and automatically shuts down to prevent unsafe operation.



# Under Water Encapsulated Reactor



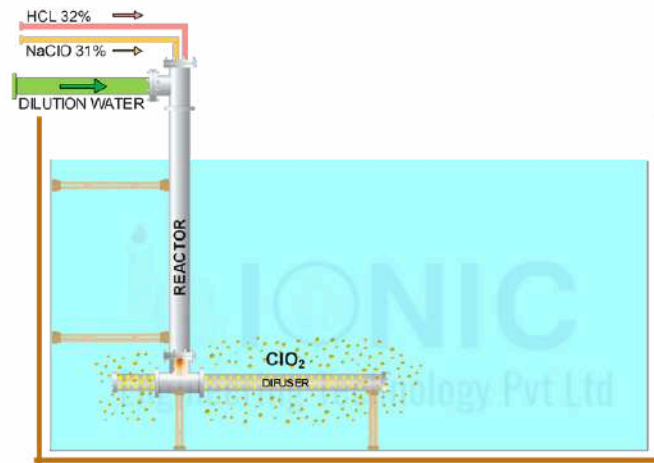
2CC-UW-IP

All Chlorine Dioxide production is undertaken in our unique Under Water Encapsulated Reactor. The precursor chemicals are mixed within the Reactor's inner chamber, located inside the flooded outer chamber. By having the reactor directly in contact with the Dilution water, there is no "air space" where concentrated ClO<sub>2</sub> solution can off gas thereby eliminating the possibility of the gas decomposing.

With high precision, integrated Smart dosing pumps we assure a high performance and yield. The chlorine dioxide solution is produced in a very small reaction chamber which is installed in-line, and is injected directly into the water to treat. In this way, the chlorine dioxide is present only in the treated water, which provides high safety and very effective consumption of the chemical precursors.



# GENOX- SMART DIGITAL CHLORINE DIOXIDE GENERATOR (SUBMERGED UNDER WATER REACTOR) FOR LARGE VOLUME APPLICATIONS



Large-capacity chlorine dioxide generators are equipped with advanced safety features to minimize the risks associated with the release of toxic  $\text{ClO}_2$  gas and potential explosions. These systems utilize a submerged in-line reactor configuration, where two chemical conveying lines transport reagents (32% HCL and 31%  $\text{NaClO}_2$ ) from metering skids to the reactor. For long-distance applications, the chemical lines are enclosed within a triple-layered dilution water pipe, ensuring leak containment. For shorter distances, the lines connect directly from dosing pumps to the reactor.

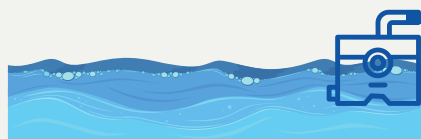
Safety is further enhanced by flexible triple-layer pipes, supplied by IONIC, which feature a PVDF/PTFE core (or similar material) reinforced with high-tensile steel-wire braid, and a polyurethane or equivalent protective outer layer. These pipes offer excellent chemical resistance, mechanical strength, and leak-free performance with minimal intermediate connections.

This configuration represents the safest approach for chlorine dioxide generation, as the chemicals and dilution water are transported separately and securely to the reactor, minimizing exposure. The generator itself is installed directly in the water basin, with chlorine dioxide production confined to this area. A fiberglass cover protects the generator, and a diffusion system is used to distribute chlorine dioxide throughout the water, enhancing disinfection efficiency. This advanced design allows for unlimited chlorine dioxide production, offering a reliable and safe solution for water treatment.

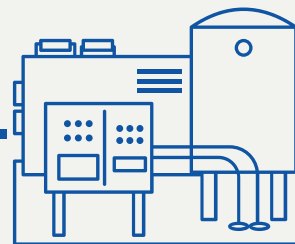
# Cost Saving Technology for Multiple Dosing Points



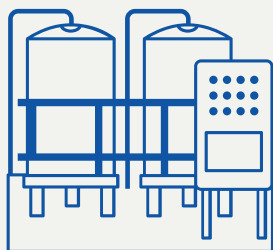
ClO2 Injection Manifold



Sea Water Intake Biofouling

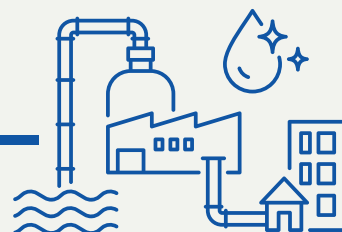


RO Membrane Biofouling Protection



RO Feed Water Pre-treatment

Upto 12 Dosing Points



Desalination Disinfection  
Feeding Supply Network



# Customized Control System



Ionic offers several types of solutions for the electrical power and control system. We have immense experience with different standards and specifications. The entire plant can be managed by using PLC and human machine interface (HMI) that will be configured providing the best user-friendly interface and, at the same time, the safest program. The control system is pre-assembled and tested at our works, reducing the costs for on-site installation.

Feature	Benefit	What this means to you
Choice of Application specific non-PLC process control and automation and PLC controlled based Process control and automation	All items are controlled from a central PLC and the touch screen provides an operator friendly way to view plant operation and status. Fault finding is simple.	It is easy to train operators on how the plant operates. They will feel comfortable using the plant. All the information you need and configuration capability is available.
Various options for redundancy – Cold/Warm and Hot version	For providing uninterrupted supply of ClO2 for process use	Ensures continuous supply of ClO2 which will increase the uptime of your process
Integration of online high concentration ClO2 online sensor to monitor ClO2 concentration at the reactor outlet.	This unique feature exclusive to our design allows continuous monitoring of the process	Process safety and reliability
Inputs for remote on/off; flow 4–20mA or pulse, analyzer 4–20mA or pulse; outputs for grams of ClO2 produced and fault.	Full flexibility of dosing from flow, stop/start or residual control available.	Whatever way you wish to dose chlorine dioxide, you can do it accurately with this generator.
Remote Real time access.	Using a secure broadband connection, users can log on to the HMI and view/operate the generator from remote allocation.	Dedicated cloud-based platform gives instantaneous information , generates SMS Email alerts, automatic report generation trending etc. The speed of making a change to the generator or fault finding is greatly increased. In most cases, it will not be necessary to send a serviceperson to site and this will save you time and money.

