

LEADING OZONE PERFORMANCE





BIGGER STRONGER FASTER



Newland EnTech Co. Ltd. Was founded in September 2000, located in the Newland Science Park, in MaWei Economic and Technological Development Zone, Fuzhou, China. Newland EnTech Co. Ltd. Is an affiliated company of Fujian Newland Group.

LEADING PRODUCT PERFORMANCE

The Newland "Ozone Generator System" has been evaluated by experts from National Ozone Professional Committee and Qinghua University. They have stated that the Newland "Ozone Generator System" is innovative, with high ozone yield, small footprint, unique design, excellent performance and good stability. Newland EnTech Co. Ltd. Owns full independent intellectual property capabilities are equal to any other internationally recognized equipment. This equipment has been applied in advanced water treatment applications with excellent effect.

MODERN MANUFACTURING CENTER

Newland EnTech has established multiple advanced production lines, in a manufacturing center of 10,000 m² with around 4,000 employees across the Fujian Newland Group. Newland has ten years of experience manufacturing a large range of equipment and is capable of fast supply and in considerable quantities.

ADVANCED ENVIRONMENTALLY FRIENDLY PRODUCTS

Newland EnTech has developed nine series of water treatment, air purification and disinfection products, such as UV disinfection systems, large ozone generators, deodorizing equipment, and so on. The products have important applications in large-flow municipal sewage treatment, water reuse, water purification, and air purification. These products have applications in other industries as well.



APPLICATIONS



DRINKING WATER TREATMENT

- Pre-ozonation enhances sedimentation and avoid turning organic compounds into chloroform
- High efficiency in eliminating micro-pollutants and improving biodegradability of organic compounds
- Advanced water purification with ozone and active carbon technology
- Odor and color improvement
- Substitute to chlorine for disinfection

MUNICIPAL WASTEWATER AND RECLAIMED WATER

- Decolorization
- Odor removal
- Disinfection of bacteria and viruses

INDUSTRIAL WASTEWATER

- Improved biodegradability of organic compounds
- Oxidation of AOX and COD after pre-treatment
- Decolorization
- Toxic removal
- Halide removal
- Decolorization of printing and dyeing wastewater
- Surfactants and detergents removal

PULP BLEACHING

- Substitute to chlorine in pulp bleaching
- Reduced environmental discharge of chloride
- Improved paper whiteness

APERMAKING INDUSTRY

- Decolorization of papaermaking wastewater
- Reduced COD
- Reduced environmental discharge of surfactants



APPLICATIONS



FOOD AND BEVERAGE

- Food and beverage disinfection
- Packaging and product line disinfection
- Fresh and aquaculture water disinfection
- Food storage
- Preservation

SEMICONDUCTOR INDUSTRY

- Reduced TOC
- Purification of re-circulating chillinf water

OFF-GAS DISCHARGE

- Odor control of industrial off-gas and wastewater treatment plant discharge removal
- Nox removal

PROCESS WATER

- Avoid biofilm in the process of water circulation

COOLING WATER

- Substitute to chloride pesticides
- Reduced corrosion rate
- Reduced environmental discharge of halides
- Reduced bio-fouling

CHEMICAL AND PHARMACEUTICAL INDUSTRY

- Oxidizer in chemical processes
- Chemical synthesis in cosmetics and pharmaceutical industries
- Strong COD oxidation
- Degradation of toxic ingredients
- Ultra-pure ring mains

NEWLAND ENTECH NLO OZONE GENERATOR





GAS SOURCE SELECTION

Ozone system can use air or oxygen as the gas source according to working conditions. Operations must ensure the inlet gas quality has a dew point lower than -60°C and has no dust oil.

Air source is usually produced by on site air-treatment equipment. Oxygen can be by an on-site oxygen generator, liquid oxygen or pipeline oxygen.

The rated ozone concentration of Newland air-feed ozone generators are 35 mg/l and the max is 70 mg/l. the rated concentration of oxygen-feed generators are 150 mg/l, and the max ozone concentration can reach 270 mg/l. users can choose the appropriate gas source according to the requirement of ozone concentration. Ozone equipment and operation cost can be quite different because of the different gas sources. In addition, the noise problem when producing air and oxygen on site should be taken into consideration.

