

Case Study

Chemical-Free Pool Water Purification Using Nanobubble Technology



Overview

Maintaining safe and hygienic swimming pool water traditionally relies on chlorine and chemical dosing, which often leads to issues such as odor, skin irritation, corrosion, and recurring operational costs.

This case study highlights the application of NICO oxygen & ozone nanobubble technology as a next-generation solution for pool water purification, enabling chemical-free, self-sustaining water treatment through advanced nanoscopic oxidation mechanisms.

Project Details

- **Application:** Swimming Pool Water Treatment
- **Location:** New Delhi, India
- **Operational Concept:** Continuous nanobubble-based oxidation and oxygenation
- **Treatment Approach:** Chemical-free purification using oxygen and ozone nanobubbles



Objective

Replace conventional chemical dosing with a sustainable, safe, and efficient treatment system

Pre-Implementation Challenges

Prior to nanobubble-based intervention, conventional pool systems typically face:

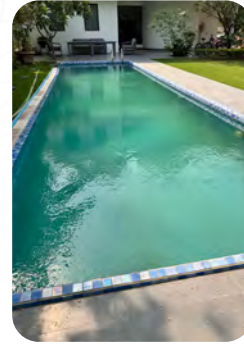
- Dependence on chlorine, algaecides, and chemical additives
- Harsh odor and irritation affecting user comfort (skin and eyes)
- Frequent maintenance and chemical balancing requirements
- Formation of biofilm and slime layers in pipes and surfaces
- High operational costs due to continuous chemical consumption
- Corrosion and damage to infrastructure from chemical exposure
- Environmental concerns due to chemical discharge and wastage

NICO Nanobubble Solution

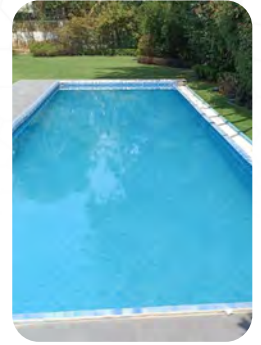
The system utilizes NICO's AQUAPOOL that remain suspended for extended durations and release oxidative energy during collapse, enabling effective water purification.

Key functional mechanisms:

- **Advanced Oxidation:** Breaks down bacteria, pathogens, and organic contaminants
- **Algae Control:** Eliminates algae and prevents regrowth
- **Biofilm Removal:** Dissolves slime layers at the nano-interface level
- **Enhanced Water Clarity:** Achieves crystal-clear water without additives
- **Oxygen Enrichment:** Improves dissolved oxygen levels, enhancing water freshness



Before



After

Performance Outcomes

Parameter	Unit	Conventional System	NICO Nanobubble System
Cleaning Method	-	Chemical-based (chlorine, algaecides)	100% chemical-free (O₃ & O₂ nanobubbles)
Water Clarity	-	Requires additives	Crystal-clear without additives
Chemical Usage	-	High	Eliminated completely
Biofilm & Slime	-	Requires manual cleaning	Naturally dissolved
User Comfort	-	Skin & eye irritation	Gentle, irritation-free water
Maintenance	-	Frequent monitoring	Minimal intervention
Environmental Impact	-	Chemical discharge	Clean & sustainable

Impact Analysis

The adoption of nanobubble technology resulted in significant operational and user-level benefits:

- **Complete Elimination of Chemicals:** Zero requirement for chlorine and algaecides
- **Improved User Experience:** Soft, odor-free, and irritation-free water
- **Reduced Operational Costs:** Savings on chemicals, water, and maintenance
- **Lower Maintenance Effort:** Stable water conditions reduce manual intervention
- **Extended Equipment Life:** Reduced corrosion enhances durability of infrastructure
- **Water Conservation:** Reduced backwashing leads to significant water savings
- **Sustainable Operation:** Eco-friendly system with no harmful by-products
- **Energy-Efficient Design:** Low power consumption with minimal moving parts

Conclusion

The case study demonstrates that NICO's AQUAPOOL package offers a transformative alternative to conventional pool treatment systems. By eliminating chemical dependency and enabling natural oxidation-based purification, the system ensures safer, cleaner, and more sustainable pool water management.

This technology establishes a new benchmark in pool water treatment, combining performance, user comfort, and environmental responsibility.