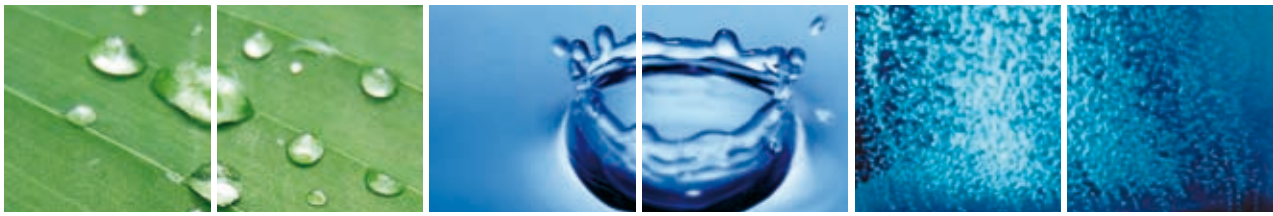
OZONIA

XF™ Vessels

Ozone Generation Equipment with MODIPAC™ Power Supply Units

HEADWORKS
BIOLOGY
SEPARATION
MEMBRANE
▶ DISINFECTION
BIOSOLIDS
SYSTEMS



OZONE | LOW-COST | EFFICIENT | TOP OF THE LINE

▸ Applications

- Bespoke XF™ ozone generators are exclusively used for applications where larger quantities of ozone are required.
- Typical applications:
  - Drinking water treatment
  - Waste water treatment
  - Leachate treatment
  - Pulp & paper applications
  - Ozonolysis, etc.

The XF™ range of ozone generators is Degrémont Technologies' latest development that will set new standards for ozone production world-wide.

Not only has the Degrémont Technologies' research team established a new calculation basis for the vessel design they have also developed a completely new dielectric technology that will replace the phenomenally successful "AT (advanced Technology)™" in the larger bespoke units.

The new patented technology, which is being marketed under the trademark "IGS (Intelligent Gap System)™", takes ozone generation to levels never thought possible. This technological breakthrough, in conjunction with Degrémont Technologies' new MODIPAC™ power supply unit, removes the last commercial barriers which prevented ozone being the first automatic choice for all applications.

MAIN FEATURES

- → In the past the capital expenditure and/or the operational costs have had a limiting effect on the use of ozone.
- → With Degrémont Technologies' new development both the equipment cost and operational costs have been drastically reduced.
- → Concentrations from 6 wt% to 14 wt%
- → This new range will cover ozone production capacities from 24 kg/h up to 100 kg/h at 10 wt% concentration from oxygen feed gas with a single generator unit.
- → This equipment will be supplied in component-form for installation in a building on the client's site or as part of a fully assembled and tested containerised plant.

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Ozone Generation Equipment

OZONE GENERATION TECHNOLOGY: XF™ VESSELS AND MODIPAC™

IGS™ ozone generation equipment offers users market-leading performance and Degrémont Technologies' well-proven design technology for generating ozone from oxygen. The main features of this technology are set out below - many of these are unique to Degrémont Technologies.

The major advance came when "AT" was commercialised. The adoption of non-glass dielectric material, combined with Degrémont Technologies' standard practices, revolutionised the ozone market. The latest development of the IGS™ product has taken ozone generation technology to unparalleled levels. The advantages are manifold:

- Compared with glass dielectrics, ozone can be generated at much higher concentrations which dramatically reduces oxygen consumption and, consequently, operating costs. Additionally, oxygen storage on site is either reduced or fewer gas deliveries are required.
- IGS™ dielectrics are more robust than glass.
- The operating voltage of approximately 4000 V is lower than that of glass.
- Each dielectric element is tested at over twice the operating voltage before installation – glass cannot be tested in this manner.
- The "Intelligent Gap System" (IGS) optimises the ozone generator design which enhances all aspects of the operating parameters.
- Degrémont Technologies's system of individual fuses for each tube is still employed ensuring that a single dielectric failure does not shut down the generator. Without this protection, projected dielectric failure rates equate directly to generator downtime.
- Vessels are compact as a result of the high ozone production per unit area of electrode and contain fewer tubes than the equivalent glass systems.
- The generators are floor mounted allowing easy inspection and, if required, convenient access for maintenance.

