

GUIDE TO USE OF UV-C RADIATORS ANDROMEDA

Thank you for purchasing from us a bactericidal UV-C irradiator type "Andromeda" of "Industrial Lighting" Ltd.

Before using your UV-C irradiator, read the instructions carefully and keep them for further reference.

ATTENTION! READ AND SAVE THESE INSTRUCTIONS.

1. Failure to follow the instructions below may result in electric shock, fire, and / or serious injury.
2. The appliance must be connected to the electrical grid circuit directly into the socket.
3. It is forbidden to use the appliance with a damaged cable or plug.
4. Keep the power cord away from busy areas. Never place the cable under carpets, near radiators, stoves or other heating appliances.
5. Protect bactericidal lamps from impact.
6. Do not use the appliance near open water.
7. Do not touch the bactericidal lamps with dirty or wet hands. Only switch the irradiator on and off with dry hands.
8. Unplug the power cord from the electrical outlet when the irradiator is not in use, before cleaning, before installing or removing parts, and before moving the irradiator to another location.
9. Never drop or insert any objects into the openings of the irradiator.
10. Use the appliance only for its intended purpose as described in this manual. It is forbidden to use the appliance for any other purpose.
11. The appliance is intended for indoor use only.
12. Do not use the power cord to pick up, carry, drag, pull, or lift the irradiator. Do not pull the cord on or around sharp corners or edges. This can damage the protective covering and damage the cable.
13. Do not pull on the power cord to unplug it.
14. Always switch off the irradiator before removing the plug from the socket.
15. Never place the irradiator on soft and unstable surfaces such as a bed or sofa. This can cause the appliance to fall, tip over and be damaged.
16. Do not cover the irradiator during operation.
17. Clean the appliance only with a clean, dry cloth. Do not use detergents.
18. Store the irradiator on a smooth, level surface, away from direct sunlight. Store and store the power cord away from hot surfaces and places where a person may walk or trip.
19. During normal operation, the bactericidal lamps glow evenly along their entire length in a light blue color. If the color of the lamps changes to purple-red or the

discharge starts to flicker, turn off the irradiator and replace the lamps. If, even after replacing the lamps, they do not light up in normal mode, turn off the irradiator and contact your dealer or authorized service center. Bactericidal lamps have an average life of 9000 hours. During operation, the efficiency of the lamps in the UV-C area gradually decreases. It is possible for the lamps to light up after 9000 hours in the visible region of the spectrum, but then their bactericidal efficiency is minimal and the radiation is not enough for normal disinfection.

IMPORTANT WARNING!
RADIATION IN THE UV-C RANGE IS DANGEROUS TO HUMANS,
ANIMALS AND LIVING PLANTS

Never look directly at UV light, including reflected light, with the naked eye. Ultraviolet light can temporarily or chronically damage your vision or even lead to vision loss.

UV-C light is harmful to exposed skin and eyes. UV-C radiation is not felt immediately. In fact, the consumer may not be aware of the danger. Symptoms usually appear 4 to 24 hours after irradiation.

To prevent exposure to ultraviolet light, turn off the power to the appliance after the disinfection process is complete. Never operate the appliance if any part of the appliance is damaged or cracked.

When the irradiator is operating, place a warning sign for dangerous radiation at the entrance of the room with the text: "Warning: High-intensity ultraviolet energy. Wear suitable eye and skin protection".

Service personnel should be trained in the safe use of UV-C equipment, and other employees should be informed of the dangers of UV radiation.

As a minimum, service personnel should be familiar with the topics:

- Device and rules for using UV-C irradiators.
- Warning signs and labels.
- Personal protective equipment and rules for their use.
- Medical aspects, symptoms, etc. when irradiated with ultraviolet light.

In the enterprises the trainings are included, registered and documented according to the general order, according to the law.

Personal protective equipment provided by the manufacturer:

Each Andromeda irradiator is equipped with:

- 2 face shields
- 2 sets of thick nitrile gloves.

Ultraviolet UV-C radiation, which is used to disinfect air and surfaces, causes radiation damage to the DNA / RNA structures of all microorganisms - viruses, bacteria, yeast, mold.

Surfaces must be directly exposed to radiation. UV rays do not pass not only through opaque materials (fabrics, paper, etc.) but also through ordinary glass and most transparent polymers.

For quality disinfection, it is important to remove objects from the irradiation line that would block the rays from the surfaces to be treated.

It is important to know that:

- The intensity of ultraviolet radiation of bactericidal lamps is significantly reduced by the presence of dust on the tubes.
- The radiation of bactericidal UV lamps should be checked periodically with a UV meter (approximately every six months) to ensure that the intensity of UV radiation is sufficient for disinfection. The intensity of radiation from bactericidal lamps decreases over time. Bactericidal lamps from different manufacturers may have different durations of effective radiation.

Andromeda emitters are equipped with tubes made by OZONE FREE technology, i.e. The special glass used in their production does not pass almost completely the ozone-forming line of mercury discharge 185nm.

Waste bactericidal lamps as waste.

Your UV-C lamps contain mercury and fall into the group of hazardous waste. As such, they are collected separately and should not be disposed of in rubbish bins. Contact your municipal hazardous waste collection services for proper disposal and disposal.