# OPTIONAL

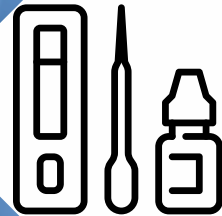
1. Bulk precursor chemical unloading pumps and storage tanks.



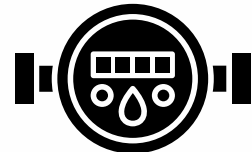
2. ClO<sub>2</sub> online residual analyser & High Concentration Sensor



3. ClO<sub>2</sub> test kit



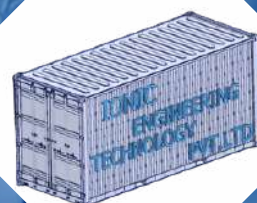
4. ClO<sub>2</sub> gas warning device



5. Mains flow indicator, transmitter



6. Containerization





# STANDARDIZED MODEL



GENOX- MINI- GENERATOR USING PREDILUTED CHEMICALS						
MODEL	CAPACITY@9 5% YIELD	FLOW (m3/hr.)	MAX.OP. PRESSURE	HCL 32%	NaCLO2 31%	POWER REQT
GENOX-2DC-100	100 gms/h	0.1	16 bar	0.424	0.463	3Ø 380 – 415 V AC
GENOX-2DC-200	200 gms/h	0.2	16 bar	0.848	0.926	
GENOX-2DC-300	300 gms/h	0.3	16 bar	1.272	1.389	
GENOX-2DC-400	400 gms/h	0.4	10 bar	1.696	1.852	
GENOX-2DC-500	500 gms/h	0.5	10 bar	2.12	2.315	
GENEOX-SR – GENERATORS WITH REAL TIME REMOTE MONITORING FEATURES						
GENOX-2DC-RM-100	100 gms/h	0.1	16 bar	0.424	0.463	3Ø 380 – 415 V AC
GENOX-2DC-RM-200	200 gms/h	0.2	16 bar	0.848	0.926	
GENOX-2DC-RM-300	300 gms/h	0.3	16 bar	1.272	1.389	
GENOX-2DC-RM-400	400 gms/h	0.4	10 bar	1.696	1.852	
GENOX-2DC-RM-500	500 gms/h	0.5	10 bar	2.12	2.315	
GENOX-UW/SW UNDER WATER /SUBMERGED GENERATOR USING CONCENTRATED CHEMICALS (CUSTOM DESIGN MAX CAPACITY UPTO 180KG/HR)						
GENOX-2CC-UW-IP-0.5	0.5 Kgs /h	0.5	16 bar	2.12	2.315	3Ø 380 – 415 V AC
GENOX-2CC-UW-IP-1.0	1.0 Kgs /h	1	10 bar	4.24	4.63	
GENOX-2CC-UW-IP-2.0	2.0 Kgs /h	2	7 bar	8.48	9.26	
GENOX-2CC-UW-IP-5.0	5.0 Kgs /h	5	4 bar	21.2	23.15	
GENOX-2CC-UW-IP-10.0	10.0 Kgs/h	10	4 bar	42.4	46.3	
GENOX-2CC-UW-IP-20.0	20.0 Kgs/h	20	4 bar	84.8	92.6	
GENOX-2CC-UW-IP-24.0	24.0 Kgs/h	24	10 bar	117.6	108.0	
GENOX-2CC-UW-IP-40.0	40.0 Kgs/h	40	10 bar	196.0	180.0	
GENOX -UW/SW GENERATORS WITH REMOTE MONITORING FEATURES (CUSTOM DESIGN MAX CAPACITY UPTO 180KG/HR)						
GENOX-2CC-UW-RM-0.5	0.5 Kgs /h	0.5	16 bar	2.45	2.25	3Ø 380 – 415 V AC
GENOX-2CC-UW-RM-1.0	1.0 Kgs /h	1	10 bar	4.9	4.5	
GENOX-2CC-UW-RM-2.0	2.0 Kgs /h	2	7 bar	9.8	9.0	
GENOX-2CC-UW-RM-5.0	5.0 Kgs /h	5	4 bar	24.5	22.5	
GENOX-2CC-UW-RM-10.0	10.0 Kgs/h	10	4 bar	49.0	45.0	
GENOX-2CC-UW-RM-20.0	20.0 Kgs/h	20	10 bar	98.0	90.0	
GENOX-2CC-UW-RM-24.0	24.0 Kgs/h	24	10 bar	117.6	108.0	
GENOX-2CC-UW-RM-40.0	40.0 Kgs/h	40	10 bar	196.0	180.0	

# GET IN TOUCH

WITH  
**IONIC ENGINEERING TECHNOLOGY PVT. LTD.**

We're here to help you with all your water and wastewater treatment needs. Whether you're looking for customized solutions, technical support, or just want to explore how our services can benefit your business, feel free to reach out to us.

Our team of experts is ready to provide personalized assistance and ensure that you get the most effective and innovative solutions tailored to your requirements. You can contact us via phone, email, or through our website. We value every opportunity to collaborate and are committed to delivering excellence in every interaction.

## CONTACT US :



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