

Agenda

- Introduction
- Principles of UV Disinfection
- Applications & Benefits
- Wedeco UV Portfolio
- References
- Competitors Overview
- Aquada UV Series Technical Documentation



The background of the slide is a blurred photograph of industrial machinery, likely a paper mill or textile factory. The image is out of focus, showing various mechanical parts, pipes, and structural elements in shades of grey and white. The overall tone is light and professional.

WEDECO

Introduction

Introduction

Wedeco a Xylem Brand – World Leader in UV and Ozone Technology

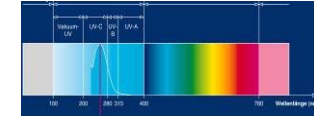


Ozone

Oxidation



UV



Disinfection



Experience since 1976

More Than 300,000 installations worldwide

Wedeco, Herford: Production and Services

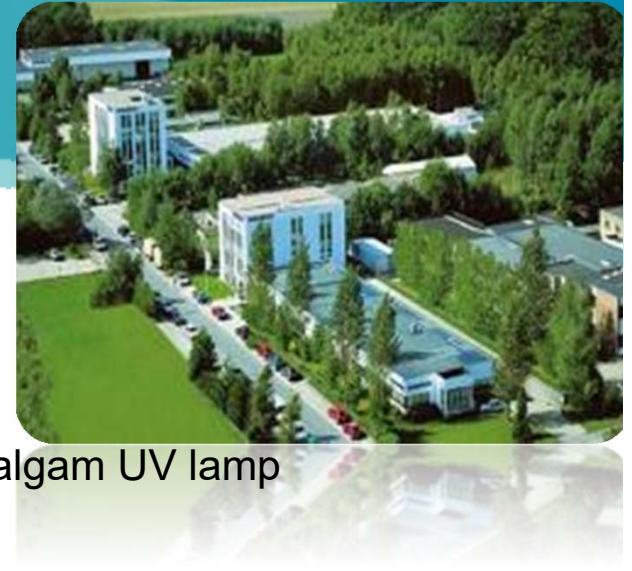


Revenue 2019: 150 Mio.\$
Employees: 290

World Leader in UV Disinfection & Ozone Oxidation

Introduction

Wedeco a Xylem Brand



- **1976** Wedeco was founded by Werner Klink and Horst Wedekamp
- **1979** Wedeco developed first low pressure high output (Lo-Hi) Amalgam UV lamp
- **1988** Wedeco starts manufacturing ozone generators
- **1994** Wedeco developed first EFFIZON® electrode
- **1999** Wedeco went to the stock market as the WEDECO WATER TECHNOLOG'
- **2001** Wedeco starts own UV lamp development and production
- **2004** Wedeco became a brand within ITT Industries
- **2010** Wedeco developed the ECORAY® UV lamp technology
- **2011** Wedeco became a brand within Xylem Water Solutions
- **2014** Wedeco launched the the ozone electrode generation EFFIZON® evo 2G



YEARS OF
PASSION
FOR WATER



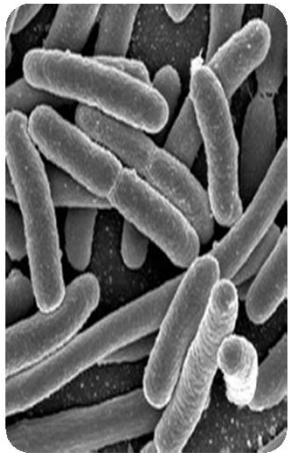
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Principle of UV Disinfection

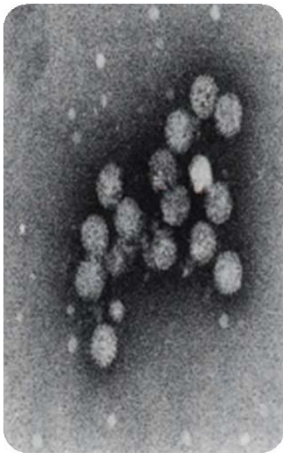
Waterborne Microorganisms

Microorganisms in drinking and waste water represent a risk to public health.

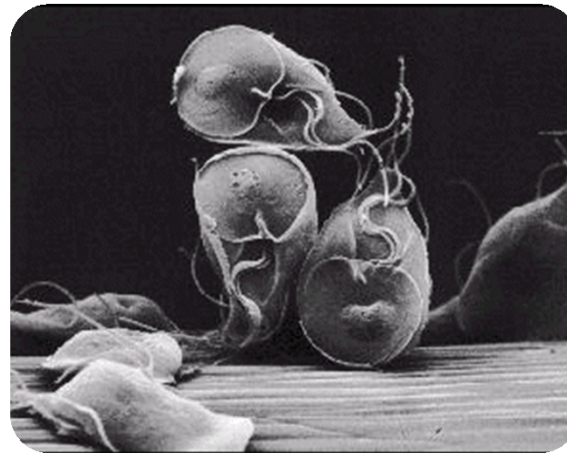
Bacteria
(*E.coli*)



Viruses
(*Polio*)

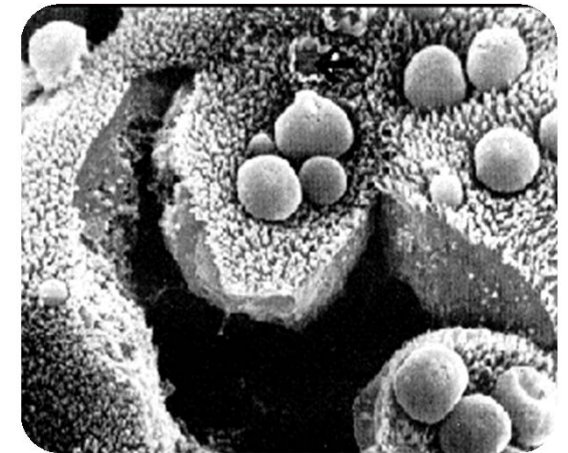


(*Giardia*)



Protozoa

(*Cryptosporidium*)



Bacteria

i.e. Escherichia coli, Fecal coliforms

Disease

Diarrheal, cramps, fever

Why Disinfection?

- Inactivate microorganisms to improve water quality and save human health
- Reuse water in stressed regions that face water scarcity
- Disinfection is required by law

Why using UV?

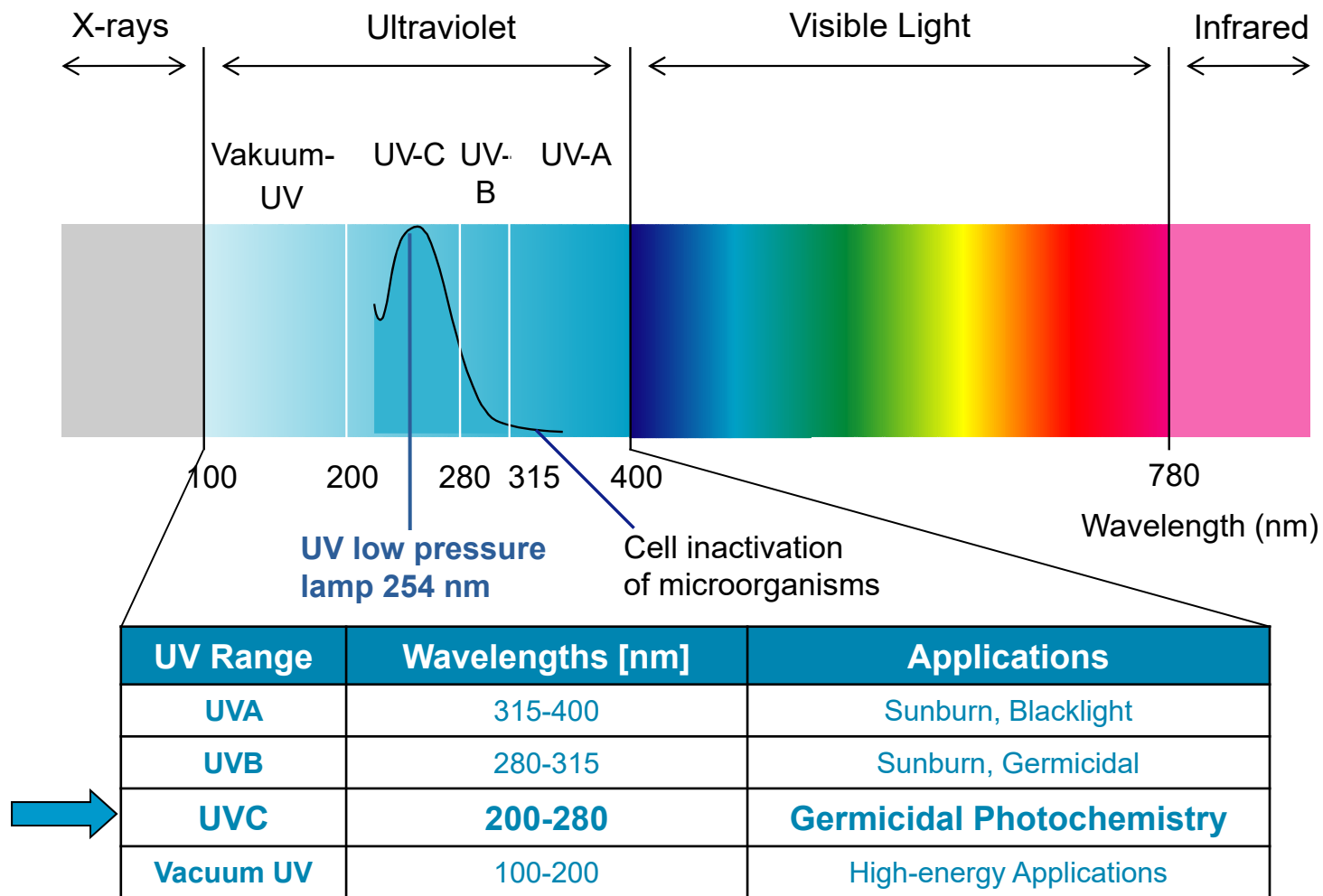
- No by-products & chemicals
- Safer for downstream communities
- Safer for public and environment
- Reliable & proven technology



