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SMOevo^{PLUS} Ozone Systems

Superior treatment and minimum energy

WEDECO
xylem

Ozone systems

Effective and environmentally friendly on-site production

Ozone is one of the most powerful commercially available oxidants and is commonly used for municipal water and wastewater treatment.

Xylem's WEDECO® brand ozone generators provide a cost effective means of producing ozone from an oxygen source.

The ozone generator

The central element in ozone production is the ozone generator, which produces the gas on-site from oxygen. If an easy-to-use system to fulfill small to medium ozone production requirements is needed, then look no further than Xylem's WEDECO SMOevo^{PLUS} ozone generators—a completely integrated system capable of producing 20 to 1,300 lbs. of ozone per day or 400 g to 25 kg per hour.

Xylem's SMOevo^{PLUS} ozone generators deliver maximum performance with a large range of customization options to meet specific needs. SMOevo^{PLUS} systems feature enhanced Effizon® evo 3G electrode technology and a superior generator design. The result is unequalled solutions in terms of performance, efficiency and operational stability.

Effizon evo 3G electrodes are the core components that use oxygen and energy in an efficient manner to generate ozone. The ozone production process also requires cooling water for heat dissipation and maintaining an efficient process. It is the sophisticated interplay between these components and processes that distinguishes the high efficiency, reliability and flexibility of WEDECO ozone systems.

Elements that achieve high efficiency, reliability and flexibility

Energy savings

WEDECO® brand ozone generators are among the most energy-efficient in the world. With Effizon® evo 3G electrodes, energy consumption has been reduced by up to 25%.[1]

Oxygen source flexibility

The Effizon evo 3G electrode technology allows up to 30 times less nitrogen than comparable competitor solutions. This considerably reduces the formation of nitrogen oxides (NOx), as well as potential corrosion and performance issues. Furthermore, the technique is insensitive to elevated concentrations of hydrocarbons (THC) in the feedgas supply. This permits a high degree of flexibility when selecting potential gas suppliers. WEDECO brand generators can be designed and delivered ready to utilize different oxygen sources such as air, liquid oxygen, or on-site generated (PSA) oxygen.

Cooling water

Efficient cooling of the electrodes is crucial for optimizing plant performance. The new Effizon SMOevo^{PLUS} generator is engineered to excel in this regard, using up to 60% less cooling by using cooling water proportionate to the demand. Peak ozone production efficiency is maintained even when cooling water temperatures reach as high as 35°C/95°F. This superior performance ensures both high efficiency and reduced water consumption, making the SMOevo^{PLUS} system an exceptional choice for demanding operating environments.

Effizon® SMOevo^{PLUS}

Engineered to be the best choice for every application

The Effizon SMOevo^{PLUS} series of ozone generators combines maximum flexibility and reliability for small to medium ozone capacities. The ozone generator system and control unit can be combined and supplemented with numerous option sets that allow project-specific customization for almost all applications.

The ozone production vessel, power supply unit and control systems are installed on a compact, packaged skid requiring only minor service connections to complete the installation. Since all pipework, instrumentation and cabling are fitted and tested prior to delivery of each Effizon SMOevo^{PLUS} generator, the installation and start-up time on site are reduced by as much as 60%!

WEDECO® branded Effizon SMOevo^{PLUS} generators are equipped with a PLC system for internal control and monitoring of the ozone system. The local interface panel ensures that operators can easily and quickly access system parameters and controls that are vital to the operation of an ozone generator.

