Energy Engineering®
Sustainable Water Solutions

OXY-RADICALS™

ADVANCED OXIDATION TECHNOLOGY
FOR A CLEANER TOMORROW

INNOVATIVE

Water Treatment Solutions

For a Cleaner,
Greener Tomorrow



TREAT
CHALLENGING
EFFLUENTS

RECOVER
VALUABLE
WATER

REUSE
FOR A SUSTAINABLE
FUTURE

SUPPORT
CLEANER
INDUSTRIES

Energy Engineering
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ADVANCED OXIDATION
FOR A CLEANER TOMORROW



About Us

Energy Engineering is committed to delivering innovative and efficient water and wastewater treatment solutions for industrial applications. With a focus on super advanced oxidation technologies, we aim to help industries address complex effluent challenges, improve treatment efficiency, and explore opportunities for water reuse.

Our approach combines technology-driven solutions with practical industrial requirements, focusing on compact systems, operational efficiency, and simplified treatment processes.

Through our advanced **Oxy-Radicals™** technology, based on Oxy Cold Plasma and Ozone oxidation, we aim to address challenging wastewater streams containing high organic loads, persistent colour, and difficult-to-treat contaminants. Our solutions are designed to support industries seeking alternatives to conventional treatment methods, subject to effluent characteristics and performance validation.

We focus on applications across **Textile and Dyeing, Chemical Processing, Sugar, Distillery, and other Industrial Wastewater Sectors**, where conventional treatment systems may face limitations in handling complex effluents.

At Energy Engineering, we believe that effective water treatment should be technically sound, commercially practical, and environmentally responsible. We work towards helping industries move closer to their water quality, treatment, and reuse objectives through applications-specific solutions and performance-based evaluation.

Our Commitment

- Advanced oxidation-based treatment solutions
- Compact system design and efficient use of space
- Potential reduction in treatment complexity and operating requirements
- Solutions tailored to challenging industrial effluents
- A practical approach to water recovery and reuse

Innovative Solutions
for a Cleaner, Greener Tomorrow

OXY-RADICALS™ TECHNOLOGY

SUPER ADVANCED OXIDATION PROCESS (SAOP)

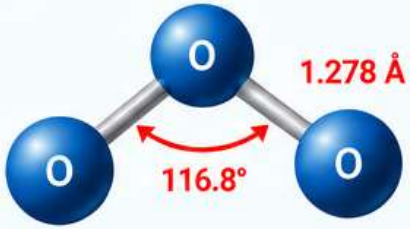
COMBINATION OF OZONE AND BIO-OXYGEN COLD PLASMA

FOR EFFECTIVE DEGRADATION OF COMPLEX POLLUTANTS

1. Oxy-Radicals is based on a patented technology developed by our Principle, combining small amount of ozone with Bio-Oxygen Cold Plasma at a controlled ratio to enhance oxidation performance.
2. Due to physico-chemical effect of oxygen cold plasma, there is generation of oxidizing radicals like O^-, OH^-, H^- that may degrade the pollutants present in wastewater or decompose the pollutants into another compound.
3. The technology is designed to break down complex organic pollutants, reduce Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD), and address colour and other contaminants in challenging wastewater streams.

OZONE (O_3)

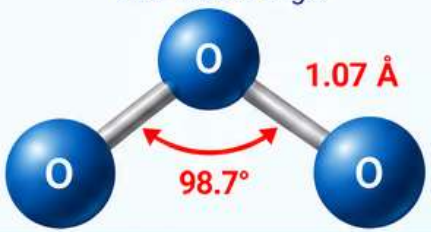
Bent molecular structure



Ozone is a strong oxidizing agent.

BIO-OXYGEN COLD PLASMA

Intermediate stage with lesser inter-atomic angle



Bio-Oxygen Cold Plasma has different (lesser) inter-atomic angles, making it more reactive than normal ozone.

OZONE

Generated by Ozone Generator



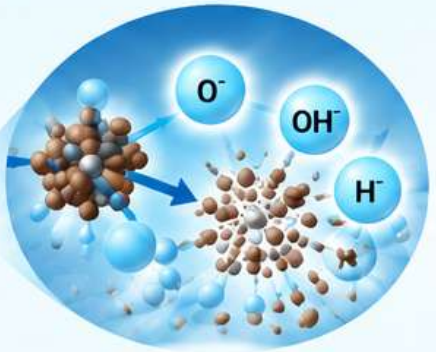
BIO-OXYGEN COLD PLASMA

Generated using Oxygen Cold Plasma Technology



Controlled Ratio Mixing





Oxidizing radicals attack and break down complex organic pollutants into simpler, non-toxic compounds.

