

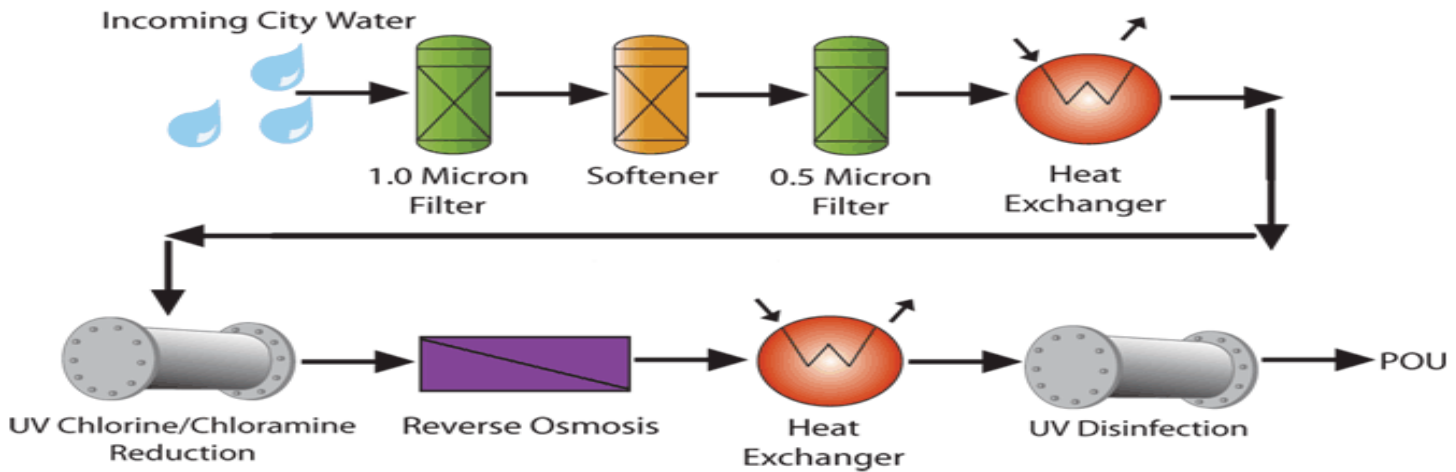
A collection of laboratory glassware including Erlenmeyer flasks and a beaker, each containing a different colored liquid. The liquids range from yellow to blue. A glass rod is placed in the central beaker. The background is a dark, textured surface with a blue and purple light gradient.

# ACME Chemical

Making Bonds for Life

# UV Treatment

## WATER TREATMENT SYSTEM





# Advantages



- There is no residual effect that is harmful to either human beings or aquatic life.
- UV treatment is also “user-friendly”.
- UV treatment has a shorter contact time with low-pressure lamps.
- UV treatment equipment takes up less space than alternative methods (Agency, 1999).



# Disadvantages



- A preventive maintenance program is necessary to control fouling of tubes.
- Turbidity and suspended solids (TSS) in the wastewater can render UV disinfection ineffective. UV disinfection with low-pressure lamps is not as effective for secondary effluent with TSS levels above 30 mg.
- UV treatment is not as cost-effective as chlorination, but costs are competitive when chlorination-dechlorination is used and fire codes are met (Agency, 1999).



# Key Considerations

- Hydraulic properties of the reactor: Ideally, a UV treatment system should have a uniform flow with enough axial motion (radial mixing) to maximize exposure to UV radiation.
- Intensity of the UV radiation: Factors affecting the intensity are the age of the lamps, lamp fouling, and the configuration and placement of lamps in the reactor.
- Wastewater characteristics: Both the concentration of TSS and the concentration of particle-associated microorganisms determine how much UV radiation ultimately reaches the target organism. The higher these concentrations, the lower the UV radiation absorbed by the organisms (Agency, 1999) .

