

The Science of Sustained Efficacy: ChloroKlean Plus L20

Advanced Oxidation Technology for PT4 (Food & Feed) and PT5 (Drinking Water) Applications.



Executive Summary: The Regenerative Advantage



The Industry Challenge

Traditional biocides (Sodium Hypochlorite, Chlorine Dioxide Generators) suffer from rapid chemical depletion (gas-off), high corrosion rates on infrastructure, and expensive CAPEX/maintenance.



The ChloroKlean Solution

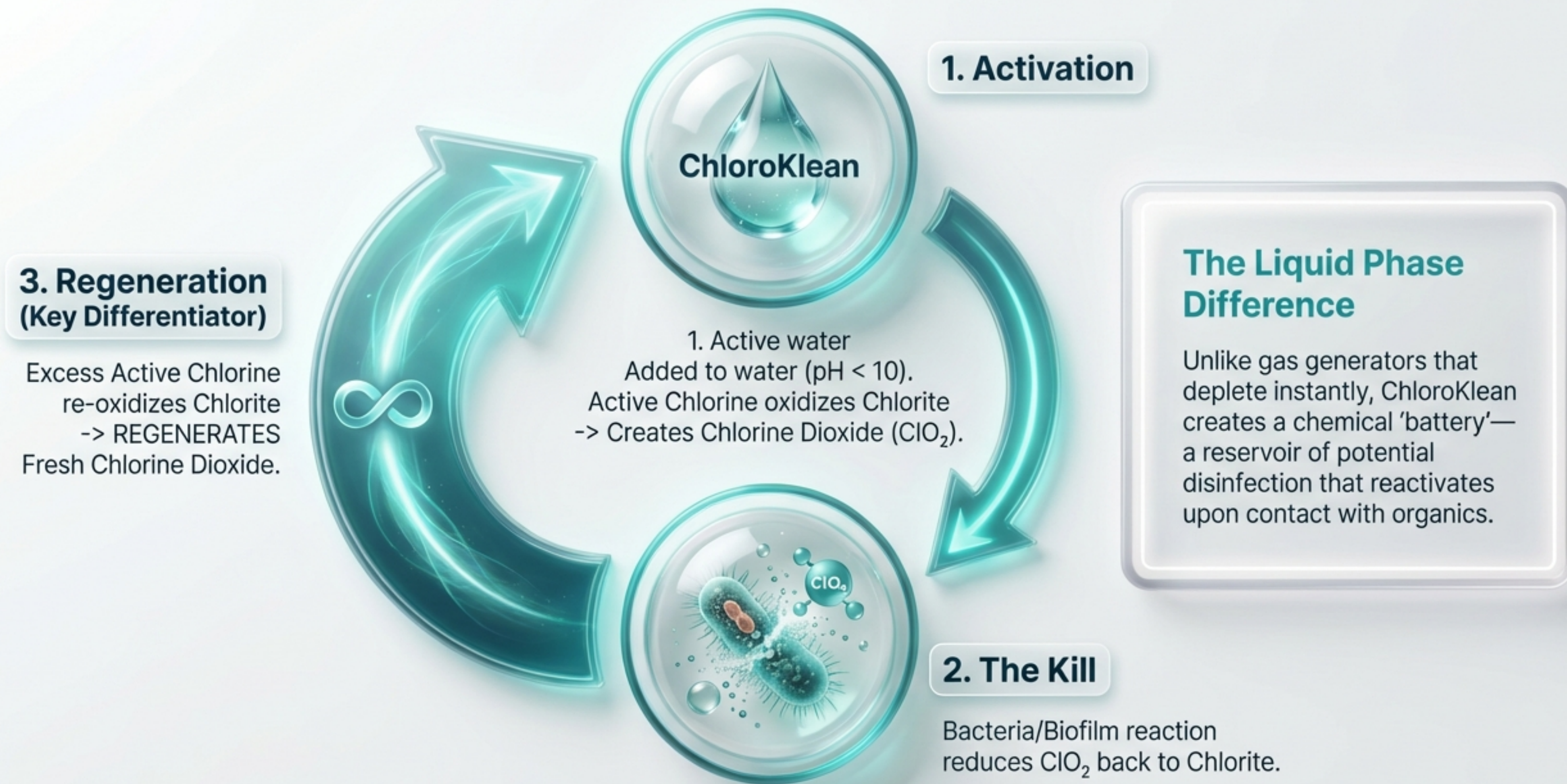
Liquid-Phase Regenerative Chemistry. Features stabilized Sodium Chlorite & Hypochlorite that generates Chlorine Dioxide in-situ (Liquid Phase). Creates a 'Reservoir' of disinfection potential that is thermally stable with prolonged residual.



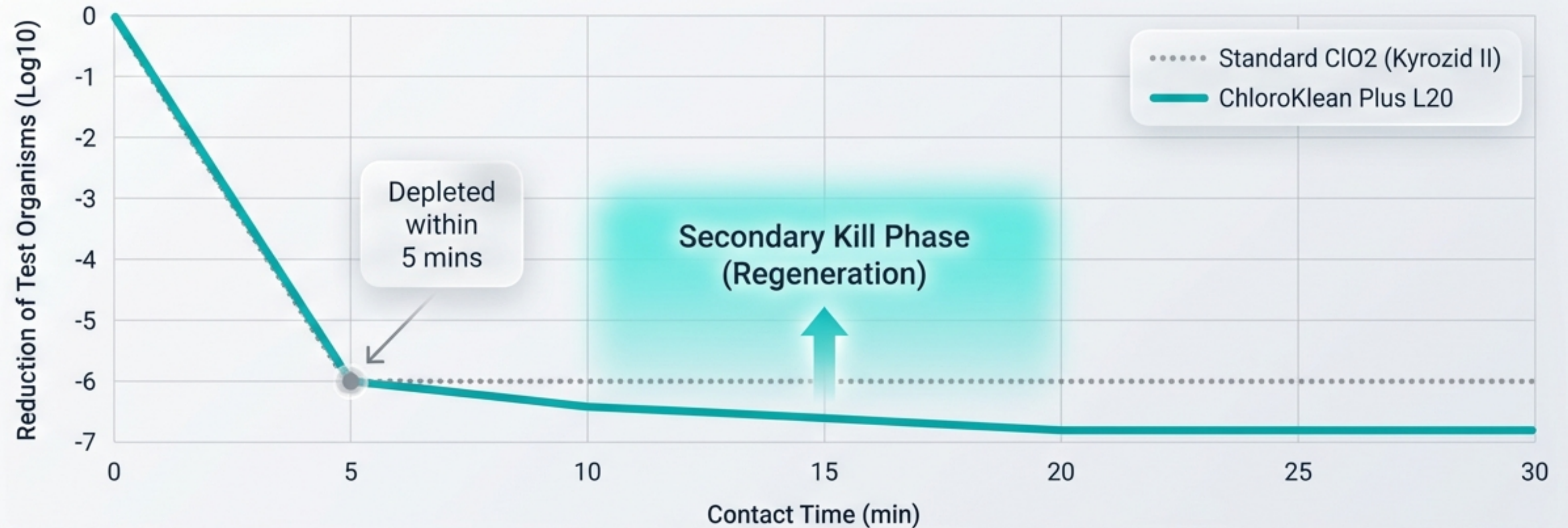
Validated Results

- **PT4 (Food):** 99% reduction in chemical volume (Poultry Case Study).
- **PT5 (Water):** Successful Legionella removal where thermal controls failed.
- **Efficacy:** >5.9 log reduction in bacteriophages (Exceeds EN standards).