Principle of UV

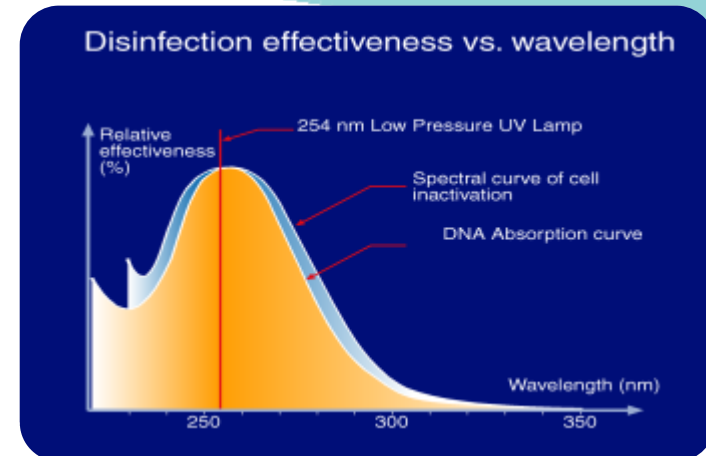
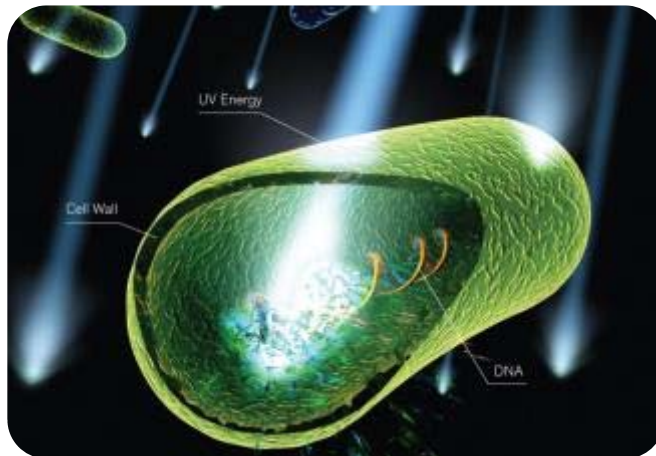
Light Spectra