# WEDECO

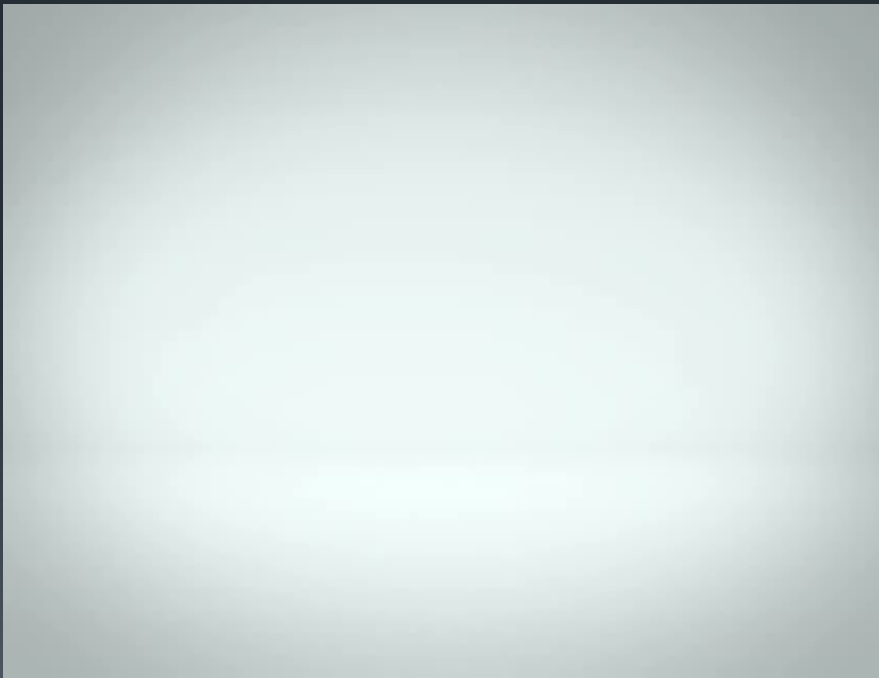
On July 14, 1976, Werner Klink and Horst Wedekamp founded WEDECO. The production and marketing of the first UV water disinfection systems began on a small scale with six employees. WEDECO systems were used in a wide variety of applications, such as disinfection of aquarium pool and exhibit water in zoological parks (WEDECO - from Pioneer to Global Brand, 2013).





# DURON

Nearly 40 years of engineering and over 20 years experiences with vertical UV disinfection systems led us to DURON: a vertical 45° inclined system for waste water disinfection (DURON: Shining new lights on original ideas, 2013).





# Implementation

- Wedeco: Duron \$75,600 per unit
- Installation \$10,000 per unit
- Cost per Unit/Installation: \$85,600 x3
- Total Cost: \$256,800



# Costs Wastewater Treatment/ Disposal

## Off-Site Incineration Costs

- TAC/5-MBT: Toluene  
\$10,000x2 (\$20,000 per  
month)
- 2-MTZ: Acetonitrile  
\$10,000/Heptane \$5,000  
@\$15,000 per month
- CAT: Dichloromethane  
@\$5,000 per month
- Non-Halogenated Solvents:  
@\$20,000 per month  
\$12,000 per month (Walker,  
2013).

## Off-Site Aqueous Waste Treatment Costs

- TAC @\$32,000 per month
- 5-MBT @\$30,000 per month
- 2-MTZ @\$2,000 per month
- CAT @\$1,000 per month
- Neutralized Aqueous Waste  
@\$12,000 per month  
(Walker, 2013).



# Benefits

- Off-Site Incineration Costs: Total: \$60,000 per month
- Off-Site Treatment Costs Total: \$77,000 per month
- Total Cost Wastewater Treatment/Disposal per Month: \$137,000 (Walker, 2013).
- Estimated Savings: -\$150,000\* or 20% of the Total Cost of Off-Site Wastewater Treatment/Disposal per year.

\*Pending tests

## References

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**Agency, T. E.** (1999). ***Wastewater Technology Fact Sheet Ultraviolet Disinfection.***

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