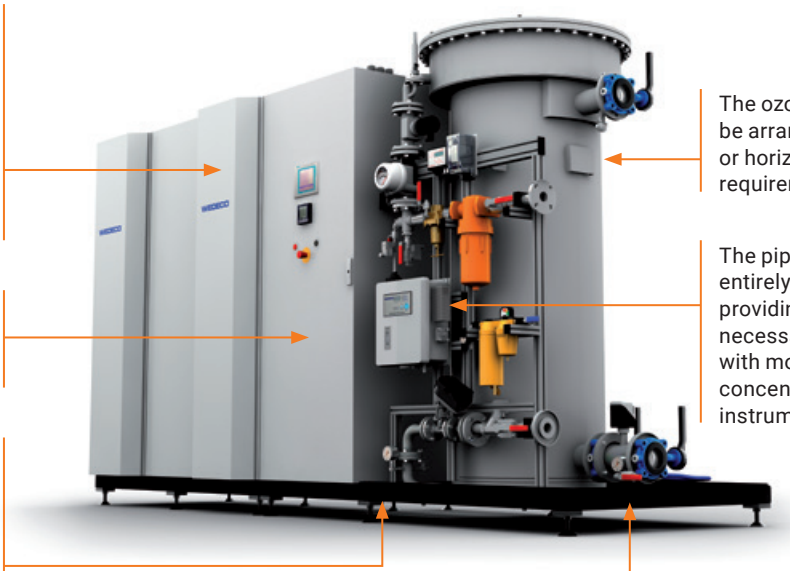
Integrated sustainability

WEDECO brand ozone systems minimize energy consumption and increase system reliability Xylem's production facilities conform to recognized international environmental management standards (ISO 14001).

The air conditioning system separates the electrical components from the ambient air and ensures protection class IP 54. This allows operation under ambient conditions with high temperatures (up to 35°C/95°F), high humidity (up to 90%), and harsh or dusty surroundings.

The power supply unit is equipped with state-of-the-art semiconductors technology (IGBT) for improved system control.

The generator vessel and power supply are separate units and can be arranged separately as an option. Forklift access from all sides is also provided, allowing for easy transportation and installation.



The ozone generator can be arranged either upright or horizontally to suit local requirements.

The pipework is made entirely from stainless steel, providing flange fittings where necessary, and is equipped with monitoring and optional concentration measurement instruments.

The footprint is reduced by up to 20% as a result of the optimum arrangement of the generator vessel, pipework and electrical cabinets.

Fast startup in seconds

The medium sized Effizon SMOevo^{PLUS} systems achieve automatic control of ozone production from 1–100% (using 1% increments), depending on the actual required amounts of ozone. Achieving the full rated ozone production capacity requires atime of less than 30 seconds—a valuable advantage in overall process control.

Effizon® evo 3G

Intelligent electrode protection making fuses a thing of the past

The Effizon evo 3G electrode, the core element of every Effizon SMOevo^{PLUS} ozone system, enables a level of reliability and energy efficiency that is unattainable with most other electrode technologies. The distinctive features of this electrode include its unique glass core and double discharge gap. Ozone is formed on both sides of the dielectric, therefore lowering the applied specific energy and increasing ozone production.

The electrodes are manufactured from inert materials making them highly resistant to corrosion. WEDECO® brand ozone generators are practically maintenance free, eliminating the need for regular cleaning or replacement of the electrodes[1].

Effizon evo 3G electrodes also feature independently operated internal safety features—Intelligent Electrode Protection (IEP). IEP complements the existing active protection interlocks inside the power supply unit with an additional passive electrode protection. With glass core technology, IEP does not rely on active controlled processes Further, in contrast to traditional protections such as fuses or coatings, the innovative Intelligent Electrode Protection is not prone to false detection of electrode defects.

Creating ozone by silent electrical discharge

Effizon evo 3G electrodes create ozone using the principle of silent electrical discharge, transforming oxygen molecules to ozone.

Medium voltage with variable frequency control is applied between the grounded tube and the electrode. Both elements are separated by a dielectric.

The unique dual gap electrode technology guides the oxygen gas flow across the electrical field formed on the inside and outside of the glass tube dielectric. A fraction of the oxygen molecules is split in the electric field and spontaneously form ozone molecules by combining with another oxygen molecule. This is resulting in efficient and increased ozone production on both sides of the dielectric element due to lowering the applied specific energy.

Customizable options for the Effizon® SMOevo^{PLUS}

Effizon SMOevo^{PLUS} series ozone generators offer a comprehensive range of options and ancillary equipment, all designed to enhance performance and flexibility and to ensure optimal operation.