OPTIONS & ANCILLARY EQUIPMENT FROM DEGREMONT TECHNOLOGIES

Feed Gas Equipment

The XF™ range of ozone generators have been designed for dry oxygen feed gas. Essentially, there are two main ways of obtaining this gas: from a LOX source or from a pressure swing type oxygen concentrator. Liquid oxygen is the preferred method because it is the most economic of the two plus it is technically uncomplicated, however, LOX is only viable if there is a gas supplier in the vicinity. Pressure swing adsorption is the next alternative which requires adsorption columns, surge tank, filters and compressors

Cooling Water Equipment

This equipment will be required when the specified amount or quality of cooling water is not available on-site. Typically, a water chiller unit is selected for this purpose and is supplied as a separate unit for installation

Ancillary Equipment

In order to give clients the best possible service Degrémont Technologies also markets and manufactures ranges of ancillary equipment which has been especially selected or designed to match the service parameters of our ozone generators. This ancillary equipment includes: vent ozone destruct units (both thermal and catalytic versions), ozone contacting equipment (injectors, radial diffusers and porous diffusers), process control equipment, electrical plant control systems (master and slave), analytic equipment, etc.

Installation / Service

It is normal that ozone generators in the XF ™ class are installed in secure rooms in a building. In many cases clients do not have a convenient room and have to invest sums of money for a new building. In order to save such expenditure, and to simplify the installation and commissioning phases, Degrémont Technologies can offer clients the unique service of installing the complete ozone generation plant in standard containers which only have to be located on a simple plinth, connected-up and commissioned.

TECHNOLOGICAL ADVANTAGES AND HIGHLIGHTS

Prospect of a "green" chemical environment with ozone

Ozone is not only useful for disinfection, it is equally useful for synthesis purposes, etc.. The advantages that ozone offers are manifold:

- A high reaction yield
- No waste products

With these benefits, ozone has a considerable - but to date little used - potential as the "green" chemical for all applications involving an oxidation process.

Technical features

- → Low power consumption
- → High efficiency
- → Long service life
- → Low maintenance
- → High availability
- → Small footprint
- → Degrémont Technologies quality

Drinking water plants

The XF™ ozone generator units will be of special interest to clients operating drinking water installations such as those found on remote sites without a great deal of infra-structure.

Paper industry

Ozone is extremely popular in the paper industry where one of its main uses is for the bleaching of the pulp to make it white. It is also used extensively for the treatment of the waste liquors.

Waste treatment

Legislative pressure is forcing industry and municipal bodies to improve the quality of the waste before discharging to the environment.

Water circulation systems

In industry. Ozone in conjunction with filtration is an effective combination to treat many problems.

Fish hatcheries and farms

To protect valuable stocks against water borne micro-organisms or pollutants and, at the same time, to increase production rates and quality levels.

Influent water treatment

There are many applications where companies treat the incoming water from the municipal source to establish and maintain a consistent quality specification. Ozone, combined with granular activated carbon, results in a perfect treatment step.

Cooling water treatment

Ozone is an excellent biocide in circulating cooling water systems. With the move towards favourable solutions and the legislative pressure to reduce harmful emissions, operators and service companies are being forced to look for better means of keeping systems clean.

CONVENTIONAL TREATMENT LINE FOR DRINKING WATER

ADVANCED TREATMENT LINE WITH OZONE

Ozone Generator Model	MODIPAC™ Power Supply	**Ozone Production**	**Oxygen Requirement**	**Cooling Water Requirement**
		kg/h	Nm^3/h	m^3/h
XF4130	IP 1x250-A0	24.0	167.9	31.2
XF4199	IP 1x250-A0	28.8	201.4	34.9
XF4264	IP 1x250-A0	30.4	212.6	36.0
XF4199	IP 2x250-A0	37.1	259.5	49.8
XF4264	IP 2x250-A0	48.5	339.2	62.7
XF4392	IP 2x250-A0	57.4	401.4	69.5
XF4392	IP 3x250-A0	72.5	507.0	93.7
XF4530	IP 3x250-A0	83.2	581.9	102.0
XF4530	IP 4x250-A0	97.5	681.9	125.6

The recommended concentration range is between 6 w% and 14 wt % when fed with oxygen.

The above specified data is based on the following standard conditions and parameters:

- **Ozone production:** 95% (i.e. based on assumption 5% of fuses blown)
- **Ozone concentration:** 10 wt%
- **Feed gas:** Oxygen from LOX source
- **Hydrocarbons in feed gas (expressed as CH_4):** < 60 ppm
- **Nitrogen in feed gas:** 1 wt%
- **Mean operating pressure:** 2.1 bar(a)
- **Cooling water inlet temperature:** 20 °C
- **Cooling water outlet temperature:** 25 °C
- **Cosinus phi at mains:** 0.99

MODIPAC™

OZONE GENERATOR XF™

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TECHNICAL DATA

Standard

- **Design standards:** SN-EN, IEC, ISO
- **Protection class:** IP 42
- **Conformity:** CE
- **Connection data:** 3 x 400 V ±10%, 50 Hz

Materials

- **XF™ vessel:** Stainless steel 1.4404
  Special ceramic
  Viton
- **MODIPAC™ :** See MODIPAC™ catalogue