Treated Water



INTENSIVE OXIDATION

Combination of Bio-Oxygen Cold Plasma and small amount of ozone promotes intensive oxidation within a dedicated contact system.

DEGRADES DIFFICULT POLLUTANTS

Targets difficult-to-treat organic compounds and supports the decomposition of pollutants in wastewater.

REDUCES COD, BOD & COLOUR

Effectively reduces Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) and address colour and other contaminants.

7.3 TIMES STRONGER THAN ONLY OZONE

7.3x

Oxy-Radicals Technology is 7.3 times stronger than only ozone. Hence this is a Super-Advanced Oxidizing Process (SAOP).

KEY BENEFITS
OXY-RADICALS™ TECHNOLOGY



NO AERATION

No mechanical aeration required. Eliminates blowers, air diffusers and aeration systems.



NO SLUDGE

No biological sludge generation, hence no sludge handling or disposal.



NO BIOLOGICAL TREATMENT

No microbes, no biological reactors, no culture management.



NO CHEMICAL TREATMENT

No additional chemicals required for treatment. Only pH correction if needed.



SMALL FOOTPRINT

Compact and modular system with significantly lower space requirement compared to conventional ETPs.



LOW MAINTENANCE

Simple operation with minimal moving parts. Low routine maintenance and operational hassles.