Inactivation of pathogenic microorganisms via photo-oxidation of DNA



Principle of UV

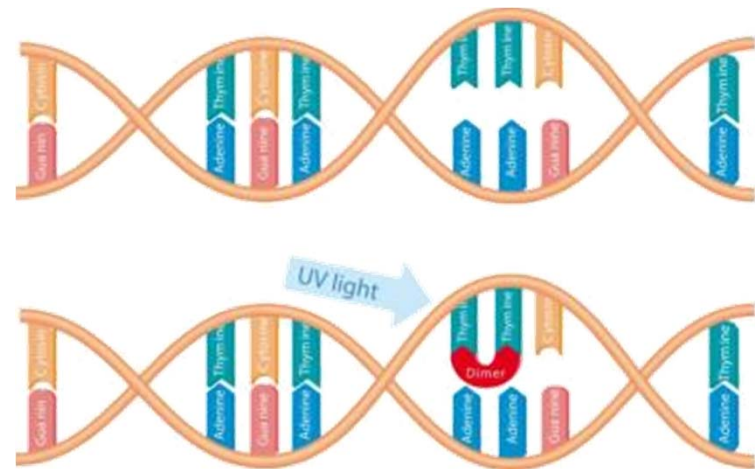
DNA Absorption Curve



UV-C irradiation @ 254nm optimum for disinfection

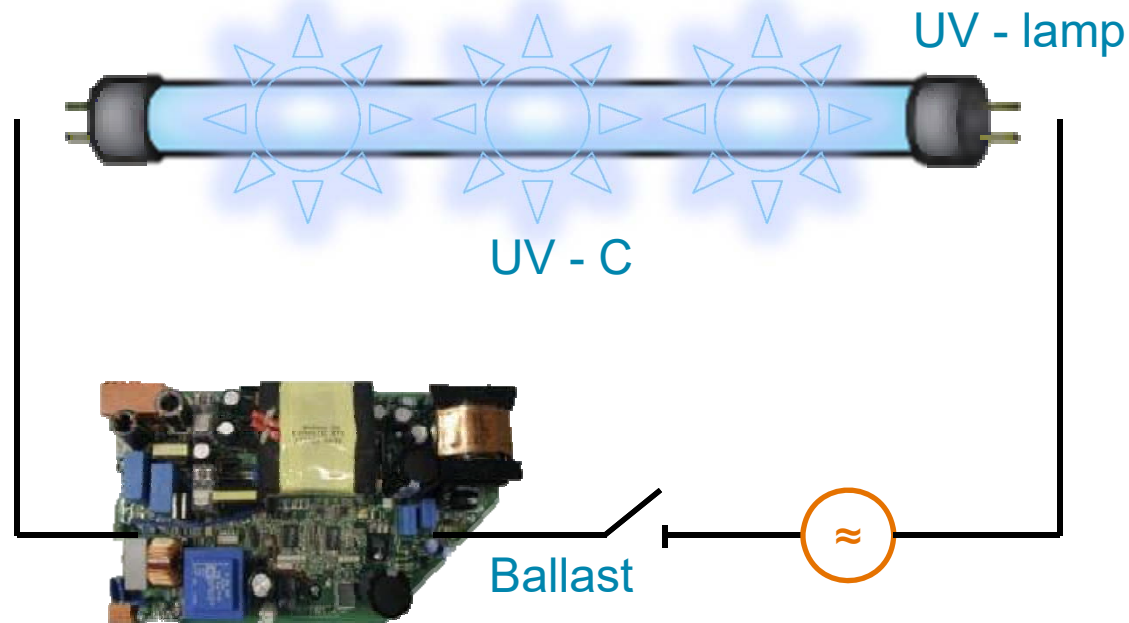
UV light absorbed by the microorganisms permanently alters their DNA which is called *thymine dimerization*.

The microorganisms are inactivated and rendered unable to reproduce or infect.

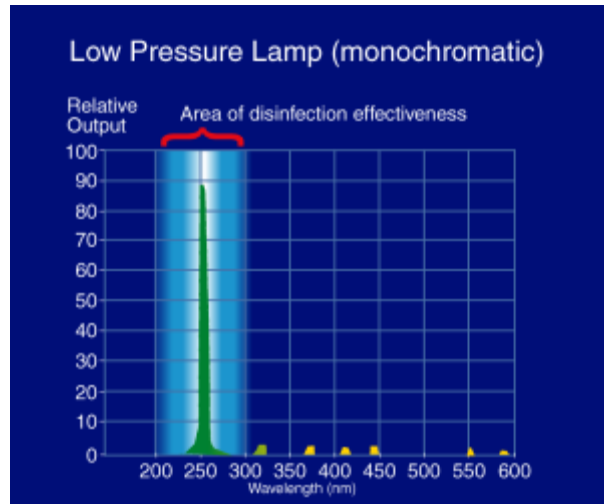


Generation of UV Light

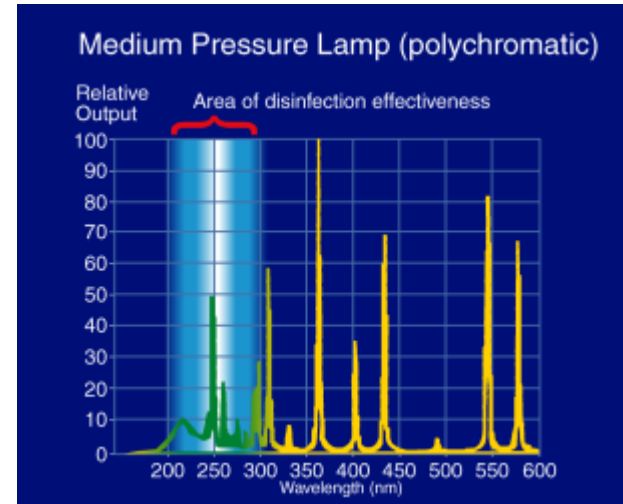
- Basis: Mercury atoms in gas discharge lamps (like fluorescent bulbs)
- ✓ Electrical field brings mercury into energized but unstable state
- ✓ Release of energy = emission of UVC light



2 different Types of UV Lamp



- Hg vapour pressure $\sim 0.2 - 2$ Pa
- Power per lamp ≤ 1 kW
- Efficiency $\sim 41\%$
- Lamp life up to 15,000 hrs
- Lamp temperature $\sim 120^\circ\text{C}$
- No cool-down before re-start
- Liquid (conventional) or solid state (amalgam) mercury
- No solarisation of quartz sleeve

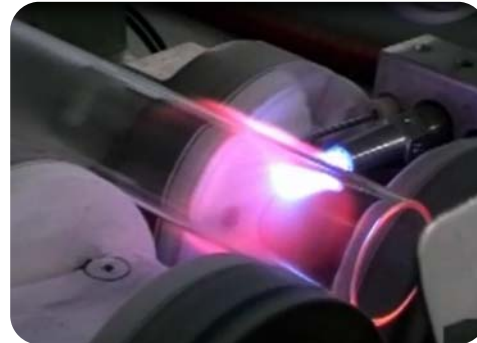


- Hg vapour pressure $> 40,000$ Pa
- Power per lamp up to 20 kW
- Efficiency $\sim 12\%$
- Lamp life 3,000 – 8,000 hrs
- Lamp temperature $600 - 800^\circ\text{C}$
- Cool-down before re-start
- Liquid mercury
- Solarisation of quartz sleeve