OPERATING COSTS

The main operational costs include the cost of the gas source and the electricity for the ozone generator. If cooling water cannot be reused, the water consumption also needs to be taken into consideration. The operation costs of various gas sources are quite different. The following table lists the operation cost comparison among liquid oxygen, air, on-site oxygen.



OPERATION COST COMPARISON (10 KG/H)

TYPE	LIQUID OXYGEN	AIR	ON-SITE OXYGEN
Power consumption of generator	75 kwh	150 kwh	75 kwh
Power consumption of gas-feed	0	50 kwh	120 kwh
Quantity of gas-feed	70 m ³ /h	0	0
Oxygen cost (year)	\$ 113.000	\$ 256.000	\$ 323.000
Electric cost (year)	\$ 92.000	\$ 256.000	\$ 323.000
Maintenance cost (year)	\$ 3.000	\$ 5.000	\$ 6.000
Rent of liquid oxygen tank	\$ 9.000	0	0
TOTAL	\$ 217.000	\$ 261.000	\$ 329.000

Note: Oxygen price = \$ 0,18 /m³ • Electric cost = \$ 0,12 /kwh

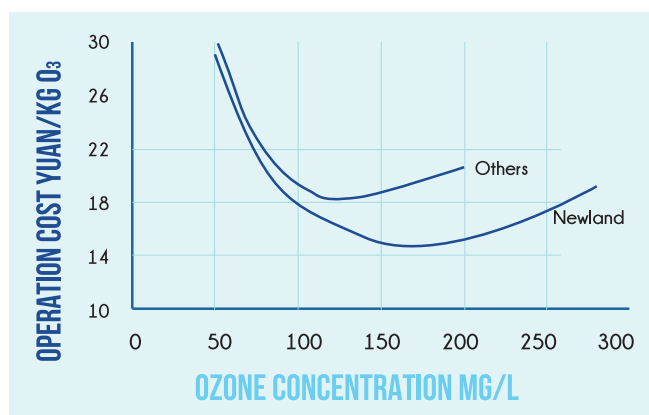
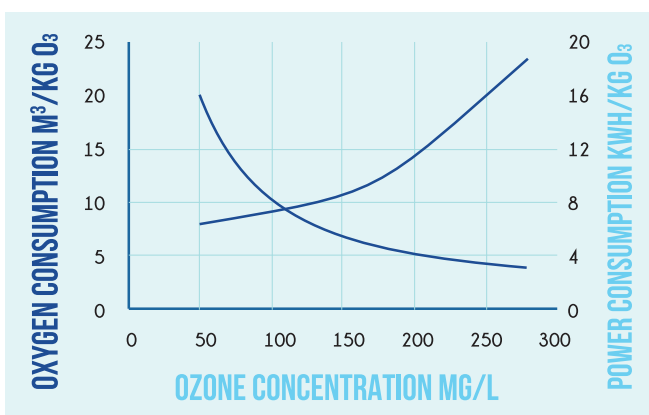


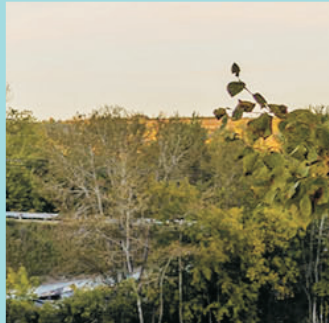
OUTLET OZONE CONCENTRATION

Outlet ozone concentration of oxygen-fed ozone systems can be adjusted greatly within the operating range (for example 0 - 270 mg/l). However, long term operating requirements should be taken into consideration for costs optimization when selecting system.

Taking oxygen-fed ozone system as an example, the operational cost includes the cost of oxygen and power consumption cost of ozone generator. Increasing ozone concentration may reduce oxygen consumption, but it would increase power consumption per kilogram of ozone.

