



Leading Edge Technology

High technology products for the permanent removal of odorous emissions from stacks, buildings and vessels in industrial environments. Ozone is often the technically superior and most cost effective method of controlling odours when compared to biofilters, wet scrubbers, carbon adsorption or the use of chemicals.

Ozone deodorizers provide numerous advantages:

- The ozone is produced on-site, electrically, and requires no consumables.
- Odour removal efficiencies are high for a wide range of organic and inorganic odours.
- The technology is remarkably insensitive to process parameters such as humidity, particulates, temperature, etc.
- Very low running costs - electricity only, low maintenance.
- Simple to install.
- No need to handle hazardous microbe biomasses, chemicals, or carbon dust.
- Does not convert air pollution into water pollution.
- Ozone is also an incredibly effective sanitiser - it kills microbes in the airstream.

Industrial deodorizers have been successfully used in the following industries:

Sewage Treatment Plants	Tanneries
Chicken and Pig Sheds	Paper Pulping
Rendering Plants	Paper Coating
Fish Processing	Rubber Manufacturing
Feed Mills	Organic Composting
Sewage Pump Stations	Coffee Roasting
High Rise Building Stacks	Breweries and Distilleries
Foundries	Abattoirs
Dairies	Paint and Varnish Manufacture
Starch Production Odours	Latex Coating of Carpets

Over the last 50 years much progress has been made in cities removing smog and particulate. Now the attention has turned to gaseous odours. EPAs around the world are now monitoring Odour Units and Ground Level Concentrations and requiring companies to fix their odour emissions.

How Ozone Works

Ozone is an extremely strong oxidant which permanently removes odours by a process of oxidation. The clean fresh smell evident after a lightning storm is ozone. Its oxidation strength is 50% greater than that of chlorine. The ozone is made electrically from oxygen. When it has done its job it reverts back to oxygen, leaving no environmental residue. In many instances the final oxidised products are carbon dioxide and water. In other cases the oxidised products are elemental. For example, in the case of Hydrogen Sulphide: $H_2S + O_3 \rightarrow S + H_2O + O_2$. In virtually all cases the resultant products are dramatically less odorous.

Ozone kills micro-organisms by a process of protein restructuring so the result is both deodorised and sanitised.

Ozone "wrote the book" on Industrial Ozone Deodorization. You are welcome to utilise our *Oztec service* to help analyse your odour solution.

Industrial deodorizers have been used to oxidise and control many common odours, including:

Hydrogen Sulphide	Phenol
Methane	Toluene
Amines (all 3 stages)	Ester Vapours
Mercaptans (e.g. Methyl Mercaptan)	Methanol
Dimethyl Sulphide	Ethanol
Dimethyl Disulphide	Iso-Propanol
Skatoles	Aldehydes (e.g. Formaldehyde)
Olefinic Hydrocarbons	Indoles
Acrylic Ester	Methacrylate
Ammonia (gas phase)	

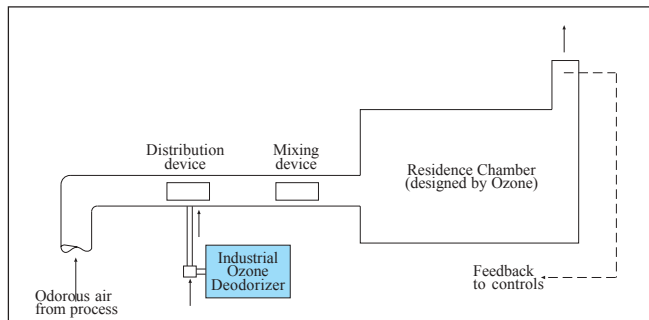
Industrial Deodorizers IX7, IX9, IX10

Our Ozone Deodorizers are complete integrated systems - not just parts and bits which you need to source and assemble. Each Deodorizer includes as standard:

- The Ozone Generator component.
- The Air Preparation component, which is an Oxygenator.
- The Oxygen Accumulator.
- Integrated pneumatics and electrics.
- Chambers and cases which neatly enclose all components.
- Touch Pad electronic controls.
- Mounting or skid.
- Test run at factory as a whole system for three days.
- Comprehensive Instruction Manual.