The Regenerating Engine: How Liquid-Phase Chemistry Works



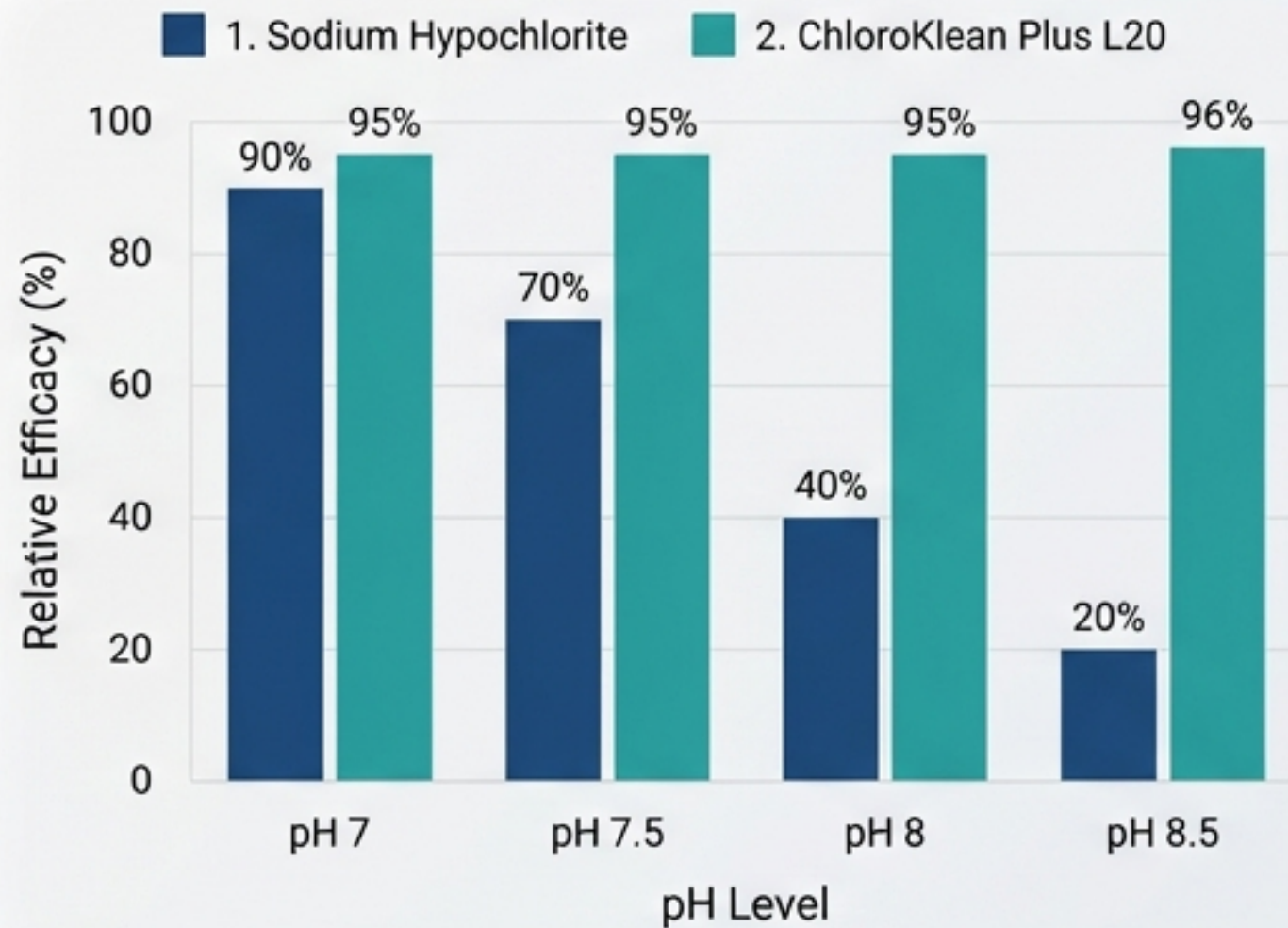
Comparative Efficacy: Sustained Activity vs. Rapid Depletion



Evidence of Regeneration: The further reduction between 10-25 minutes proves that new Chlorine Dioxide is being generated in-situ, ensuring safety throughout long distribution pipework.