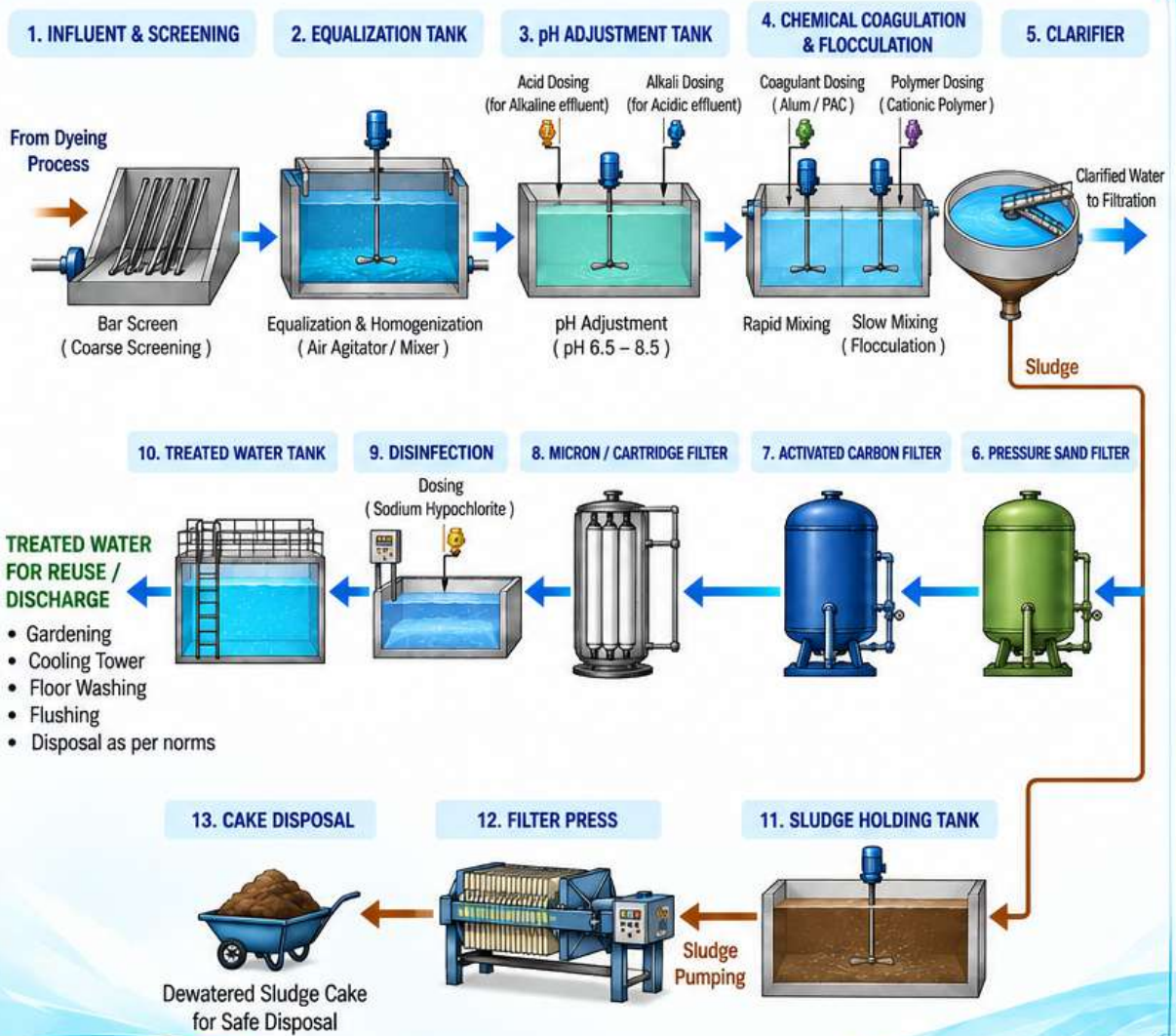


HENCE, VERY LOW COST / LITER

By eliminating aeration, sludge handling, biological treatment and chemical treatment, along with compact design and low maintenance, the overall treatment cost per litre is significantly reduced.



CONVENTIONAL ETP PROCESS FLOW



OXY-RADICALS™ ETP PROCESS FLOW



SECTOR-SPECIFIC APPLICATIONS

OXY-RADICALS™ TECHNOLOGY

1 Textile Dyeing & Processing



The Challenge:
Deep synthetic dye colors, high COD, and complex toxic fixative compounds that easily kill biological bacteria.

Oxy-Radicals Solution:
Decolorizes complex dye bonds instantly via direct advanced oxidation, producing highly clear water ready for factory floor recycling.

2 Chemical & Pharmaceutical Production



The Challenge:
Severe shock loads, high chemical toxicity variations, active pharmaceutical ingredients (APIs), and complex surfactants.

Oxy-Radicals Solution:
Purely physical-electrochemical infrastructure that treats fluctuating hazardous batches without suffering process shock.

3 Food, Dairy & Beverage Processing



The Challenge:
Rapidly fermenting organic sugars, high fats, oils, grease (FOG), biological odors, and rapid microbial growth.

Oxy-Radicals Solution:
Breaks down dense organic fats and eliminates strong odor compounds instantly without requiring massive sludge handling systems.

4 Distilleries & Tanneries



The Challenge:
Extremely high, recalcitrant organic loads (BOD/COD), dark molasses melanoidins, heavy chrome complexes, and sulfide compounds.

Oxy-Radicals Solution:
Destroys long-chain organic matter directly at the molecular level, bypassing the need for huge biological aeration basins.

5 Automotive & Electroplating Shops



The Challenge:
Heavy metal concentrations, emulsified cutting oils, degreasing chemicals, and toxic pickling acids.

Oxy-Radicals Solution:
Breaks chemical emulsions effortlessly, allowing easy physical separation of oily components without excessive polymer addition.

6 Commercial Real Estate & High-Rise STPs



The Challenge:
Extremely limited basement space, zero tolerance for noise/foul odors, and lack of dedicated specialized engineering staff.

Oxy-Radicals Solution:
Fully automated skid-mounted setup featuring an ultra-compact footprint, silent operations, and completely odor-free processing.

SUCCESSFUL INSTALLATIONS

Proven Performance Across Diverse Industries and Applications



Real Projects. Real Impact.

S. No.	Client Name	City / State	Plant Capacity	Year of Installation
1	Swachh Bharat Mission	WB	30/50 KLD (16 Plants)	2025-26
2	KIMS Hospitals	Telangana	30 KLD X 4 Plants	2023-24
3	Mass Holdings	Odisa	200 KLD	2026
4	SKY Panoramic	Goa	100 KLD	2026
5	Geetaranin Mines	Odisa	100 KLD	2024
6	Wheels India	Chennai	150 KLD	2024
7	Brainware University	WB	300 KLD	2024
8	Kakad Paradise	Mumbai	200 KLD	2025
9	Garhani Beer	Bihar	15 KLD	2025
10	Ramakrishna Mission	Odisa	150 KLD	2026
11	Aqua Treat	Vizag	30 KLD	2026
12	Zee School	Goa	300 KLD	2024
13	Rashmi Metalics	WB	350 KLD	2026
14	Ruposi Bangla Towers	WB	150 KLD	2022
15	BDBL Distillers	Jharkhand	20 KLD	2026

OUR SERVICES

Greenfield Projects

End-to-end design, engineering and execution for new installations.



Retrofits & Brownfield Upgrades

Upgrade existing systems for better performance and cost savings.



Zero Liquid Discharge (ZLD)

Sustainable solutions for minimal liquid discharge.



Water Audits

Comprehensive assessment to identify treatment opportunities and optimisation potential.



Pilot Trial Testing

On-site or off-site pilot trials to validate performance with your actual effluent.



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