The IX series is rich with great features:

- Plasma ozone emitters to generate high ozone outputs (up to 4,000 g/hour of ozone) with maximum efficiency.
- Integral cooling systems. All models include high flow rate, filtered, general ventilation. In addition, the IX7 emitters are air cooled, whilst IX9 and IX10 emitters are water cooled by using a heat exchanger.
- Sophisticated controls. All models allow control of ozone output, by using a voltage potentiometer, or by adjusting gas flow rate, together with various switches.
- Models IX9 and IX10 include a Touch Pad Control with PCB logic. This allows various running modes (with or without feedback from a Controller), timing cycles and much more. A number of sensors provide signals to the Touch Pad to monitor operating performance. If maintenance is require, a self-help "diagnostic" menu is available through the digital LCD display to provide simple "on-line" guidance.
- Compact cases and skids which contain all modules and interconnections.
- Long life components for unmatched reliability.



A common installation method is shown, conceptually, above. Ozone is injected into a process pipe which contains the odour, and the ozone/odour then mixes in a residence shed, before the odour-free air is exhausted. However, if a suitable process vessel or space already exists then no shed is required. The Oztec Service (see later) helps you select the best configuration.

Model IX7 is suitable for medium-sized odour jobs, with up to 20 g/hour of ozone. The IX7 (and the CF2) are also available for hire to "pilot test" a larger application. Then simply scale up to the IX9 or IX10.



IX7



Plasma emitters



Electronic controls

Industrial ozone generators require upstream oxygenators. The IX range includes this as a fully-integrated component. The oxygenators use two molecular sieves to remove nitrogen, with an automatic back flush, and PLC logic. Solenoids control the operation.



Oxygenator

Industrial Deodorizers are supplied as a complete integrated package. Simply connect electricity and air, read the Instruction Manual, and connect the ozone gas outlet to your odorous stack, building or tank. Then simply adjust the ozone output and gas flow rate. There are no consumables and the only running cost is electricity.



Skid mounted



IX9-200

Small Deodorizers

CF2

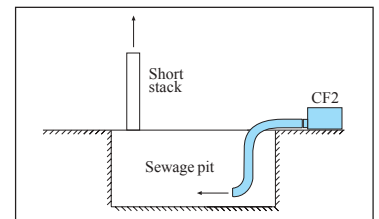
The CF2 is suitable for smaller jobs. Two models are available, in very compact cases, with an impressive range of industrial quality features. A truly unique product:

- Patented Plasma Ozone Emitters, featuring a wafer thin silicon alloy laminate. High output and reliability.
- Large inlet cartridge filter, with massive 50,000 cm² surface, and plated polymer media.
- Integral circulation fan, high flow and high pressure.
- Combination ozone and ion electrics to maximise deodorization, and also to kill airborne microbes.
- Long life components (with separate plasma source and ion source), with twin electrical circuits for contingent reliability and twin control switches.
- Variable output, electronic cyclical timer, indicator lights, fuses, access doors, EMI certified, and much more.



CF2-16000

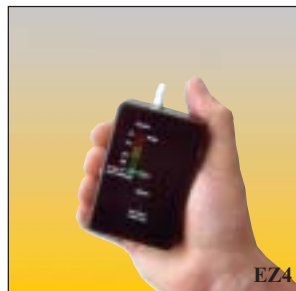
The CF2 is ideal for small sewage pump stations or sewage pits, or vent pipe deodorization in high rise buildings. A common installation method is shown in the diagram.



Controllers

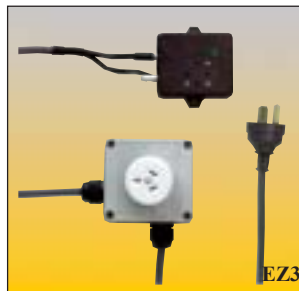
EZ3, EZ4, EZ5, EZ7

The EZ4 and EZ5 Electronic Monitors are hand-held devices which measure ozone levels in ppm. Both models include a battery charger and detailed instructions. The EZ4 measures up to 0.14 ppm with an LED display, and the EZ5 up to 20 ppm with a digital display.



EZ4

The EZ3 and EZ7 Controllers act like thermostats by measuring ozone levels and sending a signal to automatically adjust the output from the Deodorizer plant. The Controllers include indicator light and adjustable set point. The EZ3 controls up to 0.14 ppm, and the EZ7 up to 20 ppm with a digital monitor display.