Controls & alarms

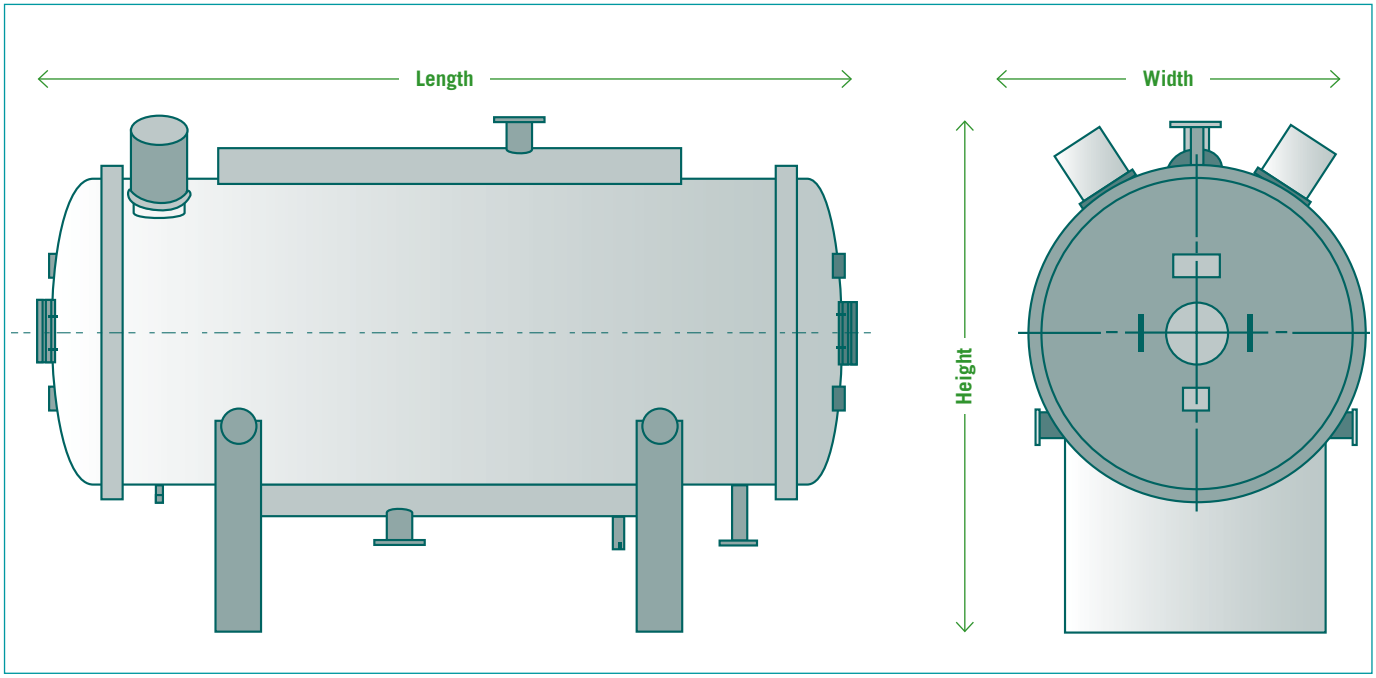
- Typically, plants including XF™ type generators are built to conform with client's specifications which specify what additional features are required

Optional features

- Degrémont Technologies can supply any optional features and ancillary equipment required

DIMENSIONS

Ozone Generator Model	l x h x w	Weight
	mm	kg
XF4130	3600 x 2100 x 1060	3600
XF4199	3700 x 2200 x 1260	5000
XF4264	3800 x 2700 x 1710	6500
XF4392	3900 x 2700 x 1710	9300
XF4530	4000 x 2700 x 1960	12500



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Ozone Generation Equipment

REFERENCES

Typical references:

- Guangzhou Water
- Municipal Drinking Water
- Asia, China
- Ozone production: 142 kg/h

- Metropolitan Water District of Souther California:
- Municipal Drinking Water
- North America, United States
- Ozone production: 354 kg/h

- Cellardenne:
- Pulp & Paper
- Europe, Belgium
- Ozone production: 210 kg/h

- Namura:
- Industrial Wastewater
- Asia, Taiwan
- Ozone production: 214 kg/h

DEGREMONT TECHNOLOGIES QUALITY AND CERTIFICATION

Degrémont Technologies operates a Quality Management System covering all aspects of business activity. The system is supervised by a QA manager and is subject to regular internal audits and annual certification by the company Bureau Vertitas.

HOTLINE SERVICE

Take-over..... and then?

Having placed their trust in Degrément Technologies' equipment, it is only logical that clients expect a professional and competent after-sales service plus technical assistance in cases of emergency.

Degrémont Technologies has the structure to ensure that clients get the best support.

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