Lamp & Ballast Technology

Ecoray[®] technology:

Proprietary lamp and ballast development with more than 15 years of in-house expertise means perfectly matched lamp and ballast for highest efficiency



From Wedeco's lamp facility in Essen, Germany

The background of the slide is a blurred photograph of industrial machinery, likely a conveyor belt system, with various rollers and mechanical components visible. The overall color palette is light and airy, with a soft blue tint.

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Benefits & Applications

The Benefits

Easy and reliable to apply

No change of water
chemistry

Disinfection within seconds

No need of contact tank

No by products or residuals

No effect on odour and taste

No regrowth of viruses,
bacteria and parasites

No corrosion

No hazardous chemicals
handling, transport &
storage

No resistance as with
chlorine

Less space requirement

On site disinfectant
production

Strong movement from chemical disinfection to physical biotechnology

Why to choose UV disinfection?

CHLORINATION	UV
AFFECTS TASTE & ODOUR	NO AFFECT ON TASTE & ODOR
PRODUCES DBP's (CARCINOGEN)	NO DBP's (NOT CARCINOGEN)
HAZARDOUS CHEMICALS	NO HAZARDOUS CHEMICALS
CHANGE OF WATER CHEMISTRY	NO CHANGE OF WATER CHEMISTRY
CORROSIVE	NON CORROSIVE
LONG CONTACT TIME (EASIELY 25 min)	SHORT CONTACT TIME (< 5 sec)
TOXIC	NON TOXIC

UV Applications Overview

☞ Drinking water

- Raw water disinfection
- Chlorine removal
- Protection of ion exchanger and membranes

☞ Bio-Pharma, Cosmetic

- Protection of ion exchange + membranes
- Disinfection of Purified or DI water
- Ozone destruction below detection level
- Disinfection of blood serum
- DI water for dialysis machines
- TOC reduction in RO water

☞ Micro-electronic

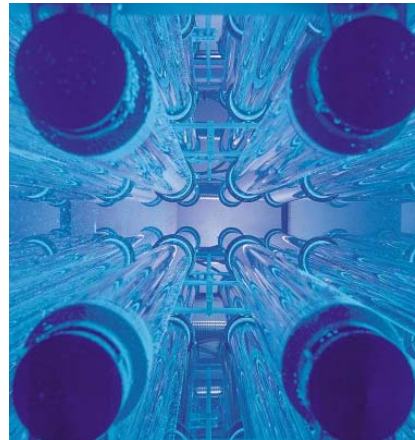
- TOC reduction
- Disinfection

☞ Ships and Trains

- Drinking water and waste water
- Ballast water disinfection

☞ Recycling + Waste Water

- Disinfection of waste water
- Disinfection of recycling water



☞ Aqua Culture / Zoos

- Fresh water disinfection
- Recycling water disinfection
- Waste water disinfection

☞ Food & Beverage

- Disinfection of product and brewing water
- Disinfection of CIP water
- Table water disinfection
- Disinfection of liquid sugar
- Bottles and Caps Rinsing

☞ Swimming Pools

- Chloramine destruction
- Disinfection

☞ Process water

- Deionised water disinfection
- Water recycling -automotive industry
- Hot water loop disinfection (legionella)
- Cooling water disinfection

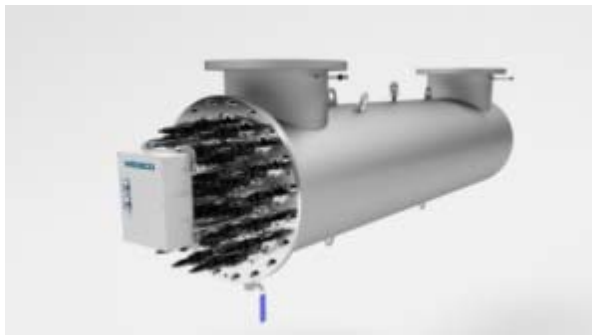
Wedeco's UV Portfolio



In General: 2 different Types of UV Systems

Closed Reactors (pressurized)

- Main applications: drinking water, water reuse, industrial applications
- Typically standardized systems
- Installation in pipework
- Isolation valves required



Open Channel (Gravity fed)

- Main applications: wastewater, aquaculture
- Modular design
- Installation typically in concrete channels
- Water level control required