EZ3

Compressor Sets

The IX range of Deodorizers include compressors up to the IX9-100. Above this size, if factory air capacity is not available, Ozone can supply compressor sets which deliver the correct quantity of clean, dry air. The sets comprise:

- | | |
|-----------------------------|---------------------------------|
| Electric refrigerated dryer | Particulate & coalescer filters |
| Rotary vane compressor | Water separator & auto drain |
| Air receiver tank | DP indicators, dryer alarms |
| Integrated electrics | Skid mount. |



Oztec Service

Ozone "wrote the book" on Industrial Ozone Deodorizers. Extensive documentation includes *Issue Papers* for end-users and *Distributor Guides* for approved Distributors. Ozone Installers assist with your product selection.

End-users are asked to fill in a Fact Finder document to help size up the job. Ozone then generates a Sizing Report by reference to Oztec - a computer database which records our extensive experience and research with odour control.



Data Table - Industrial Ozone Deodorizers

Ozone Deodorizer System Code	CF2-8000	CF2-16000	IX7-20	IX9-50	IX9-100	IX9-200	IX10-400	IX10-800	IX10-2000	IX10-4000
INCLUDED - Ozone Generator module	✓	✓	IP6-20	IP8-50	IP8-50	IP8-200	2IP8-200	4IP8-200	IP10-2000	IP10-4000
AS STANDARD - Oxygenator module	✓ (filter)	✓ (filter)	AX6	2AX6	3AX6	AX9-40	AX10-80	AX10-150	AX10-200	AX10-500
IN SYSTEM - Compressor Set module	✓ (fan)	✓ (fan)	✓ (AX6)	✓ (2AX6)	✓ (3AX6)	-	-	-	-	-
- Fully integrated system	✓ portable	✓ portable	✓ pallet	✓ pallet	✓ pallet	✓ skid	✓ skid	✓ skid	✓ skid	✓ skid
- Test run, factory, 3 days	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Instruction Manual	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Requires factory air or Compressor Set accessory	-	-	-	-	-	CS10-450	CS10-1000	CS10-2000	CS10-3000	CS10-6000
Oxidant output- max, O ₂ feed (g/hour)	8	16	24	50	100	200	400	800	2,000	4,000
- design level, continuous (g/hour)	4	8	18	45	90	180	360	720	1,790	3,820
Flow rate (ozone/oxygen/air) l/min	9,000 (fan)	9,000 (fan)	6	8	16	32	64	130	205	430
Power, nominal (kW x phase)	0.25 x 1	0.41 x 1	0.8 x 1	0.8 x 1	1.2 x 1	2.3 x 1	4.6 x 3	9.2 x 3	14.3 x 3	29.3 x 3
Cooling water required (Tin = 15°C) l/min	-	-	-	1.4	3	6	11	24	50	100
Dimensions - Width W (mm)	320	320	700	700	700	1,400	1,400	2,100	2,500	3,100
(nominal) - Length L (mm)	570	570	900	900	900	1,200	1,200	1,400	2,400	2,400
- Height H (mm)	450	450	900	1,800	1,800	1,800	1,800	1,800	2,000	2,000
Ozone Generator Module - included as standard										
- Plasma Emitter, stainless steel	plate (8)	plate (16)	tube (4)	tube (1)	tube (1)	tubes (2)	tubes (4)	tubes (8)	tubes	tubes
- Adjustable ozone output	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Gauges: flow, pressure, volts	-	-	✓	✓	✓	✓	✓	✓	✓	✓
- Performance diagnostics	-	-	-	✓	✓	✓	✓	✓	✓	✓
- Touch pad controls: PCB + LCD display	-	-	-	✓	✓	✓	✓	✓	✓	✓
- On line help menu	-	-	-	✓	✓	✓	✓	✓	✓	✓
- Welded enclosed chambers, 2 layers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Air Preparation Modules - included as standard										
- Type of air preparation	Filter	Filter	Oxygenator	Oxygenator	Oxygenator	Oxygenator	Oxygenator	Oxygenator	Oxygenator	Oxygenator
- Oxygen purity produced, max (%)	-	-	95	95	95	97	97	97	97	97
- Accumulator tank (litres) + relief valve	-	-	-	-	-	220	220	450	650	1,350
- PSA method, pressure vessels, sieve	-	-	✓	✓	✓	✓	✓	✓	✓	✓
- Controls with PLC	-	-	-	-	-	✓	✓	✓	✓	✓

