
# Important Safety Information for the MiniZ Emitter & Controller

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# Introduction

This document provides information on the issues surrounding the use of RBD Instruments' MiniZ emitter and the MiniZ controller. This includes discussions about the equipment you should have available and the measures you can take that can greatly reduce and even eliminate the potential for risk.

Due to its construction and component materials, the MiniZ emitter can present some hazards when it is not used properly or without some precautionary measures. When used improperly or without some precautionary measures, a user of the MiniZ could be exposed to the following:

- UV-C Radiation
- Ozone Creation
- Mercury Exposure

Each of these areas is discussed in this document.

For additional information, please refer to:

- "General UV Safety Information", which is included in the Safety Information envelope
- "EC Safety Data Sheet", which is also included in the Safety Information envelope
- For information about standard viewport windows, the following web site has helpful information: http://www.mdc-vacuum.com/searchs/doc/viewports-intro.htm

**Note:** OSHA does not regulate the exposure of personnel to UV radiation. Instead, it references the guidelines set by the American Conference of Governmental Industrial Hygienists (ACGIH). Basically, continuous exposure to UV should not exceed 1 mW/cm2. This is significantly less than what might be experienced on a cloudless summer's day in the northeast area of the United States.

# UV Radiation

## *Issues:*

- There are no immediate warning symptoms to indicate overexposure of UV radiation. However, symptoms of overexposure can include sunburn on skin or photokeratitis (an inflammation of the cornea) or photoconjunctivitis (an inflammation of the conjunctiva, the membrane that lines the inside of the eyelids) in eyes and typically appear hours after exposure has occurred. Photokeratitis and photoconjunctivitis can be very painful, however, they are reversible and do not seem to result in any long-term damage to the eye or vision.
- The type of viewport/window has an impact on exposure to UV radiation.

## *Prevention & Protection:*

### How do we help protect you?

- UV safety glasses (available for purchase).
- Available UVC Meter for testing to ensure that your viewport/system isn't leaking radiation.

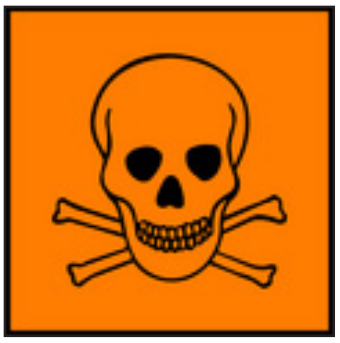

### What must you do to help protect yourselves?

- Wear special clothing to prevent skin exposure to UV radiation (you need to provide your own).
- Use a UV-C meter to regularly test your viewports to ensure there is no UV-C leakage.

# Ozone

## *Issues:*

- The emitters used with the MiniZ produce ozone when they're operated in air (that is, outside vacuum conditions). Ozone vapors are harmful (they can cause mucous membrane damage) so should not be breathed. When there's a high enough concentration of ozone, it is a poisonous gas.



- Additionally, there is a risk of explosion if the system is pumped out with a hydrocarbon oil mechanical pump when large amounts of ozone are present.

## *Prevention & Protection:*

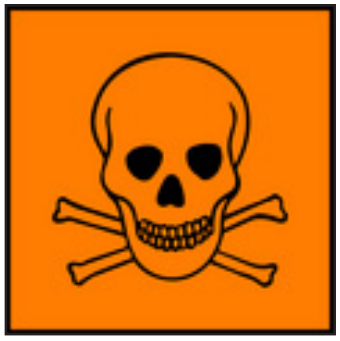
### What must you do to help protect yourselves?

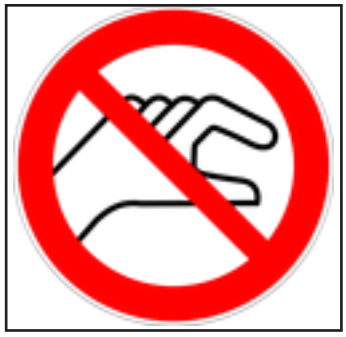
- Use the MiniZ emitters only in vacuum situations. Do not operate the MiniZ emitters in air.
- For those applications that require pumping at pressures approaching atmosphere or applications that desire the production of ozone, an inert mechanical pump fluid such as Fomblin or Krytox should be used because they are not reactive with oxygen.

# Mercury

## *Issues:*

- The emitters in the MiniZ contain mercury. Mercury is highly toxic when it is inhaled, even in small amounts.
- Mercury should not come in contact with bare skin.





## *Prevention & Protection:*

### How do we help protect you?

- We have included the Material Safety Data Sheet for mercury as prepared by the manufacturer of our emitters.
- Because the mercury in our emitters is amalgamated and there isn't much of it, it's not a significant hazard. However, you should still take precautions and dispose of any broken emitters as you would any fluorescent light bulbs according to your local laws.

### What must you do to help protect yourselves?

- Have a mercury spill clean-up kit available at all times.
- In the event that an emitter breaks, wear protective clothing and breathing apparatus when cleaning up the spill. And again, dispose of the broken emitter as you would any fluorescent light bulbs according to your local laws.