



Project Summary

Contribution to Indoor Ozone Levels of an Ozone Generator

Raymond S. Steiber

Ozone generators are claimed to provide a way to clean indoor air. The amount of ozone generated by these devices is a major concern. A study of a commonly used commercially available unit was undertaken to determine the impact of the ozone generator on indoor ozone levels. Experiments were conducted in a typical mechanically ventilated office and in a test house. The ozone generated by the unit and the in-room ozone concentrations were measured. The results showed that, when the unit was operated at the manufacturer's recommended setting, it generated little if any ozone. The indoor concentrations in this case were not significantly above natural background. When operated at the maximum setting, the generator produced large amounts of ozone. In this situation the indoor ozone concentration exceeded 100 ppb in well ventilated spaces and was close to 1 ppm in poorly ventilated spaces. When the ozone generator was turned off, ozone levels quickly returned to background. No measurements were made to determine the effect of the device on other aspects of indoor air quality, such as the elimination of volatile organic compounds.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

Ozone generators are claimed to help purify indoor air and remove odors and other pollutants. Large industrial scale ozone generators have been found useful in ameliorating unpleasant odors, particularly in fire-damaged buildings. Ozone generators are also claimed to be effective in combatting molds and bacteria. There are no published data supporting these claims.

Although manufacturers of ozone generators claim that their units do not increase indoor levels of ozone, they offer no supporting data, other than testimonials. This study was undertaken to determine the impact of a commercial ozone generator on indoor ozone levels under typical conditions. No measurements were made to determine the effect of the device on other aspects of indoor air quality, such as the elimination of volatile organic compounds.

The unit selected for test was an ozone generator designed for use in the home or office. It has two user-adjustable controls: one that varies the speed of the circulating fan and another that controls the output of the ozone.

The unit was tested under three different sets of conditions. The first of these was a 24-hour test under normal operating conditions in a well-ventilated room. The second group of tests also took place in a well-ventilated room, but this time only the higher generator settings were used. The third group of tests was conducted in a poorly ventilated room. Here the emphasis was on what happened when the ozone generator was left running overnight with no air circulation, but normal



leakage around the door and through the walls. In running these tests, the chief interest was in the amount of ozone being contributed to room air and not the ozone levels at the face of the instrument. However, these were also measured.

Conclusions

When operated at the recommended setting for normal use (dial set at 11 o'clock), the ozone generator contributes little or no ozone to background air levels. At the highest setting, however, it can contribute as much as 100 ppb to a well-

ventilated room and 10 times that much to a poorly ventilated one. Our personal experience shows that at that level the air becomes difficult to breathe and there is some irritation of the eyes and the mucous membranes, perhaps due to excessive drying.

*The EPA author, **Raymond S. Steiber**, is also the EPA Project Officer (see below). The complete report, entitled "Contribution to Indoor Ozone Levels of an Ozone Generator," Order No. PB93-234 557/AS; Cost: \$17.50, subject to change) will be available only from:*

*National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650*

The EPA Project Officer can be contacted at:

*Air and Energy Engineering Research Laboratory
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711*

*U.S. Government Printing Office: 1993 — 550-067/80120

United States
Environmental Protection Agency
Center for Environmental Research Information
Cincinnati, OH 45268

Official Business
Penalty for Private Use
\$300

EPA/600/SR-93/177

BULK RATE
POSTAGE & FEES PAID
EPA
PERMIT No. G-35