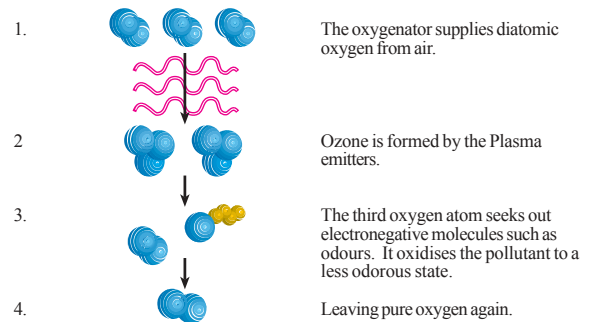
Data Table - Compressor Sets

Compressor Set Accessory Code	CS10-450	CS10-1000	CS10-2000	CS10-3000	CS10-6000
Suits Ozone Deodorizer shown (if existing factory air not available)	IX9-200	IX10-400	IX10-800	IX10-2000	IX10-4000
Air flow (l/min)	438	930	2,050	2,940	6,540
Includes as standard - Rotary compressor, power shown (kW)	5.5	7.5	15	22	45
- Refrigerated dryer (suits 40°C ambient)	✓	✓	✓	✓	✓
- Receiver tank, gauge, valve, auto drain (litres)	220	220	450	650	1,350
- Gauge, auto drain, relief drain	✓	✓	✓	✓	✓
- Water separator, auto drain, DP indicator	✓	✓	✓	✓	✓
- Water coalescer, auto drain, DP indicator	✓	✓	✓	✓	✓
- Particulate filter, 0.1 micron	2	2	2	2	2
- Dryer alarm contacts, solenoid valves	✓	✓	✓	✓	✓
- Moisture indicator, alarm, auto drain sensor	-	-	-	-	✓
- Skid, integrated electrics and pneumatic fixtures	✓	✓	✓	✓	✓

The limitations of outdated technologies:

- Bio filters
 - Always risky, as difficult to conduct a small scale test.
 - Low odour removal efficiencies (seldom above 70%).
 - Sensitive to process parameters, e.g. if humidity or particulate levels change, odour levels can actually increase.
 - Often require upstream cyclones, filters, scrubbers, coolers.
 - High running costs due to large fans and regular biomass replacement.
 - Hazardous massive microbe colonies on your site - can leak.
- Wet scrubbers
 - Pollution converters, i.e. turn air pollution into water pollution.
 - Require careful chemical monitoring.
 - Often require an increase in treatment pond capacity.
 - Often require upstream dust collectors.
- Gas filters
 - Large quantities of media required. When media is "full", odours pass straight through. Very expensive replacement costs.
 - Pollution converters, i.e. turns air pollution into landfill pollution.
 - Often require upstream removal of moisture and dust.
- Chemical oxidants
 - Handling, transport and storage of hazardous chemicals.
 - Can increase environmental problems and by-products.
 - Corrosion issues for environment.
 - Inefficient. (Ozone is the strongest oxidant, e.g. 50% more powerful than chlorine).

Ozone science



Application notes

1. The safe threshold for ozone levels in an occupied space is 0.1 ppm. All Ozone Deodorizers are designed to be used in conjunction with Controllers (e.g. EZ3, EZ4, EZ5 and EZ7) to measure and adjust ozone levels.
2. Feedstock air to Ozone Deodorizers should be dry, clean and cool.
3. For applications which are new on your site, test and prove the Ozone Deodorizers on a small scale, before upscaling.
4. Our services (such as Oztec) help you choose the products for your application. They are free because we are equipment suppliers, not consultants. We rely on customers and their agents to safely select products and design connected systems, to suit their application. We warranty our products, not your results. Conditions of Quotation and Sale apply.
5. Read Instruction Manual before use.

Useful Conversions

1m = 1000 mm = 3.38 feet
 1kg = 1000 g = 2.20 pounds
 1Pa = 0.102 mm water = 0.004 inches water
 1 l/s = 3.60 m³/hr = 2.12 cfm
 1kW = 1000 W = 1.34 hp
 Ozone: 1 ppm (by volume) = 2 mg/m³ = 2000 mg/m³
 (at 1 atmosphere and 25°C).

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