General Concept of a UV System



Lamp



Quartz sleeve



Sensor



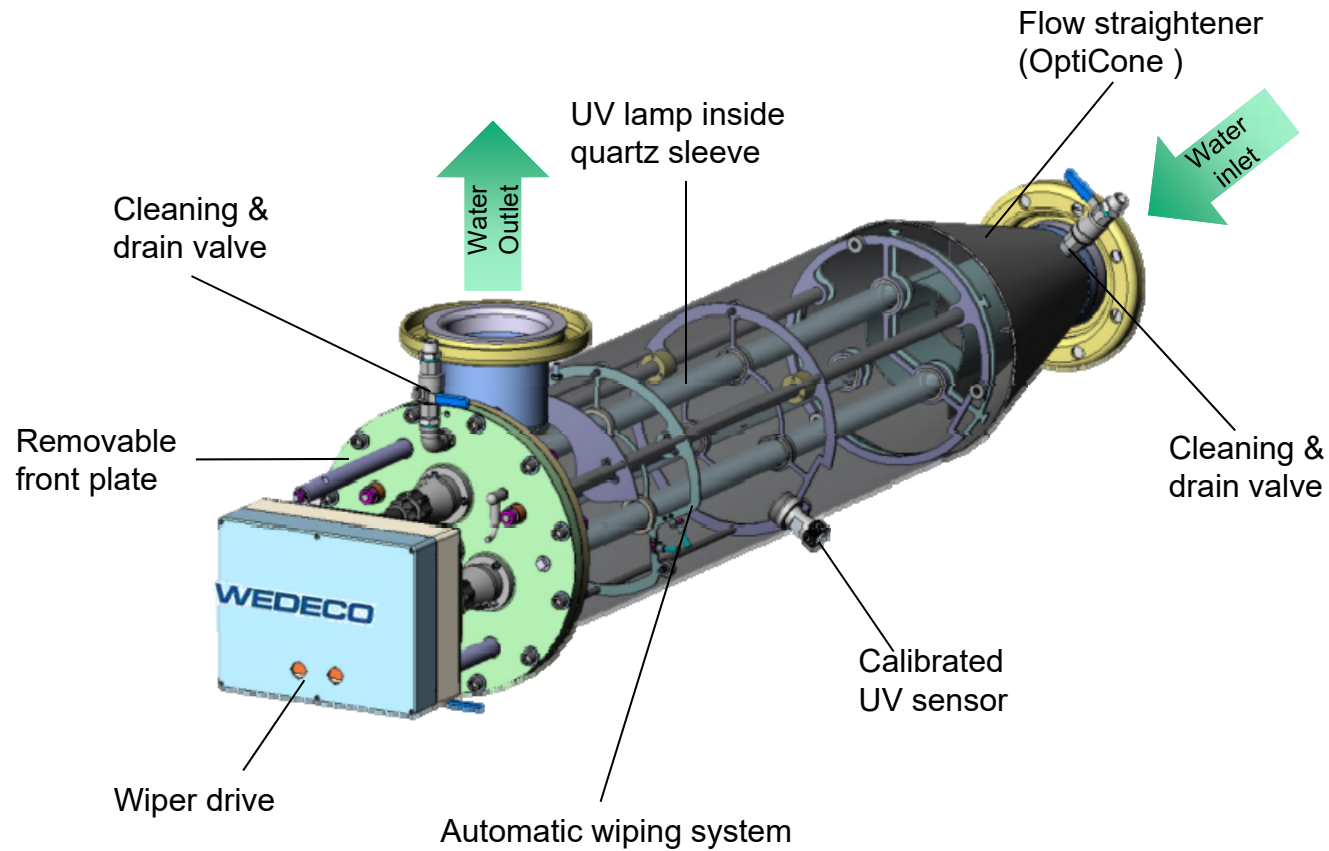
Ballast



Cabinet & Controller

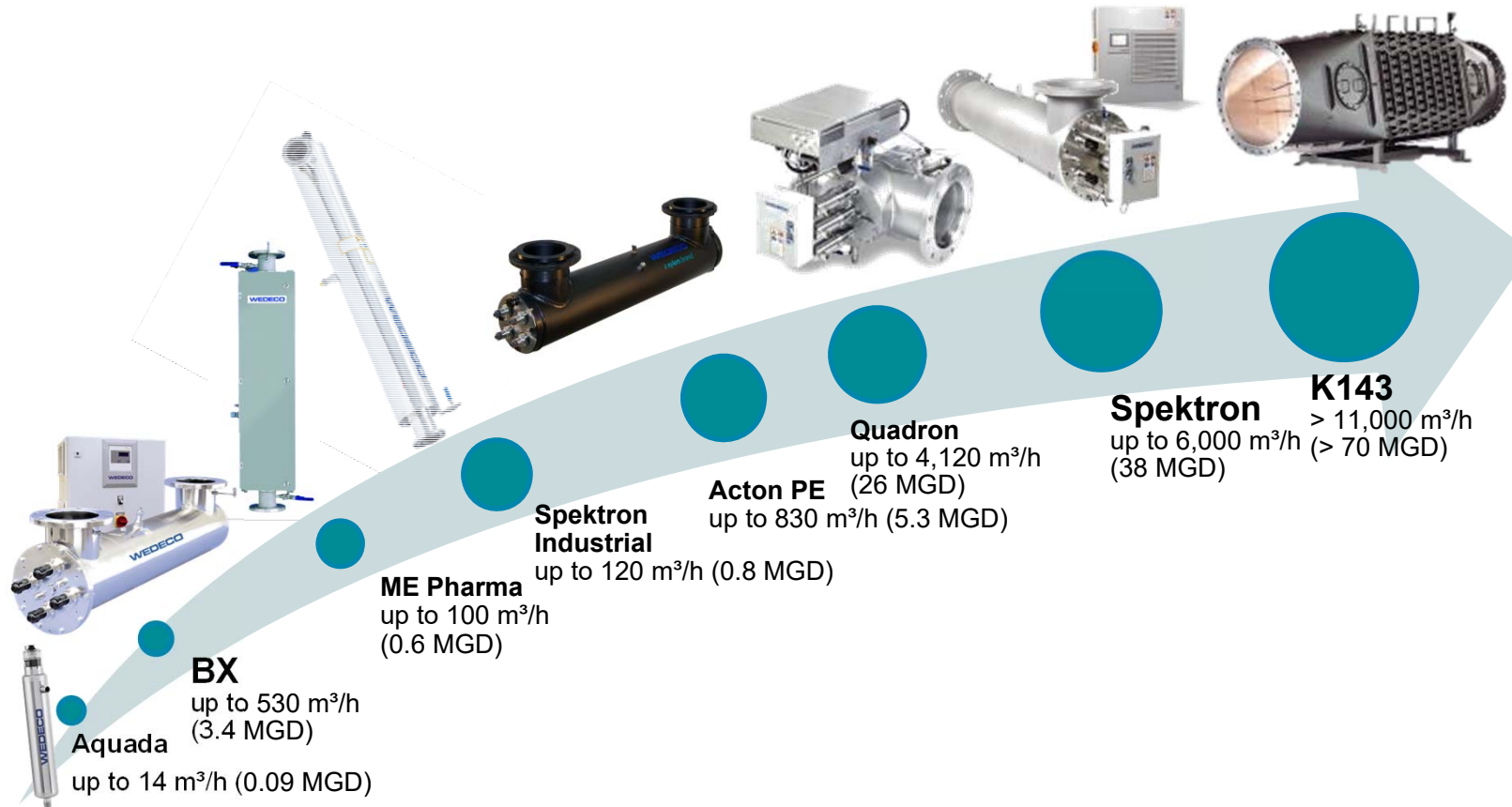


Components of Closed Vessel UV Systems

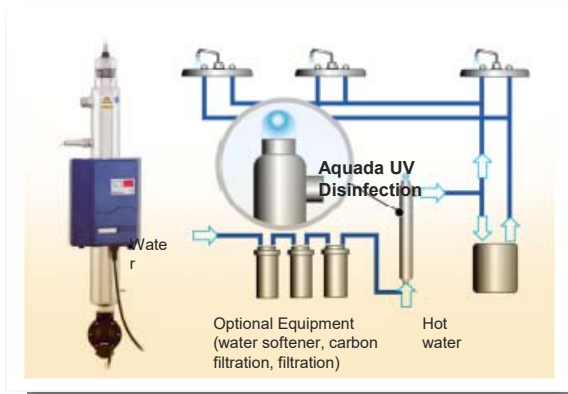


UV Disinfection – Wedeco Closed Reactor (LBX Series)

Wedeco UV Portfolio 1: Solutions for Clean Water Applications



Details on Clean Water Application Portfolio 1/2



Aquada: max. 14 m³/h
(0.09 MGD)

- Households and commercial users
- Mainly POE (point of entry)
- Single lamp units
- 5 different models with 3 options



Spektron: max. 6,000 m³/h
(38 MGD)

- Municipal drinking water supply
- Multiple lamp units (max. 60) with lamps parallel to flow
- Optional wiping system
- 17 different models

Details on Clean Water Application Portfolio 2/2



Spektron Industrial:

max. 120 m³/h
(0.8 MGD)

- Industrial applications, e.g. food and beverage
- Single and multiple lamp units (max. 3) with lamps parallel to flow
- 7 different models



Acton PE:

max. 830 m³/h
(5.3 MGD)

- Industrial applications, e.g. aquaculture (highly corrosive media)
- Multiple lamp units (max. 6) with lamps parallel to flow
- 5 different models

A blurred background image of industrial machinery, likely a paper mill, with various rollers and mechanical components visible in shades of blue and white.

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References

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a xylem brand

Ozone Plant References: Bottling Water Plant disinfection

Customer:

- Nestlé Waters Factory H & O, LLC – Dubai, U.A.E
- Producer of bottling drinking Water (5 gallon, 5 lits, 1.5 lits, 0.5 lits)

Problem :

- - Hygienic sensitive, avoid chlorine for storage water tank / Reverse osmosis.
- - 4 log bacteria, virus reduction with ÖNORM certified UV system.

Xylem Solution:

- 1 X Spektron 100 : ÖNORM M5873-1 (40 mj/cm²) UV system design for membrane bio-fouling
- 2 X Spektron 70 : ÖNORM M5873-1 (40 mj/cm²) UV system design for Post RO permeate water disinfection
- 1 X Spektron 70 : ÖNORM M5873-1 (40 mj/cm²) UV system design for Storage tank recirculation
- 1 X OCS GSO 10 : Maintaining residual Ozone in bottling water. Minimizing formation of bromide



Ozone Plant References: Bottling Water Plant disinfection

Customer:

- Al Janoub Water, Sabya KSA
- Producer of bottling drinking Water (5 gallon, 5 lits, 1.5 lits, 0.5 lits)

Problem :

- - Potential for bacterial infection in recirc loops
- - Adequate Ozonation of process water

Xylem Solution:

- 2 X Spektron 70 : UV system design for Post RO permeate water disinfection
- 4 X Spektron 25 : UV system design for Storage tank recirculation
- 2 X OCS GSO 10 : Maintaining residual Ozone in bottling water
- 1 X COD 73 with blower : Ozone destruction



References

Customer: Vattenverket Marienberg – Uddevalla (Sweden)

- 3 x Spektron 650e
- Flow: 700 m³/h (4.5 MGD)
- UVT: 82.9%
- UV Dose: 40 J/m² (UVDGM)
- Installation: 2013



References

Customer: Söderhamn Nära AB , Sweden

- Plant: Ålsjöns VV
- System: 2 x Spektron 650e
- Flow: 160 m³/h
- UV Dose: 40 mJ/cm² UVDGM
- Installation: 2013



References

Customer: Erlanger Stadtwerke AG, Germany

- Plant: Wasserwerk Eltersdorf
- System: 1 x Spektron 2000e
- Flow: 432 m³/h
- UVT: 91%
- UV Dose: 40 mJ/cm² DVGW
- Installation: 2015



References

Customer: Grey District Council, NZ

- Plant: Coal Creek, Greymouth, South Island, NZ
- System: 2 x Spektron 650e
- Flow: 640 m³/h
- UVT: 87%
- UV Dose: 40 mJ/cm² UVDGM
- Installation: 2015



References

- Customer: Yorkshire Water
Plants: Great Heck & Cowick WTWs
System: 2 x Spektron 650e
 2 x Spektron 2000e
- Flow: 284 and 625 m³/h per reactor
 - UVT: 90%
 - UV Dose: 40 mJ/cm² (DVGW)
 - Installation: 2016



References

Customer: Purena GmbH, Burgdorf - Germany

- System: Spektron 350e
- Flow: 230 m³/h
- SAK254 nm = 3,3 m⁻¹
- Design: 40 mJ/cm² DVGW
- Installation: 11 / 2012



References

Customer: Snells Beach WTP - New Zealand

- System: 2 x Spektron 180e
- Flow: 120 m³/h
- UVT: 95.6%
- UV Dose: 40 mJ/cm² DVGW
- Installation: 2013



References

Customer: SW Gaggenau, WW Muggensturm

- System: 2 x Spektron 650e
- Flow: 450 m³/h per reactor
- UVT: 93 %
- UV Dose: 40 mJ/cm² DVGW
- Installation: 2016



References

Customer: Stadtwerke Uslar

- Plant: Wasserwerk Eschershausen
- System: Spektron 150
- Flow: 200 m³/h
- Design: 40 mJ/cm² DVGW
- Installation: 12/2007



References

Customer: City Nieheim - Germany

- Plant: Spring Erwitzen
- System: Spektron 25 S
- Flow: 35 m³/h
- Design: 40 mJ/cm² DVGW
- Installation: 02/2007



References

Customer: Ingolstadt - Germany

- System: Spektron 250
- Flow: 160 m³/h
- UVT: 98%
- Design: 40 mJ/cm² DVGW
- Installation: 2001



References

Customer: Enrotec - Luxemburg

- Plant: Waterworks Pulvermühle
- System: Spektron 250
- Flow: 255 m³/h
- UVT: 95%
- Design: 40 mJ/cm² DVGW





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Competitors Overview

Competitor Overview

TROJAN **UV**[™]
WATER CONFIDENCE[™]



Ready ...Set...Go!!!

o3ONIA



ProMinent[®]

ultraviolet.com
Atlantic Ultraviolet Corporation

WEDECO
a xylem brand



WEDECO

Aquada UV Series Data Sheet

xylem

Let's Solve Water