Options

Containerized systems	• Insulated, lighted and painted container • Electric heating and ventilation fan
Instrumentation and control	• Ozone concentration control • Ozone residual monitoring • Alarm monitoring and indication • Complete alarm systems in compliance with international standards
Feed gas supply options	• Liquid oxygen (normally supplied by the oxygen manufacturer) • PSA—Oxygen (On-site generation, Pressure swing adsorption) • Air preparation comprising air compressor, desiccant dryer, filtration
Ozone mixing and contacting	• Side stream injection systems • Fine bubbles diffusers • Closed reactors • Degassing tanks • Demistors
Electronic process control	• Operation panel • Overall process control
Ozone destruction in off gas	• Catalytic ozone destructor • Blowers
Cooling water supply	• Air/water cooled chiller units • Heat exchangers

Technical data

	Ozone output from feed gas oxygen		Ozone output from feed gas air	
SMOevo^{PLUS} 410	2.4 kg/h	128 PPD	1.2 kg/h	68 PPD
SMOevo^{PLUS} 460	2.5 kg/h	131 PPD	1.3 kg/h	71 PPD
SMOevo^{PLUS} 510	3.4 kg/h	229 PPD	2.2 kg/h	116 PPD
SMOevo^{PLUS} 560	4.4 kg/h	263 PPD	2.7 kg/h	142 PPD
SMOevo^{PLUS} 610	9.3 kg/h	491 PPD	4.4 kg/h	232 PPD
SMOevo^{PLUS} 660	9.9 kg/h	520 PPD	5.3 kg/h	280 PPD
SMOevo^{PLUS} 710	12.1 kg/h	634 PPD	5.7 kg/h	300 PPD
SMOevo^{PLUS} 760	13.3 kg/h	698 PPD	7.1 kg/h	376 PPD
SMOevo^{PLUS} 810	15.5 kg/h	810 PPD	7.2 kg/h	383 PPD
SMOevo^{PLUS} 860	16.6 kg/h	870 PPD	8.9 kg/h	469 PPD
SMOevo^{PLUS} 910	23.0 kg/h	1,205 PPD	11.0 kg/h	556 PPD
SMOevo^{PLUS} 960	24.5 kg/h	1,284 PPD	11.8 kg/h	626 PPD

Cooling water temperature: 5°C–35°C/41°F–95°F
Ozone concentrations: 2–6wt% (air); 6–15wt% (oxygen)
Values reflect standard conditions. System operates within these ranges and may vary accordingly.

Technology engineered to deliver superior results to clients world wide.

Maximum ozone availability

- High system availability, using low maintenance Effizon® evo 3G electrode technology; electrodes do not require regular replacement or cleaning[1]

Lowest lifecycle costs

- Low aftermarket costs
- High oxygen supply security with operating capability using oxygen containing higher THC values
- Nitrogen dosing capability up to 30 times lower[1]
- Low specific energy consumption
- Broad system portfolio enables precision designing to suit requirements

Maximum operating flexibility

- Ease of choice for local gas suppliers/qualities
- All ozone systems can be designed to operate with air, LOX or PSA oxygen
- Efficient operation at elevated cooling water temperatures (up to 35°C/95°F)
- Startup to maximum capacity in only 30 seconds, thanks to reliable and thermal shock-resistant electrodes
- Smooth ozone capacity control (from 1–100%) to suit process requirements

Customer-oriented solutions

- System customization available to meet specific requirements
- Fundamental in-house process knowledge
- Complete process peripherals available from a single source

Simple implementation and installation

- Experienced team of project engineers, application developers and service personnel
- Completely preassembled and tested
- Container solutions can be built to fit local requirements (preliminary work, building, etc.)
- Comprehensive connection options to superordinate controls (e.g. via SCADA, Profibus, etc.)

Simple maintenance and operation

- Local control touch screen panel (HMI)
- Easy access to all systems and fittings relevant to service
- Operation and diagnosis via network control (remote diagnostics)

1 WEDECO brand Ozone Generation systems undergo factory acceptance testing to ensure they are capable of producing the desired ozone concentration, based on operational parameters outline in the Operating Manual. System performance of microorganism inactivation depends on the CT value, pH, and temperature of water. Performance limitations depend on feed conditions, overall installed system design, and operation and maintenance processes; please refer to Operations Manuals. For more information contact treatment@xylem.com.

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Let's Solve Water