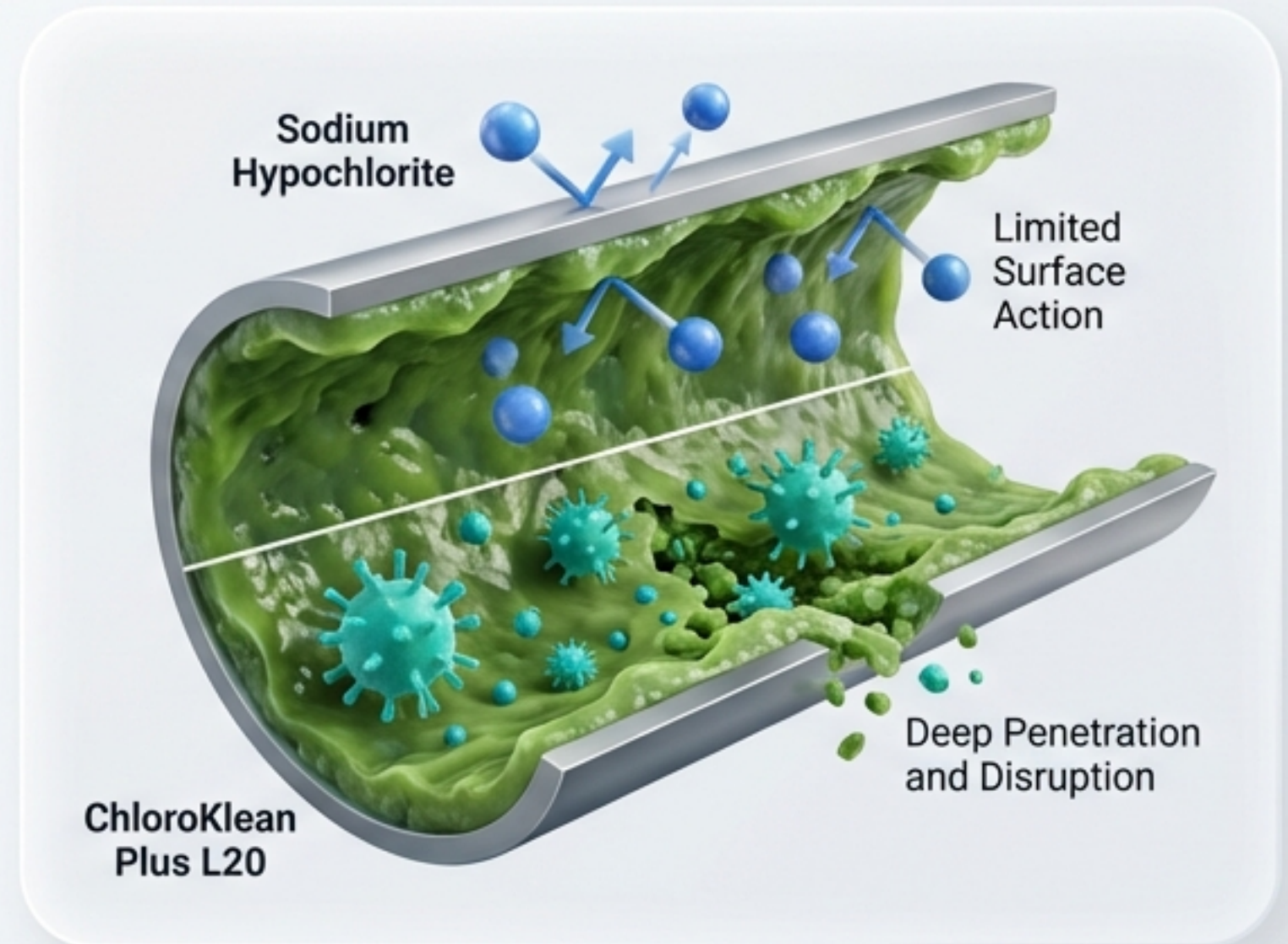
Superiority in Biofilm Removal and pH Stability

pH Independence



ChloroKlean maintains high efficacy regardless of pH fluctuations.

Biofilm Penetration



End-of-life ChloroKlean outperforms 10x stronger Sodium Hypochlorite in biofilm removal.

PT4 Application: Food & Feed Area Disinfection

Scope of Compliance

- **Approvals:** Direct & Indirect Food Contact Surfaces.
- **Sectors:** Dairies, Breweries, Meat & Poultry Processing, Bakeries.

Target Organisms



Listeria monocytogenes



Salmonella spp.



E. coli



Viruses.

Operational Benefits

- Stable in CIP (Clean-in-Place) systems.
- No rinse required (at appropriate dosages).
- Non-corrosive to stainless steel equipment.

PT4 Case Study: Solving Chemical Overload & Bacterial Failure

The Problem



- Manual handling of 1000L of chemicals.
- Frequent E. coli / Coliform failures.
- Heavy corrosion on stainless steel.