The optimal operation concentration of Newland EnTech oxygen-fed ozone system is between 150 mg/l - 160 mg/l. The total operation cost is the lowest at this time. If the oxygen price is \$0,18/m³ and the electric cost is \$0,12/kwh, the oxygen cost and electric cost are about \$2,28 per kilogram of ozone. The rated ozone concentration of the NLO ozone system is 150 mg/l, and the corresponding ozone output is rated output.





OZONE DOSAGE

For each specific application, a reasonable ozone dosage can be determined through lab experiment or pilot test according to local conditions and requires treatment effect. If the ozone dosage is too low the required treatment will not be achieved. Too high an ozone dosage may not be economic, and may even produce toxic by-products, such as bromate. There is a great range of required ozone dosage depending on the application.

OZONE DOSAGE

OZONE APPLICATION

Water disinfection
Micro-pollutants removal
Chrome in water removal
COD removal
Deodorization
Air disinfection

OZONE DOSAGE

0,5 - 5 mg/l
1 - 12 mg/l
1 - 60 mg/l
20 - 200 mg/l
20 - 100 mg/l
5 - 20 ppm (10 - 40 mg/m₃)

REMARK

1 - 10 min
Usually choose 2 - 5 mg/l, 5 - 15 mg/l
Reclaimed water of 8 - 15 mg/l
Advanced treatment of wastewater
-
60 - 120 min



PRODUCTS OF NLO OXYGEN-FEED OZONE GENERATOR

TYPE	RATED OUTPUT (G/H)	AIR QUANTITY NM ³ /H	COOLING WATER QUANTITY M ³ /H	RATED POWER KW	DIMENSION L X W X H (MM)
NLO - 10	10	0,1	0,1	0,2	250 x 170 x 610
NLO - 20	20	0,2	0,1	0,3	250 x 170 x 610
NLO - 30	30	0,2	0,1	0,5	250 x 170 x 610
NLO - 50	50	0,3	0,1	0,6	1000 x 600 x 1200
NLO - 100	100	0,7	0,2	1	1000 x 600 x 1200
NLO - 200	200	1,4	0,4	2	1000 x 600 x 1200
NLO - 1K	1.000	7	2	8	1200 x 800 x 2000
NLO - 2K	2.000	14	4	15	1200 x 800 x 2000

TYPE	RATED OUTPUT (KG/H)		AIR QUANTITY NM ³ /H		COOLING WATER QUANTITY M ³ /H	RATED POWER KW	DIMENSION L X W X H (MM)	
	110 MG/L	150 MG/L	110 MG/L	150 MG/L				
NLO - 3K	3,9	3	36	21	5,4	23	2500 x 1200 x 1950	
NLO - 5K	6,5	5	61	34	9	38	2500 x 1200 x 1950	
NLO - 7K	9,1	7	85	48	12,6	53	3000 x 1300 x 2000	
NLO - 8K	10,4	8	97	55	14,4	60	3000 x 1300 x 2000	
NLO - 9K	11,7	9	109	62	16,2	68	3000 x 1400 x 2050	
NLO - 14K	18,2	14	170	96	25,2	105	3000 x 1500 x 2100	
NLO - 15K	19,5	15	182	103	27	113	3000 x 1500 x 2100	
NLO - 16K	20,8	16	194	110	28,8	120	3000 x 1500 x 2100	
NLO - 20K	26	20	242	137	36	150	3000 x 1600 x 2150	
NLO - 35K	45,5	35	424	240	63	263	3000 x 1900 x 2300	
NLO - 45K	58,5	45	545	309	81	338	3000 x 2100 x 2400	
NLO - 60K	78	60	727	412	108	450	3000 x 2300 x 2500	
NLO - 70K	91	70	848	480	126	525	3000 x 2300 x 2500	
NLO - 85K	110,5	85	1030	583	153	638	3000 x 2300 x 2500	
NLO - 120K	156	120	1454	823	216	900	5400 x 2300 x 2500	
NLO - 130K	169	130	1575	892	234	975	5400 x 2300 x 2500	
NLO - 140K	182	140	1696	960	252	1050	5400 x 2300 x 2500	





