

# INSTRUCTIONS FOR USE



Product: **LifeOX<sup>®</sup>** air

**INDUSTRIAL**



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

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## 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.

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<sup>®</sup>-AIR INDUSTRIAL. 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 decay spontaneously back to oxygen. To make the time for ozone decomposition shorter and the ozone application completely safe, the LifeOX<sup>®</sup>-AIR INDUSTRIAL is equipped with integrated catalytic ozone destructor. Therefore, in this phase of the treatment process, the ozonized air from the room is sucked into the device where ozone is safely decomposed on a catalyst to oxygen. This feature provides substantially shorter treatment time. The principle is shown in Fig. 1.



**Fig. 1:** Principle of operation

1) The air is drawn into the LifeOX® -AIR INDUSTRIAL device. In the device, a part of oxygen from the air is converted to ozone. Air containing active oxygen enters the room. 2) After the end of ozone generation period, the air containing ozone is drawn from the space back through catalytic filters, on which ozone decomposes, and ozone-free air is leaving the device.

### 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 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.**

Further instructions are given in the chapter: Ozone application and safety measures.

## 4. LifeOX® -AIR INDUSTRIAL operation

### 4.1. Placement of the device, its operation and control



**Fig. 2: Remote control and display of the device**

Observe the Conditions of use in the previous chapter.

Place the device in the middle of the room, connect it to the mains and switch the power button on the side of the device to position „1“. The device is now in standby mode. Lamp starts to flash in six seconds intervals and on the display it shows:

- **„AirOzonizer Lifetech\*“**
  - **Total time of operation hours „Working hours: 00000000“**
  - Time setting for production and destruction of ozone  
**„-prod+ -dest+ hrs: 1:30 0:50“**
- Set the time of production and destruction of ozone using „+“ a „-“ buttons on remote control.
  - Go away from the device and press **„START“** on the remote control. Production of ozone is started (fan is on, lamp starts to flash in one second intervals and time of production and destruction is counted down on the display).
  - Leave a room, close the door, or lock it and put a clear warning, that a process of producing active oxygen takes place in a room.
  - After the end of production and destruction time (lamp flashes in six seconds intervals and fan is off) you can enter the room, without taking any health risk.

Notes:

- Ozone destruction starts automatically after ozone production process. After end of whole treatment it is shown on the display:
  - **„The run cycle done successfully“**
  - **“Press START for new run cycle >> or switch off the power”**

Air in the room should be fresh and fragrant. If you want to start a new cycle, press **„START“** button. Set time of production and destruction shows on the display again. To start treatment, press **„START“** button again.

- If necessary, production of ozone can be aborted by pressing **„STOP“** button on a remote control. You can abort automatically started ozone destruction process by long pressing of **„STOP“** button. On the display it shows
  - **„Aborted by user Switch off power“**

To completely turn off the device and use in other room, turn the switch to „0“ position („I“ – ON, „O“ – OFF).



**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).**

## 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<sup>®</sup> -AIR INDUSTRIAL, we recommend you to start with the shortest time for disinfection and deodorization. Based on your experience you will find the most appropriate mode for your conditions.

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 spaces it was necessary to repeat the treatment or use long-term mode of operation.

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.

- For safety reasons the time of ozone destruction used by the device is oversized. In some cases, in dependence on conditions of ozone application, it is possible to enter the space already after less than 1 hour of ozone destruction, to switch the device off and to use it for treatment of another space.
- 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.*

We recommend a gentle cleaning of the filters on both sides of the device with a vacuum cleaner. The filters should be replaced once a year. 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 <sup>3</sup> /h) | Power supply  | Input (W) | Dimensions LxWxH (cm) | Weight (kg) |
|-------------------------------------|------------------------------|---------------|-----------|-----------------------|-------------|
| LifeOX <sup>®</sup> -AIR INDUSTRIAL | 350                          | 230V AC, 50Hz | 300       | 43 x 52 x 81          | 31          |

**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 INDUSTRIAL 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  $20^\circ\text{C}$  and atmospheric pressure of  $101.32\text{kPa}$ . 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 ( $\text{ml}/\text{m}^3$ ).*