



# Ventilation & Fume Extraction for Dymax UV-Curable Chemistries and Equipment

A question we are frequently asked about is the vapor given off during the curing process of Dymax adhesives, gaskets, maskants, and coatings.

This phenomenon is the result of a very rapid polymerization or chemical reaction that occurs during UV light cure. Both heat given off during the reaction (at the molecular level) and heat from the absorption of UV energy can in some instances result in a small amount of vapor to emit before the adhesive has a chance to completely polymerize (cure). It commonly referred to as “outgassing” or “VOC”.

Essentially, this phenomenon may emit trace amounts of the most volatile compounds listed on the Safety Data Sheet (SDS). Please note that the volatilization may or may not be noticeable.

## What is VOC?

Volatile Organic Compounds (VOC) weight loss content is determined as two separate components – processing volatiles and potential volatiles per ASTM 5403-93, Test Method A. Processing volatiles is a measure of volatile loss during the actual cure process and is usually seen as vapor during the cure process. Potential volatiles is a measure of volatile loss that might occur during aging or extreme storage conditions. The total mass loss (TMC) is measured for our adhesives and is available upon request.

### Example of VOC Calculation

$$\text{VOC} = \% \text{ Processing Volatiles} + \% \text{ Potential Volatiles}$$

Avg. Processing Volatiles	0.487%
Avg. Potential Volatiles	0.554%
Avg. Total Volatiles (Processing + Potential)	1.041%

## Product Data Sheet

Ventilation information in the “General Information” section of the Product Data Sheet (PDS) is mostly limited to instructions to avoid breathing vapors. This is a generalized statement that allows the Environmental Health & Safety Team of the facility to decide the most appropriate means to protect the users. Specific information on how to avoid vapor inhalation is not provided in the PDS but does refer the user to the product’s SDS.

## Safety Data Sheet

Information provided in the Safety Data Sheet (SDS) is more specific regarding the content of the adhesive and the effects thereof. Section Two in the SDS is the Hazard Identification Section where the hazard statement, prevention, response, storage, and disposal advisements are identified. Section Four identifies first-aid measures to be taken if exposed.

## Dymax Chemistry Ventilation Recommendations

When using any Dymax UV light-curable materials, Dymax strongly recommends a well-ventilated area to avoid breathing in vapors as well as Local Exhaust Ventilation systems designed in accordance with ANSI/ASSP Z9.2-2018 – Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems or ACGIH – Industrial Ventilation, A Manual of Recommended Practices of Design. Dymax does not offer fume extraction equipment, but methods of ventilation can include, but are not limited to:

- Overhead hood vents
- Soldering iron fume extractors
- Fans or directional airflow sources
- Vacuums
- Considerations that need to be taken for production are:
  - The size of the production area
  - The volume per part
  - The quantity of parts per hour/shift
  - Proper curing techniques

## Curing Equipment

Customers often ask Dymax about the generation of Ozone ( $O_3$ ). Dymax standard arc-ignition bulbs (UVA type) generate an insignificant amount of UVC and therefore essentially no ozone. Some UV light-curing systems, like those used to cure UV ink, emit primarily “shortwave” (UVB & UVC) energy. Upon exposure to UVC light (specifically <240nm), oxygen molecules ( $O_2$ ) split into oxygen atoms (O) and recombine with  $O_2$  to create  $O_3$ . The current long-term ozone concentration limit recommended by ACGIH, NIOSH, and OSHA is 0.1ppm (0.2 mg/m<sup>3</sup>).

Dymax LED curing equipment, such as RediCure® (365nm), PrimeCure® (385nm), and VisiCure® (405nm) models, are not near the UVC range and therefore are not capable of producing ozone.

## Dymax Curing Equipment Ventilation Recommendations

Many of the curing systems manufactured by Dymax have onboard ventilation for thermal management. Only the UVCS conveyors have a blower system that can aid in fume extraction. Consult the Operator Manual for the specific ventilation instructions and guidelines.