TECHNICAL PARAMETERS OF NLO OXYGEN-FEED OZONE GENERATOR

INPUT POWER SUPPLY	380 V / 50 Hz	OZONE CONCENTRATION	150 mg/l (0 - 370 mg/l)
VOLTAGE	4 - 7 kV	INLET FLOW	7 m ³ /h kg O ₃
FREQUENCY	3 - 6 kHz	POWER CONSUMPTION	7,5 kwh/kg O ₃
COOLING WATER TEMPERATURE	25°C (10 - 30 °C)	COOLING WATER FLOW	1,6 m ³ /h kg O ₃
PRESSURE	100 - 200 KPa	COOLING WATER TEMPERATURE RISE	4°C

UP TO 140 HG/H BY UNIT

PRODUCTS OF NLO-A AIR-FEED OZONE GENERATOR

TYPE	RATED OUTPUT (G/H)	AIR QUANTITY NM ³ /H	COOLING WATER QUANTITY M ³ /H	RATED POWER KW	DIMENSION L X W X H (MM)
NLO-A - 10	10	0,4	0,1	0,3	250 x 170 x 610
NLO-A - 20	20	0,8	0,1	0,5	250 x 170 x 610
NLO-A - 30	30	1,2	0,2	0,6	250 x 170 x 610
NLO-A - 50	50	2	0,2	0,9	1000 x 600 x 1200
NLO-A - 100	100	4	0,4	1,8	1000 x 600 x 1200
NLO-A - 200	200	8	0,8	3,6	1000 x 600 x 1200
NLO-A - 400	400	15	1,5	7,2	1200 x 800 x 2000
NLO-A - 500	500	17	2	8	1200 x 800 x 2000
NLO-A - 600	600	21	2,4	10	1200 x 800 x 2000
NLO-A - 1K	1.000	29	4	16	1200 x 800 x 2000

TYPE	RATED OUTPUT (G/H)		AIR QUANTITY NM ³ /H		COOLING WATER QUANTITY M ³ /H	RATED POWER KW	DIMENSION L X W X H (MM)
	25 MG/L	35 MG/L	25 MG/L	35 MG/L			
NLO-A - 2,5K	3,3	2,5	131	72	10	40	2500 x 1200 x 1950
NLO-A - 4K	5,2	4	210	116	16	64	3000 x 1300 x 2000
NLO-A - 5K	6,5	5	262	145	20	80	3000 x 1400 x 2050
NLO-A - 7K	9,1	7	367	202	28	112	3000 x 1500 x 2100
NLO-A - 7,5K	9,8	7,5	393	217	30	120	3000 x 1500 x 2100
NLO-A - 10K	13	10	525	289	40	160	3000 x 1600 x 2150
NLO-A - 17K	22,1	17	892	492	68	272	3000 x 1900 x 2300
NLO-A - 22K	28,6	22	1154	636	88	352	3000 x 2100 x 2400
NLO-A - 30K	39	30	1574	867	120	480	3000 x 2300 x 2500
NLO-A - 42K	54,6	42	2203	1214	168	672	3000 x 2500 x 2600
NLO-A - 60K	78	60	3148	1735	240	960	5400 x 2300 x 2500
NLO-A - 85K	110,5	85	4459	2458	340	1360	5400 x 2500 x 2600





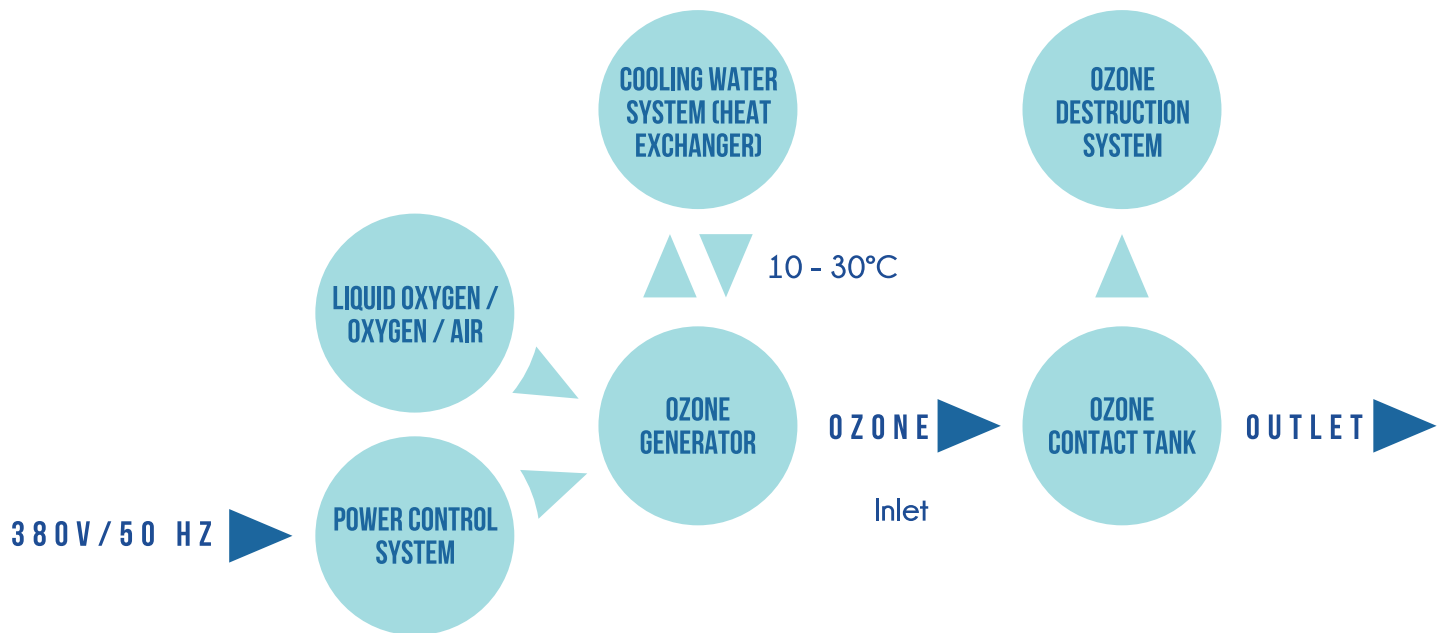
TECHNICAL PARAMETERS OF NLO-A AIR-FEED OZONE GENERATOR



INPUT POWER SUPPLY	380 V / 50 Hz	OZONE CONCENTRATION	35 mg/l (0 - 70 mg/l)
VOLTAGE	6 - 9 kV	INLET FLOW	35 m ³ /h kg O ₃
FREQUENCY	1 - 4 kHz	POWER CONSUMPTION	16 kwh/kg O ₃
COOLING WATER TEMPERATURE	25°C (10 - 30 °C)	COOLING WATER FLOW	4 m ³ /h kg O ₃
PRESSURE	100 - 200 KPa	COOLING WATER TEMPERATURE RISE	4°C

SYSTEM STRUCTURE

A large-scale ozone generator system consists of an oxygen or air source, ozone generator, power supply system, cooling water system, PLC control system, and an ozone dosing and ozone destruction system.





EFFICIENT DISCHARGE TUBE

- The discharge tube in the generator is the core technology and main component of the ozone system. It directly affects equipment efficiency and reliability
- Newland EnTech NLO series ozone generator system adopts micro-gap dielectric-barrier discharge design. This reduces the system operating voltage to 4 kV; which is much lower than the glass tube dielectric material limit of around 50 kV. This minimizes any risk of short-circuit by dielectric breakdown, ensuring running efficiency and enhancing the continuous operational safety and reliability. In addition, high frequency discharge technology improves the working efficiency of the ozone generator which consequently reduces the generator footprint.
- The Newland EnTech NLO ozone generator has a modular design which makes the installation and maintenance convenient.
- All the equipment is made of high quality ozone resistant materials (such as stainless steel SS316L, PTFE), which ensures reliability for long-term operation.
- Under normal operating conditions, the discharge unit can be operated continuously for 10 years without maintenance.

POWER SUPPLY WITH HIGH FREQUENCY AND HIGH VOLTAGE

Newland EnTech ozone system uses high frequency power supply technology, which is an improvement on medium frequency (<1 kHz) technology of traditional ozone generators, ensuring the reliability for long-term operating. With micro-gap discharge design, ozone generating efficiency can be improved, reducing the generator footprint.

High-frequency inverter power outputs sine wave, high voltage through a boost system, which connects to the generator discharge chamber through high voltage cable. With high frequency and high voltage, the discharge gap generates cold plasma, which discharges to generate ozone.



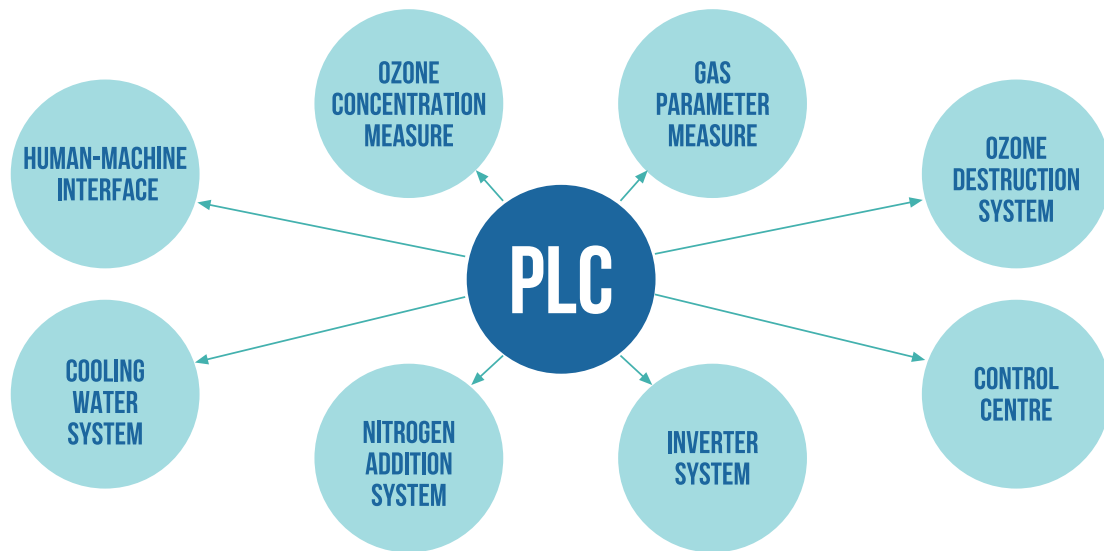




PLC CONTROL SYSTEM

The ozone system can be controlled through a PLC human-machine interface (HMI) in the control cabinet or remotely monitored through networking between Ethernet and the plant Control Center. The main system operation parameters can be read from HMI or the Control Center.

- In the manual mode, the ozone production rate can be entered according to operation requirements, and the system will automatically adjust operation parameters such as gas flow, gas pressure, and power to ensure the ozone output production and concentration meet the requirements.
- In the automatic mode, the system automatically adjusts ozone production to meet the ozone dosage requirements taking into account the flow rate, ozone concentration in water or vent ozone concentration.



NITROGEN ADDITION

For oxygen-fed ozone systems, adding a small amount of nitrogen can improve the operation stability, reduce the corrosion of the electrode surface, and prolong operation lifetime of the discharge tubes.

Oil, dust, and moisture in the air not only reduce the generator's operational efficiency and ozone concentration, but can also produce nitric acid on the electrode surface. Poor air quality can reduce the discharge efficiency and the overall performance of the ozone generator. Therefore, the nitrogen dosing system needs to have high quality air purification and drying equipment. Newland ozone systems use high quality air compressors, filters, and air dryers, to ensure the correct air quality in the ozone generator resulting in system reliability.

COOLING WATER SYSTEM

The efficiency of modern ozone generators has improved significantly compared with earlier products. However, part of input energy still turns into heat in the discharge gap. If the heat cannot be dissipated effectively, the temperature of the discharge gap can rise and exceed the design temperature. High temperature is not conducive to ozone generation as it accelerates the decomposition of ozone and reduces the ozone concentration and yield.

Small-scale ozone systems usually employ external circulation direct cooling. Large-scale ozone systems usually use internal circulation water cooling, which exchanges heat through a plate heat exchanger and external circulation cooling water. Internal circulation can guarantee the cooling water quality in the ozone generator, minimizing risk of deposit on the outer-wall of the discharge tube, and avoiding the reduction of heat exchange efficiency or tube leakage caused by corrosion.

When the temperature of cooling water exceeds the design temperature or if there is a water shortage, the system will send an alarm signal automatically.

Plate heat exchangers can be stainless steel SS304L or SS316L according to the water quality of external circulation cooling. Without special requirements, a SS304L exchanger would be sufficient.

OZONE DOSING AND VENT DESTRUCTION SYSTEM

Ozone can be transferred into water through ceramic, stainless steel or titanium plate micro-pore diffusers on the bottom of a contact tank. The tiny bubbles mix with water or air to ensure the required oxidation effect. More than 95% ozone will be absorbed and utilized in the contact tank, and the little remaining residual ozone will be decomposed to oxygen and exhausted into the atmosphere through the vent ozone destruction system.

The ozone destructor generally decomposes ozone through a high temperature heating method (380°C) or heating-catalyzing method (40°C). High-temperature heating method is more expensive but is more reliable. Heating-catalyzing method is less expensive, but consideration needs to be taken as to whether the vent gas contains components such as chlorine or sulfur which may destroy the catalyst. The heating-catalyzing destructor includes demister, heater, catalyst beds, fans and independent power control cabinet. The performance and lifetime of the destructor is determined by the quality of catalyst.

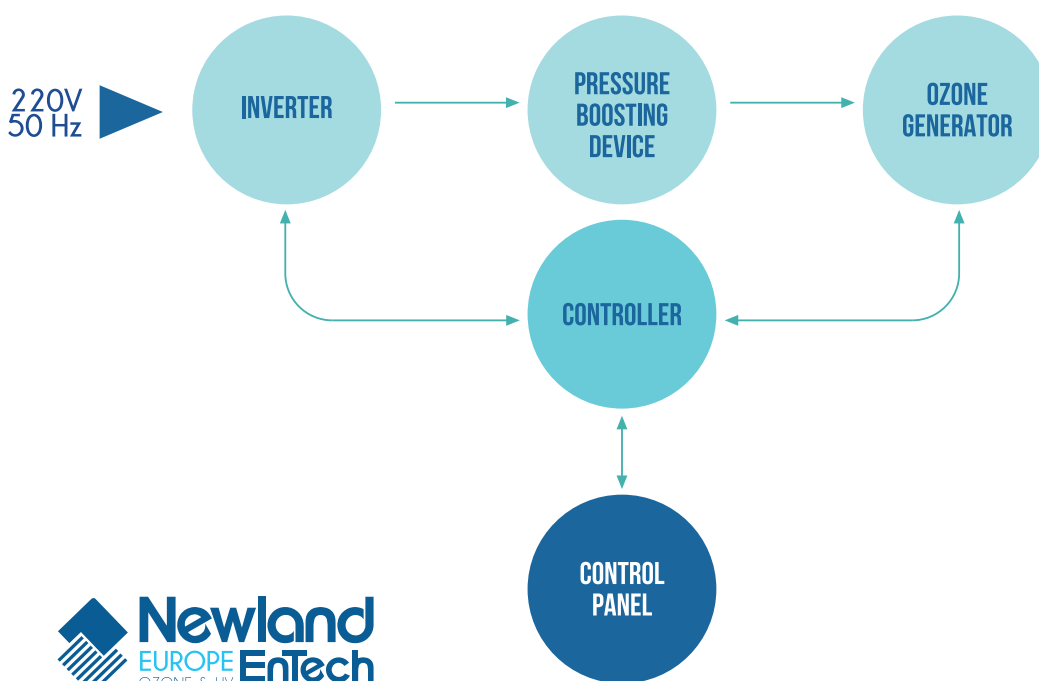
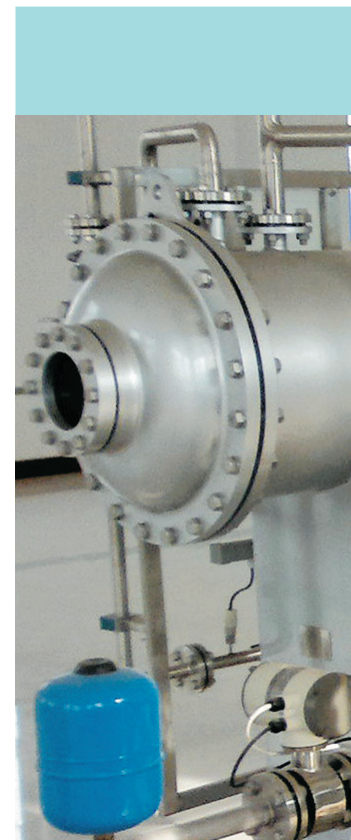
Newland EnTech ozone vent destructor uses high quality ozone destruct catalyst, with a normal service life of 5 and can often last up to 10 years. The ozone concentration is less than 0,15 ppm after destruction meeting environmental emission standards. In some circumstances, the ozone off gas can be vented to the atmosphere without a destructor to save investment and operation costs.

MATCHED EQUIPMENT AND PIPELINE

Newland EnTech ozone systems use quality auxiliary components such as an ozone meter, flow meter, heat exchanger, valves, sensors, pumps, etc. to ensure the reliability of the system and maintain ozone production within the required operational parameters.

All auxiliary equipment is tested before leaving the factory to ensure operability and has serial numbers for ease of traceability, registration, installation and maintenance.

All of the pipelines and equipment which are in contact with ozone are made of stainless steel S316L. All interfaces in the pipeline are welded or connected by flange with PTFE seals to ensure the system operates reliably for long periods without leakage. The cooling water system usually uses HDPE, stainless steel SS304L or SS316L pipeline-connection.







LOW ENERGY
CONSUMPTION

7,5 KW/H/KG
OZONE



NLO SERIES
OZONE GENERATOR





THE ADVANTAGE OF NLO SERIES OZONE GENERATOR

- 1** | Newland EnTech NLO series ozone generators use the most advanced discharge tube design and precise machining techniques to ensure outstanding performance and reliability.
- 2** | Newland EnTech NLO series oxygen-fed ozone generators can produce ozone concentrations of 0-270 mg/l. the lowest operation cost can be obtained at the ozone concentration of 150 mg/l, with power consumption of 7,5kwh/kg ozone, 7 Nm³ gas consumption and 1,6 m³ cooling water.
- 3** | Newland EnTech NLO series air-fed ozone generators can produce ozone concentrations of 0-70 mg/l. the lowest operation cost can be obtained at the ozone concentration of 35 mg/l, with power consumption of 16 kwh/kg ozone, 16 Nm³ gas consumption, and 4 m³ cooling water.
- 4** | Newland EnTech NLO series ozone generators adopt modular design, which enables easy assembly work from small to large scale. The high capacity ozone production systems range from 0,1 kg/h to 130 kg/h, suitable for various applications.



- 5** | Newland EnTech NLO series ozone generators use high-frequency discharge technology for a smaller size and thus reducing space requirements.
- 6** | Newland EnTech NLO series ozone generators have excellent automatic performance because of its advanced control system. System data collection and automatic control can be performed through a plant control center.
- 7** | Newland EnTech NLO series ozone generators use internationally recognized quality auxiliary components to ensure system reliability. The ozone specific auxiliary equipment and technologies, such as ozone vent destructor, ozone concentration monitor, ozone diffuser and advanced oxidation technology are of proven high quality providing rugged and reliable performance.
- 8** | Newland EnTech has powerful scientific and technical strength and can offer multi-faceted technical solution, technical consultation and pilot experiments for customers.

MANUFACTURED UNDER STANDARD



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