Dechlorination – Clean, Easy & Efficient

The PharmaGuard's Medium-Pressure high-intensity UV light - brought to its full potential by applied fiber-optic and hydraulic mechanics – enables easy & efficient Dechlorination, while at the same time providing powerful disinfection for reduced risk of microorganisms and RO membrane bio-fouling.

Sustainable Solution

The PharmaGuard provides a clean, green alternative to other Dechlorination methods. The Bio-Pharma Industry can capitalize from a system with no chemicals, reduced risk, better protection and lower operating expenses.

The system reduces Free Available-Chlorine (FAC) and Chloramines in production lines to undetectable levels.

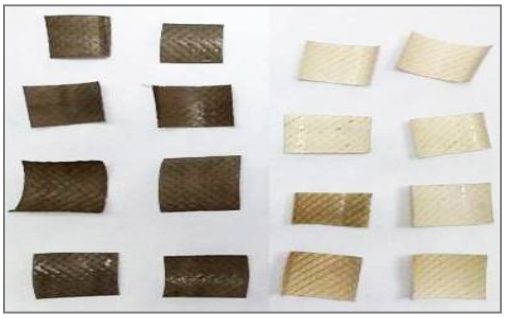
- Protects products from chlorine contamination.
- Protect RO (reverse osmosis) membranes.
- Protects EDI (Electro De-Ionization) modules.
- Protects chlorine-sensitive equipment.

Measuring free available chlorine levels in water using a colorimeter: Pink bottle shows water in which chlorine is detected. Clear bottle shows water after PharmaGuard treatment – no chlorine detected.

Superior to the Other Methods

The PharmaGuard is a superior alternative to carbon bed (Activated Carbon) filter, sodium bisulfite (SBS), and other commonly-used methods that create an ideal environment for microorganisms to thrive, and require increased maintenance, not to mention complex operation hurdles.

- The carbon bed (AC) grains' relatively large surface areas and filter pores make it easy for microorganisms to attach and become a source of food for various types of bacteria.
- Carbon bed (AC) requires frequently-scheduled maintenance procedures such as hot sanitation and backwash.
- SBS is a source for sulfite reducing bacteria and makes an ideal environment for anaerobic microorganisms, creating slime on the RO membranes.



Left: *Bio-fouled RO membranes using traditional methods* Right: *RO membranes after PharmaGuard treatment during the same period.*

- **No chemicals**
- **Clean and quick**
- **On-demand availability**
- **Safe, reliable and sustainable**
- **Protects RO membranes and other costly chlorine-sensitive equipment**
- **Reduced maintenance burden and operating costs**
- **Reduced carbon footprint**
- **Full control with real time monitoring**
- **Low Total Cost of Ownership**
- **True in-line system with small footprint**

Dechlorination Method Comparisons

	Activated Carbon Filter	Sodium Bisulfite	PharmaGuard UV system
Bacteria proliferation	Yes. Intensive.	Anaerobic, including sulfur-reducing bacteria.	**No. The very high UV-Dose "kills" ALL micro-organisms.**
Chemicals into the water	A little, though it can spike.	Yes.	**No – chemical-free.**
On-Demand	Not always. Intensive maintenance, risk of breakthrough.	**Yes.**	**Yes.**
Effect on RO membranes	Bio- fouling. Increased solids load.	Bio- fouling and scaling.	**Greatly reduces bio-fouling and scaling.**
Maintenance burden	Yes. Ongoing routine.	Yes. Ongoing routine.	**No. Easy maintenance.**

The PharmaGuard Advantage

- Medium Pressure High-Intensity UV lamps with broad spectrum UV light much more efficient in decomposing FAC.
- Easy to maintain: 4-minute lamp replacement.
- Very small footprint (plus system can be mounted vertically).
- Doesn't affect water chemistry.
- Reduces membrane and pipe bio-fouling.
- Effective with hot or cold water.
- Constructed in compliance with cGMP criteria.
- Fiber optic and hydraulic principles change the way UV light is delivered.
- Unprecedented UV power efficiency and uniform UV dose distribution.
- Integrated advanced software for real time monitoring & control.
- Measured UV dose for guaranteed results.
- Validated to the highest regulatory standards.
- Green solution - environmentally safe.

Easy to Integrate and Use

- True in-line system with small footprint.
- Can also be mounted vertically for 100% drainability and elimination of air bubble traps.
- Connectivity for remote monitoring and integrating plant controls.
- Optimized Medium Pressure UV delivery means fewer lamps, with 4-minute lamp replacement.
- Short lamps for easy handling.

Monitor shows status of critical parameters in real-time, including actual UV dose being delivered.

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