The warnings and instructions discussed in this guide may not cover all possible conditions and situations. Staff must exercise common sense when using UV-C irradiators. The bactericidal irradiator is not a toy. Keep it out of the reach of children and do not leave it to untrained staff.

The time for effective sterilization in the most general case depends on:

- the type of harmful microorganisms present;
- the dimensions of the room;
- the temperature and relative humidity of the air in the room;
- the bactericidal parameters of the irradiating device.
- the time for heating the irradiator to reach maximum capacity. For Andromeda irradiators, this time is 3 to 5 minutes.

The effective dose required to achieve a certain percentage of sterilization for each particular microorganism is achieved by a certain exposure to UV-C radiation.

Exposure is the product of the power of UV-C radiation at the time of irradiation. This means that if a situation requires irradiation of 1 hour, then you can get the same result if you use twice as powerful an irradiator, but already for half an hour.

Bactericidal parameters of "Andromeda" UVC288W8-230

I. Intensity of UV-C radiation

Distance from the irradiator	UVC intensity	Distance from the irradiator	UVC intensity
1 m	> 100 $\mu\text{W}/\text{cm}^2$	8 m	16 $\mu\text{W}/\text{cm}^2$
2 m	> 100 $\mu\text{W}/\text{cm}^2$	9 m	13 $\mu\text{W}/\text{cm}^2$
3 m	91 $\mu\text{W}/\text{cm}^2$	10 m	11 $\mu\text{W}/\text{cm}^2$
4 m	59 $\mu\text{W}/\text{cm}^2$	11 m	9 $\mu\text{W}/\text{cm}^2$
5 m	38 $\mu\text{W}/\text{cm}^2$	12 m	8 $\mu\text{W}/\text{cm}^2$
6 m	27 $\mu\text{W}/\text{cm}^2$	13 m	7 $\mu\text{W}/\text{cm}^2$
7 m	21 $\mu\text{W}/\text{cm}^2$	14 m	5 $\mu\text{W}/\text{cm}^2$

II. Efficiency in terms of air disinfection.

- 5 minutes for a room up to 40 m²;
- 10 minutes for a room from 40 m² to 140 m²;
- 15 minutes for a room from 140 m² to 200 m²;
- 25 minutes for a room from 200 m² to 300 m²;
- 30 minutes for a room from 300 m² to 400 m²;
- 60 minutes for a room from 400 m² to 550 m².

III. Efficacy against some types of bacteria.

Test strain:	Time to achieve disinfection at different distances from "Andromeda" UVC288W8-230									
	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m	11 m	12 m
<i>S. aureus</i>	5 min	5 min	5 min	5 min	5 min	10 min	10 min	10 min	10 min	25 min
<i>P. aeruginosa</i>	5 min	5 min	5 min	5 min	5 min	5 min	10 min	10 min	10 min	10 min
<i>E. coli</i>	5 min	5 min	10 min	10 min	10 min	15 min	15 min	15 min	15 min	20 min
<i>E. hirae</i>	5 min	10 min	10 min	10 min	15 min	15 min	25min	30 min	60 min	60 min

Sequence of actions when working with "Andromeda" irradiators

1. Make sure there are no people, pets or live plants in the room.
2. Select a flat and stable surface and the most suitable location for the operation of the appliance.
3. Depress the wheel brakes to secure the device.
4. Press the on / off button on the appliance to the right of the control box.
5. Select the exposure time (1 to 120 minutes) on the display located centrally on the control box by turning the center knob.
6. Press the green button to start the disinfection.
7. Exit the room and close the door. After 20 seconds, the timer will turn on the lamp automatically and the disinfection process will begin.
8. If necessary, you can forcibly stop the disinfection process by pressing the red button, which will reset the timer and stop the irradiation.
9. Do not enter the room unnecessarily during the disinfection process.
10. The irradiator has a built-in motion sensor that will automatically stop the radiation if you approach less than 15 meters to the device, and will restore the radiation until the set time has elapsed, in the absence of movement.
11. After disinfection is complete, allow the irradiator to cool for at least 5 minutes.
12. Unplug the appliance and store it, restricting access to untrained persons and personnel.
13. After the end of the irradiation, be sure to ventilate the premises in order to remove the residues in the air from the destroyed microorganisms, as well as the minimum amounts of ozone generated.

Information about COVID19

Ultraviolet light disrupts the genetic material of bacteria. Depending on the type of virus or bacterium, specific doses of UV-C radiation are needed to block their growth. The dose that is needed to destroy 90% of a type of microorganism is called LD90.

Influenza viruses require a small dose of 2 mJ / cm².

For corona virus, most experts consider a dose of 4 mJ / cm² to be sufficient.

Industrial Lighting EOOD adheres to the recommendation of the National Center for Parasitic and Infectious Diseases.

According to her, effective disinfection is achieved by operating the lamps for 20-30 minutes and a minimum of 6 μW / cm² UVC intensity in the entire volume of the premises.

[https://ncipd.org/index.php?option=com_k2&view=item&id=563:covid-19-desinfection-08032020&lang=en#UVC_Desinfection.](https://ncipd.org/index.php?option=com_k2&view=item&id=563:covid-19-desinfection-08032020&lang=en#UVC_Desinfection)

Example proposal for disinfection with "Andromeda" UVC288W8-230 of COVID-19

