



Ozone Concentration Measurement for UV System used in Respiray

22.01.2021
Maido Merisalu
Captain Corrosion OÜ

Overview

The goal of the study was to evaluate if the ultraviolet light source (265 nm wavelength) used in Respiray is capable of producing ozone from the oxygen in air. The study was necessary because some UV sources are capable of producing ozone, which can be harmful if its concentration in air is too high. The measurements were performed with a D16 model handheld ozone detector, which is capable in measuring ozone concentrations from 0.1 ppm. Two types of measurements were performed overall, where in the first case the air was collected near the ultraviolet light source. There the concentration of ozone was expected to be highest. In the second measurement, the ultraviolet light source was operated inside a sealed chamber, which would allow collect ozone if it were to be created.

Results and Discussion

In both measurements no ozone was detected with the D16 model detector, which means that the ozone concentration was lower than 0.1 ppm. Such an ozone concentration is considered acceptable for exposure over 24h. However, the experimentators did also not smell any ozone in the air, which means that the possible level of ozone concentration would have been significantly lower than 0.1 ppm as humans can normally smell ozone from 0.003 – 0.015 ppm. These results are not surprising if the studied ultraviolet light source had a peak intensity at a wavelength of 265 nm, which is not sufficiently energetic to produce ozone. In order to produce ozone, the ultraviolet light source would need to have sufficient intensity at the sub 200 nm part of the spectrum, which is was not the case with the tested device. Based on the results it was concluded that the tested ultraviolet light source does not produce a quantity of ozone that could be considered dangerous.

Literature

<https://www.ncbi.nlm.nih.gov/books/NBK208281/>