**99%
Reduction
in Chemical
Volume**

1000L → 10L

The ChloroKlean Result



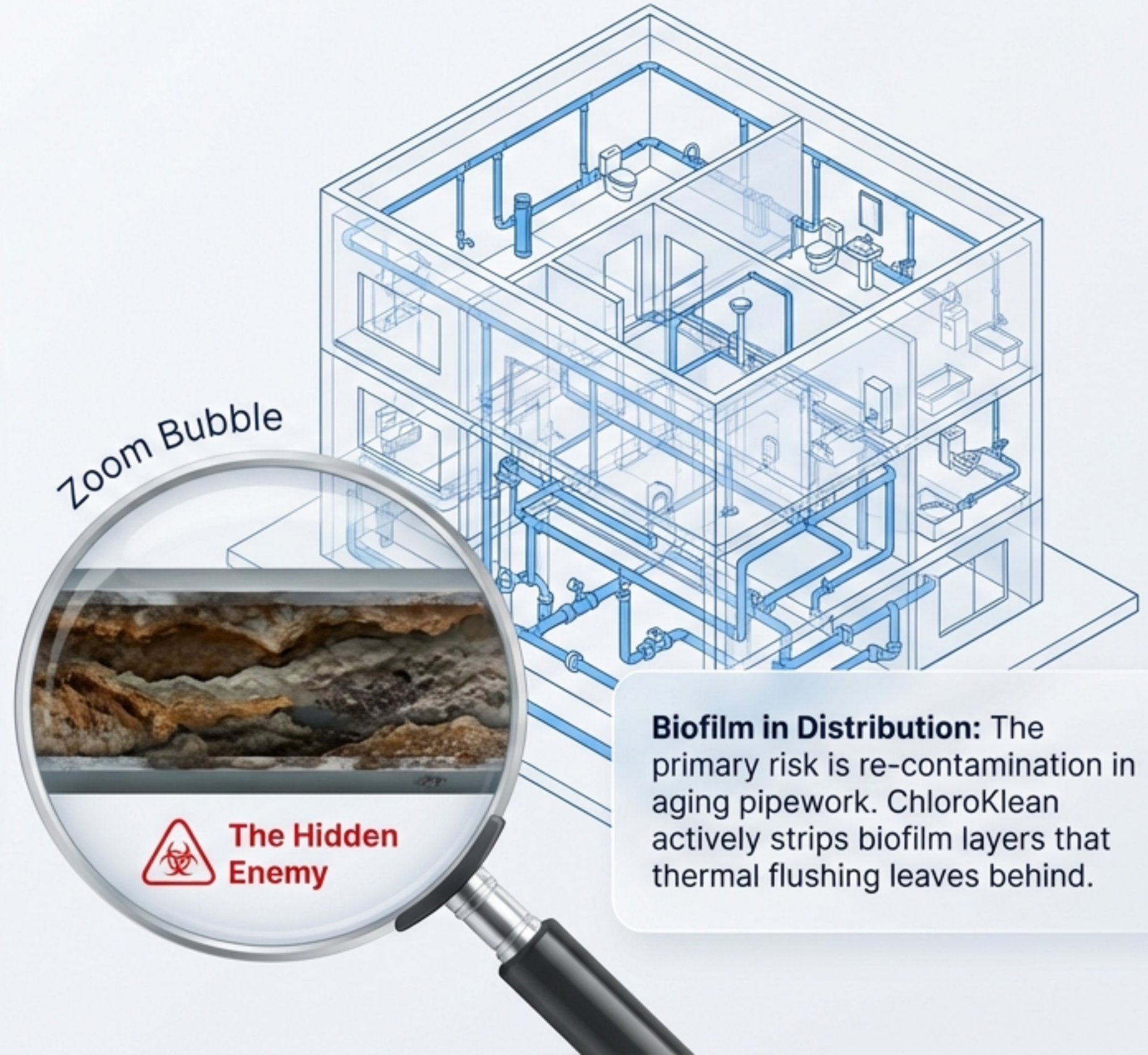
Switch to continuous low-level ChloroKlean dosing.

- ✓ Zero bacterial failures since implementation. | ✓ Corrosion and foaming eliminated.

PT5 Application: Drinking Water & Distribution

Compliance Scope

- Potable Water Treatment
- Hospital Water Systems
- Private Supplies (Wells/Boreholes)
- Legionella Control



Biofilm in Distribution: The primary risk is re-contamination in aging pipework. ChloroKlean actively strips biofilm layers that thermal flushing leaves behind.

