Purifics

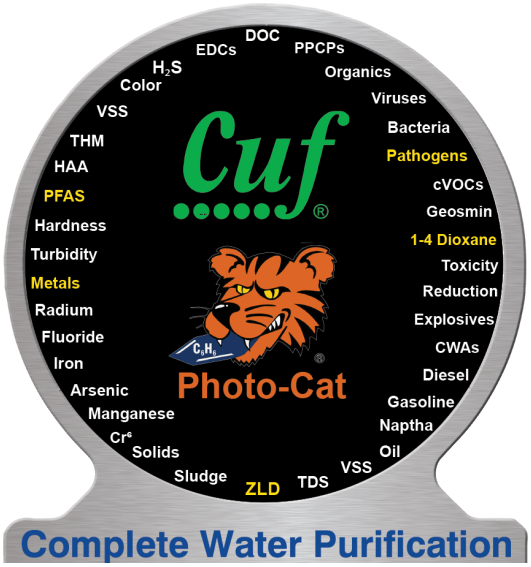
AOP+ PHOTO-CAT

## Why *Photo-Cat*

## The Proven Chemical Free Oxidation Process AOP+

- ✓ Better Water at Lower Cost
- ✓ The Platform is the Plant
- ✓ Chemical Free Process
- ✓ Removes & Destroys Chemicals
- ✓ Removes Color, Taste & Odor
- ✓ Removes Pb, Hg, Cr6, Fe, etc
- ✓ Disinfects & Sterilizes
- ✓ Reduced Complexity
- ✓ Broad Temperature & Pressure Range
- ✓ Longer Service Interval
- ✓ Lower Cost Structure
- ✓ >99% Online Duty
- ✓ ANSI 61 Compliant
- ✓ > 25 Year Membrane Life
- ✓ Multiple Destruction Pathways
- ✓ Oxidation and/or Reduction
- ✓ Strongest Oxidation Potential
- ✓ Multi-Barrier
- ✓ Reduced Complexity
- ✓ 0-100% Turndown Capability
- ✓ Highest Oxidation Potential 3.18 – 4.8 eV
- ✓ Generic Off the Shelf Parts
- ✓ Promote Sustainability
- ✓ Destroys Forever Chemicals
- ✓ Precise, Tunable DO in ppm range

- ✓ Eliminates Annual Lamp Replacement
- ✓ Eliminates Wipers
- ✓ Eliminates Hydrogen Peroxide
- ✓ Eliminates Residual Peroxide Quenching
- ✓ Eliminates Ozone
- ✓ Eliminates Stabilizer Residuals
- ✓ Eliminates Bromate Production
- ✓ Eliminates Chemical Oxidant Storage
- ✓ Eliminates UVT Dependence
- ✓ Eliminates Pre-Treatment Requirements
- ✓ Eliminates THM or HAA Issues
- ✓ Eliminate Hydroxyl Radical Dependent
- ✓ Eliminates Generated Waste
- ✓ Eliminates Noise Issues
- ✓ Eliminates Off Gas
- ✓ Eliminates Injectors'
- ✓ Eliminates Micro Bubbles




# Better Water at Lower Cost

**Learn More:** https://www.youtube.com/watch?v=4QRzXWrVWc8&t=38s

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## Chemical-Free Water Purification Since 1993:

Photo-Cat is a chemical free process that destroys organic contaminants using a TiO2 slurry-based photocatalytic process to purify or detoxify water. Photo-Cat removes chemical contaminants (such as 1,4-dioxane), biologicals, viruses, oocysts, EDCs, PPCPs, sub-micron particulate, metal and can reduce bromate back to bromide. Photo-Cat has an established history of regulatory compliance since 1994 as it is the solution to the challenging MOTCO Superfund Site, and in Drinking Water 2013.

***Photo-Cat*** Benefits include:

- The strongest oxidation potential of all AOPs
- A unique reductive pathway for recalcitrant compounds
- Biological destruction/filtration
- Significant advantage in efficiency, cost, and complexity reduction
- Multiple destruction pathways, oxidation and/or reduction
- Not Hydroxyl radical dependent
- Multi Barrier
- CapEx & OpEx → Cost reduction

Photo-Cat lifecycle costs are significantly less than conventional technologies such as activated carbon, UV ozone, UV peroxide, chemical oxidation, air stripping with off-gas treatment, and reverse osmosis. Photo-Cat is the economical choice for multi-year projects with complex water challenges.

This fully automated process can purify water to very high standards that exceed drinking water standards. Photo-Cat is essentially a solid state, automated device that operates unattended, with service intervals exceeding 20,000 hours.

## Differentiation Between AOP & AOP+

Do not confuse the Photo-Cat process with other AOP processes.

| AOP | (eV) |
|---|---|
| **Photo-Cat** | 3.18-4.80 |
| **UV/$O_3$** | 2.8 |
| **UV/Peroxide** | 2.8 |
| **Ozone** | 2.07 |
| **Cavitation** | 2.8 |
| **E Beam** | 2.8 |
| **Chemical** | |
| • Hydrogen Peroxide | 1.77 |
| • Permanganate | 1.67 |
| • Chlorine Dioxide | 1.50 |
| • Chlorine | 1.36 |
| • Fluorine | 3.05 |

Photo-Cat has the strongest oxidizing potential of any commercially available AOP process and will destroy contaminants of concern that other AOPs can not

## Applications:

Municipal, Industrial, Oil & Gas, Marine, Food & Beverage

| | | |
|---|---|---|
| Drinking Water | Industrial Process Wastewater | RO Feed & Polish |
| Groundwater Remediation | High Purity Water | Reuse / Recharge |
| Disinfection & Sterilization | Bilge & Ballast Water | Zero Discharge / Closed Loop |

## Simple & Efficient:

- No catalyst loss - continuously recovers all catalyst, 24/7 duty, Catalytic process reduces energy requirements, Quiet
- No wipers, No membrane cleaning, No off gas, No waste generated, No UVT dependence, No chemical oxidants like peroxide or ozone. No Carbon Requirement.

## Automated:

- Audited not Operated, SCADA/PLC programmed operation
- Digital service manual online; Remote monitoring, control, and data logging
- Automatic fault detection and recovery, 0 to 100% turn down capability

## Ability to Treat:

- Insensitive to dissolved solids and opaque fluids, Not inhibited by turbidity, UVT or pH levels
- Not affected by pressure, temperature, alkalinity
- Operates with water containing iron and other metals

## Manufacturing Excellence:

- Corrosion resistant, High-grade stainless-steel construction, NEMA 4 rating
- Plug & Play installations
- Highly reliable using highly developed standard, off the shelf components

## Photo-Cat Models:

**Photo-Cat L**
**1kw-20L Batch**

**Photo-Cat DL**


Photo-Cat DDL

Photo-Cat QDL
Up to 4 MGD

## Sizing:

The product of Flow Rate X Rate Constant (Energy/Volume).

## The Next Step Is to Pilot: