

INSTRUCTIONS FOR USE



Product: **LifeOX[®] air**

ULTRA



Prior to putting the product into operation, the operator should get acquainted with the information in these instructions.

Contents

- 1. Purpose of the product.....3
- 2. Function principle3
- 3. Conditions of use4
- 4. LifeOX® -AIR ULTRA operation4
- 5. Safety measures and remarks to ozone application5
 - 5.1. Our clients’ experiences7
- 6. Recommendations for transport7
- 7. Maintenance7
- 8. Disposal of irreparable product and worn-out parts.....7
- 9. Authorized service8
- 10. Specifications8
- 11. Operating conditions8
- 12. Pack contents.....8
- 13. Note8
- Appendix.....9

1. Purpose of the product

The product is used for deodorization, disinfection and disposal of molds in closed spaces (rooms, restaurants, kitchens, stores, vehicles) by active oxygen. This device integrates the functions of an ozone generator and ozone destructor.



Fig.1: LifeOX®-AIR ULTRA

If you intend to use the product for any other purpose, please consult with the manufacturer or its authorized representative at first.

2. Function principle

A fan draws the air into the LifeOX®-AIR ULTRA. Here, in corona discharge, a part of oxygen from the air is converted to ozone. High voltage transformer is used as a source of high voltage for corona discharge ignition.



Ozone (active oxygen) is the most powerful disinfectant. It does not leave any residual products and its use is environmentally friendly.

Exposure to higher ozone concentrations causes health problems. Please read the information in Appendix. Never inhale ozone from the device!

Ozone molecule is instable and ozone will decompose spontaneously back to oxygen. The air is sucked into device LifeOX®-AIR ULTRA. Inside part of the oxygen is converted into ozone and air containing active oxygen is pushed by fan into a room.

3. Conditions of use

The device is to be used for indoor applications, in a dust-free area. High air humidity (RH>60%), barriers disabling free air flow into and out of the device and/or high temperature can damage the device damages and reduce its lifetime.



Do not use the device in proximity of chemicals, where release of corrosive or explosive chemical vapors can proceed.

The equipment shall be plugged into the outlet that meets the standards, i.e. with protective conductor connected.

4. LifeOX[®] -AIR ULTRA operation

Observe the Conditions of use in the previous chapter. Place the device in the middle of the room on a desk or on a floor, connect it to the mains and set a time setting. Device will automatically turn on and starts to generate ozone.

Before leaving, make sure there is nobody in the room and there are no pets. Close the door so as the active oxygen could not leak out of the room under treatment.

For safety reasons we recommend to lock the door or place a clear warning about the process creating active oxygen.



Nobody should enter the room with the device in operation. If necessary, enter the room only if the ozone concentration in the room does not cause any health problems (see Appendix).

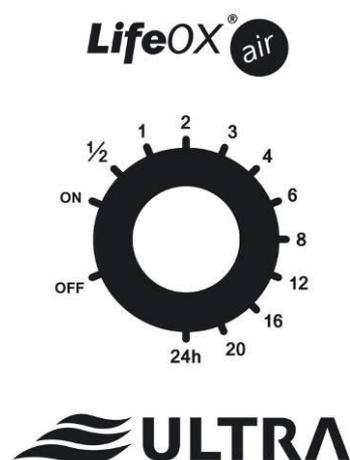


Fig. 3: Time setting on a control panel

Device is turned on by revolving switch, on which you also set the time setting for ozone production from 30 minutes to 24 hours. Longer settings are suitable for spaces stricken by bad smell or moulds in greater extent.

Wait approximately 90 minutes after ozone production is finished and ozone decomposes naturally. From this moment it is possible to enter the room without any health risks. The air in the room is fresh and fragrant. To turn off the device completely, switch the revolving switch to position OFF

Operation of LifeOX®-AIR ULTRA can be finished at anytime by switching to OFF position. For turning on the device, switch it to ON position again. Do the same when power-failure occurs.

5. Safety measures and remarks to ozone application



Close the windows, doors, and, if they do not fit tightly, seal them e.g., with an adhesive tape. When the treatment process starts, leave the room, close the door so as ozone could not leak out of the treated room. Before leaving the room, make sure there is nobody inside and there are no pets.

It is important that nobody enters the room in the course of production and destruction of active oxygen. If necessary, enter the room only if the ozone concentration in the room does not cause any health problems (see Appendix).

Ozone is a toxic gas. Never inhale ozone directly from the device!

Follow the safety regulations for electrical equipment! Prevent electrical accident! Never attempt to take the device apart or service it yourself. The unit may not be covered or transported while in operation.

The device mustn't come into contact with any liquid. If this happens, the device can't be used. In such a case contact the manufacturer.

Prior to application of active oxygen always

- Remove the source of odor – cigarette butts, ash, biological waste etc.
- Remove or seal aromatic food products, perfumes, and cleansing articles.
- Pull out drawers slightly and open the doors of cupboards, wardrobes, bookcases etc.
- Turn off any air venting or exhaust.
- Do not use aromatized polishing or cleansing articles immediately before the ozone application.
- All surfaces should be dry.
- The equipment should be placed on a stable base in the middle of the room and the air flow should not be restricted by any obstacle.
- Keep the device out of reach of children and pets. Do not place home plants in its proximity.
- Place the device in such manner that air flow will not be restricted.

- Do not expose the device to humidity.
- Do not use the device in the proximity of chemicals, where corrosive or explosive chemical vapors could be released.
- Do not cover ventilation openings of the device and do not place any items on the device.
- Never use damaged or polluted device.
- The power supply of the device generates high voltage. There is a danger of electrical accident in breaking enclosure of the device that is live.
- Contact the manufacturer or its authorized centre for any service or reparation.
- Items containing rubber or some plastics can be deteriorated by ozone and, therefore, should be removed from the area before the device activation.

If you do not have any experience with LifeOX[®]-AIR ULTRA, we recommend you to start with the shortest time for disinfection and deodorization as specified in the table below. Based on your experience you will find the most appropriate mode for your conditions.

Estimated values of treatment time by ozone in dependence on room size are shown in table 2.

Estimated treatment time (min) for:	Room volume (m ³)				
	40	40-70	70-100	100-180	180-240
Usual deodorization (tobacco smoke*) and disinfection	10-20	15-30	30-60	45-120	60-180
Deodorization and disinfection of vehicle interiors	20-30	30-60	60-90	60-180	60-210
Disinfection and removal of animal and kitchen smells	20-30	30-60	60-90	60-180	60-210
Disposal of molds, removal of chemical odors	30-45	45-60	60-120	120-180	120-240

Table 2: Estimated time of treatment by ozone

* It is important to take into account, how long the room has been exposed to cigarette smoke. If you deal with long-term exposure and the room is equipped with furniture with upholstery, hangings and drapes, you need to use the device several times and for longer period.

The efficiency of disinfection is affected by air humidity that should not be lower than 50%.

Maximum available ozone concentration in the room depends on its size, the air humidity and temperature, degree of air renewal, and the time of device operation. Actual ozone concentration will depend also on the concentration and nature of the volatile compounds present in the air and in the pores of the materials.

These factors reduce the concentration of active oxygen in the air. Production of active oxygen is lower at higher air humidity and temperature.

To attain the required goal (removal of intensive odor, moulds control), several times repeated ozone application can be a necessity. If the aim was not attained, select longer time of operation. To decrease the ozonation efficiency, select a shorter time of the device operation.

5.1. Our clients' experiences

- In heavily loaded rooms it was necessary to repeat the treatment 2- up to 4-times using 2 hours ozone generation period. We recommend using long-term mode of operation in such cases.

It can happen that after the first treatment the room is without odor. However, the smell appears again after some time. This problem is common in heavily loaded rooms where the air and material surfaces are deodorized in the course of the first treatment. After the treatment, the odor causing substances are released from the pores of walls, furniture, and textiles. The content of odorous substances in the pores is reduced after each treatment. For this reason it is necessary to repeat the treatment several times.

- Common mistakes:
 - electric current switched off in the course of the room treatment,
 - the device placed in front of an obstacle that blocks the air flow,
 - the room air conditioning not switched off,
 - to short time of ozone production chosen.

6. Recommendations on the transport

Make sure the unit is properly secured and protected from knocks and bumps during transport. The producer doesn't bear any responsibility for mechanical damages caused by knocks or bumps.

7. Maintenance



Keep the openings for air intake and outflow free. Clean the outer surface of the housing and its openings only when the equipment is unplugged. Never insert any objects into the openings of the device. Any item or liquid can't fall into the unit.

The discharge element has to be replaced by manufacturer or authorized staff only.

8. Disposal of irreparable product and worn-out parts

The disposal does not require any special procedures or safety precautions. Protect the environment and entrust a specialized company with disposal of expendables and the product.

9. Authorized service

Service is provided by the manufacturer, LIFETECH s.r.o., Czech Republic or by a company trained by LIFETECH s.r.o.

10. Specifications

Product	Air flow (m ³ /h)	Power supply	Input (W)	Dimensions LxWxH (cm)	Weight (kg)
LifeOX [®] -AIR ULTRA	350	230V AC, 50Hz	60	35,0 x 16,3 x 35,8	7

Lifetime of discharge element: 9,000 hours

Degree of protection: IP20

11. Operating conditions

The device is designed for indoor use in low-dust environment.

Ambient temperature: 10-40°C

With increasing temperature, the efficiency of device cooling as well as efficiency of ozone generation decrease.

Air humidity: up to 60% RH

Storage conditions: +5°C to +50°C, <65% RH

12. Pack contents

- LifeOX[®]-AIR ULTRA device
- Instructions for use
- Warranty card

13. Note

The manufacturer is not responsible for any damage caused by non-compliance with the Instructions.

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APPENDIX

Airborne ozone - Effects on organisms and concentration limits

Effects of the airborne ozone

Ozone molecule is unstable and decomposes spontaneously back to oxygen. Further decrease of ozone concentration proceeds due to the oxidation of substances present in the air or by ozone decomposition in contact with object surfaces. Lifetime of ozone molecule in the air usually varies in order of few hours.

At low concentrations (< approx. $110\mu\text{g}/\text{m}^3$), the odor of ozone is sweet, pleasant. The human sense of smell is able to identify ozone already at very low concentrations approx. $10\mu\text{g}/\text{m}^3$. This ability is individual and in the permanent presence of low ozone concentrations is lost soon.

The effects of increased ozone concentrations in the air

The ozone is an irritating substance. Longer stay at places with increased ozone concentrations over approx. $350\mu\text{g}/\text{m}^3$ results in irritation of eyes, nose and throat and in some cases also in feeling of pressure on the chest, cough and headache. Organism responses are different and depend on predispositions, actual physical activity and exposure time. With reference to the World Health Organization (WHO), initial symptoms of difficulties (lung function decrease) can occur in some individuals after exceeding an average hourly concentration $160\mu\text{g}/\text{m}^3$.

Concentration limits

Ozone concentrations in the ground atmosphere

The summer ozone concentrations in the ground atmosphere vary in range of 60 to $120\mu\text{g}/\text{m}^3$. However, maximum (hourly) values can reach or exceed the **eight-hour immission limit, i.e. $180\mu\text{g}/\text{m}^3$** . In winter, the values usually vary in the range from 30- $60\mu\text{g}/\text{m}^3$.

Generally, higher long-term average values are reached in countryside and mountain areas where, on the other hand, no significant local increases occur. Here ozone is generated due to a **natural photochemical cycle** in the ground atmosphere (troposphere). At higher altitudes, the ozone generation is enhanced by increase of solar radiation intensity.

Less ozone can be found in large conurbations due to its reaction with nitrogen oxides and, therefore, long-term average values are lower there. However, under favorable conditions photochemical smog can be formed and higher ozone concentrations exceeding $200\mu\text{g}/\text{m}^3$ can persist several days. According to the EU directives, the population should be informed about exceeding the $180\mu\text{g}/\text{m}^3$ level and warned if the limit $360\mu\text{g}/\text{m}^3$ is exceeded.

Ozone concentrations in the working environment

The American Conference of Governmental Industrial Hygienists (ACGIH) suggests for an eight-hour exposure the **PEL-TWA** value $214\mu\text{g}/\text{m}^3$. This value was accepted by a number of countries within the American continent among them also by the Occupational Safety and Health Administration (OSHA), USA. The same applies for a short-term exposure value for a period of 15 (OSHA) or 10 minutes (ANSI/ASTM), **PEL-STEL**, that equals to $642\mu\text{g}/\text{m}^3$. The PEL-STEL value however, can only be reached maximum four times a day and an interval between such exposures has to be longer than 1 hour.

The German **MAK-Wert** (Maximale Arbeitsplatzkonzentration) equals to $214\mu\text{g}/\text{m}^3$ under conditions of 8-hour exposure a day, 40 hours per week in 4 consecutive weeks.

Ozone concentration in the indoor environment of buildings

For indoor environment, the $214\mu\text{g}/\text{m}^3$ exposure limit valid for 8-hour exposure is usually accepted.

*Note*The above values apply to standard conditions, i.e. to the temperature of 20°C and atmospheric pressure of 101.32kPa . Under such conditions, a coefficient of $4.67 \cdot 10^{-4}$ is valid for conversion between the values in $\mu\text{g}/\text{m}^3$ and in ppm v/v (ml/m^3).