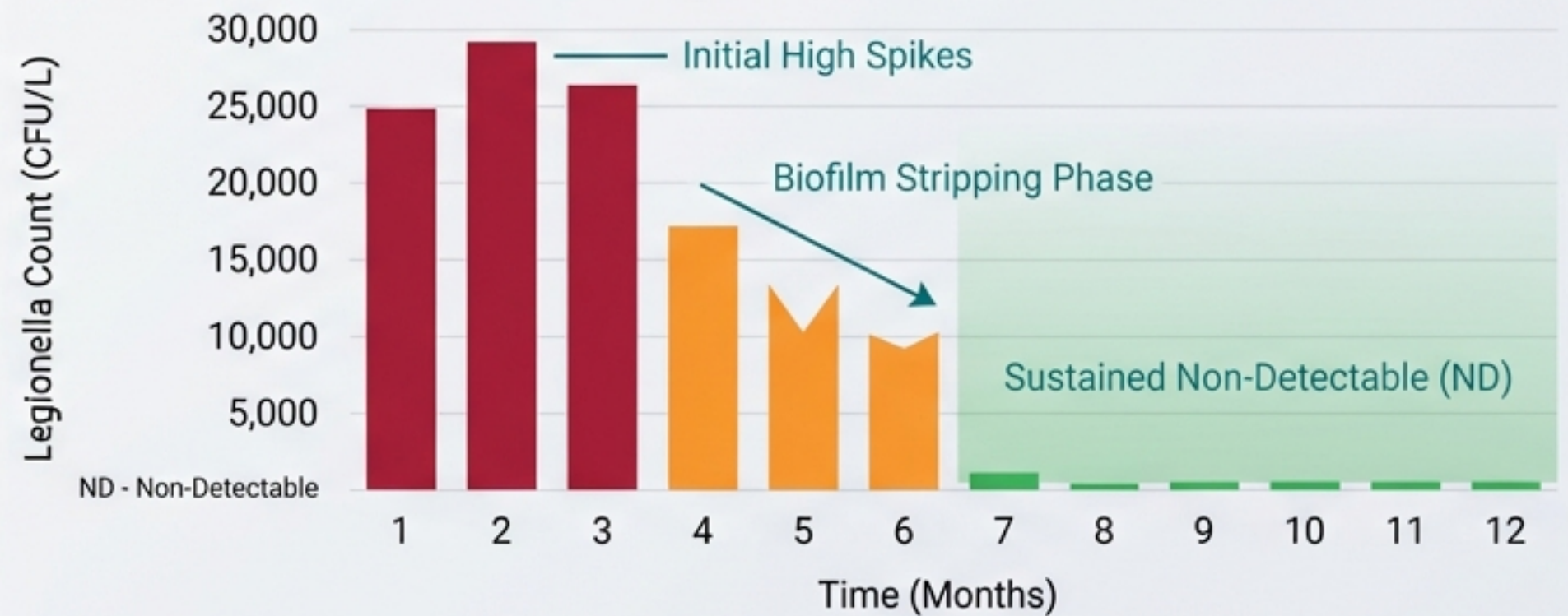
PT5 Case Study: Major Hospital Water Safety

Eradicating Legionella in Critical Care Environments

The Challenge:

Persistent Legionella Pneumophila SG1 in hot & cold systems. Thermal controls and standard flushing failed due to biofilm in aging infrastructure.

The Results (Graph):



Key Insight: Initial fluctuations are positive—proving the chemical is stripping the habitat (biofilm) from the pipes, followed by sustained safety.

Scientific Validation: Independent Laboratory Verification

Compliance with EN Standards for Drinking Water (Verified by SUT Simulated Use Test)

Organism	Log Reduction (10 mins)	Standard Requirement	Result
<i>E. coli</i>	> 4.5 log	> 2 log	 PASS
<i>Enterococcus faecium</i>	> 3.9 log	> 2 log	 PASS
Bacteriophage MS2	> 5.9 log	> 2 log	 EXCEEDS STANDARD

Report validated by SUT Simulated Use Test GmbH according to UBA/ECHA guidelines.

Broad-Spectrum Efficacy Redefined



Bacteria Efficacy

ChloroKlean Plus L20



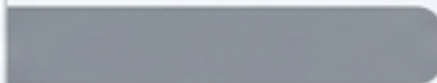
Very High

Bromine



Very High

DCCA/TCCA

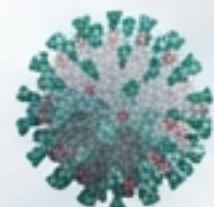


High

Calcium Hypochlorite



High



Virus Efficacy (Enteric, SARS, COVID)

ChloroKlean Plus L20



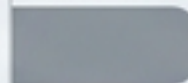
Very High

Bromine



High

DCCA/TCCA/Hypo

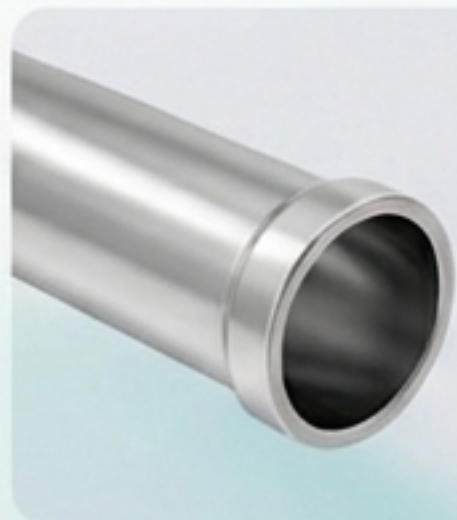


Low to Moderate



Key Differentiator: ChloroKlean's multi-oxidant mechanism targets not just DNA but also RNA. This makes it uniquely potent against RNA viruses like Coronaviruses, where traditional chlorine and bromine are less effective.

Material Compatibility & Safety Profile



Infrastructure Safety

Compatible with Stainless Steel, PVC, PE, PP, EPDM, Viton.
Significantly lower corrosion rate than Sodium Hypochlorite or Peracetic Acid.



Operational Safety

No On-Site Generation:
Eliminates mixing of dangerous precursors or pressurized gas.

Toxicity Risk & DBPs

Disinfectant	Common DBPs	Toxicity Risk
ChloroKlean Plus L20	Chlorate	Low-Moderate
Bromine	Brominated THMs, Bromate	Moderate-High
Calcium Hypochlorite	THMs, HAAs, Chlorate	High

Operational Economics & Efficiency



Shelf Life

12-18 Months stability.
Outlasts activated ClO₂
(short half-life).

Reduces waste and
simplifies inventory.



Dosage Efficiency

Low volume dosing:
~0.6 ml/m³ for Potable
Water.

Drastic reduction in
storage footprint and
transport costs.



Asset Protection

Biofilm removal extends
heat exchanger and
valve life.

Reduces 'shock dosing'
damage common with
other biocides.



A Single Solution for Diverse Water Systems



Potable



Swimming Pool



Cooling Tower



Process Water

Application	Typical Dosage (ml/m ³)	Total Chlorine (mg/l)
Potable Water	10 ml/m ³	Total Chlorine 0.6 mg/l
Swimming Pool/Spa	430-860 ml/m ³	Total Chlorine 1.8-2.4 mg/l
Evaporative Cooling Tower	(15-20)/C	Total Chlorine 0.9-1.2 mg/l
Process Water	20-100 ml/m ³	1.2-6.0 mg/l

One Product: Continuous Dose, Shock Dose, and CIP.
A versatile, single-drum solution for a wide range of applications.

Scalable Solutions for Any Facility Size



Targeted Disinfection

1 litre ChloroKlean Plus L20
ChloroKlean Plus L20 targeted
disinfection.



Small System Dosing

10 litre ChloroKlean Plus L20
ChloroKlean Plus L20 canister
small system.



Industrial Standard

25 litre ChloroKlean Plus L20
ChloroKlean Plus L20 drum or
standial staderl.



High Volume Infrastructure

Large lage ChloroKlean Plus L20 Ibc
IBC Container (ChloroKlean Plus L20
cagetott) IBC Container.

From precision dosing in niche applications to bulk supply for municipal water treatment, ChloroKlean Plus L20 provides a unified safety protocol.

The ChloroKlean Plus L20 Advantage: The Smart Choice



Sustained Efficacy

Regenerating Engine provides prolonged residual and deep biofilm penetration.



Superior Safety

Minimal harmful DBPs (THMs). No dust, fire, or explosion hazards.



Operational Simplicity

Easy-to-dose liquid, low odor, long shelf life.