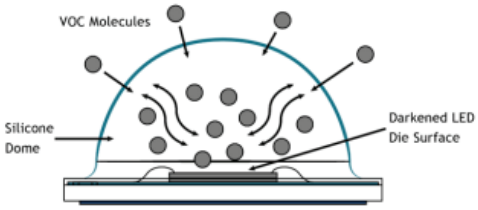
Product Note:
Lumidox® II LED Arrays and VOCs

Lumidox II LED Arrays are robust devices that will provide countless hours of operation when used and maintained properly. When using in an environment where volatile organic compounds (VOCs) are present, device longevity and expected operation are dependent upon proper workspace ventilation. Lack of ventilation can cause VOC contamination and possible damage to your device. However, VOC damage is usually temporary, and a procedure for restoring your device is explained at the bottom of this page.

Potential LED Damage due to VOC Contamination



Contaminants can darken LEDs, resulting in rapid light output degradation. This effect can be amplified when exposure to environmental pollutants is combined with high temperatures and/or high intensities of high-energy photons in an environment with little to no ventilation.

When contamination occurs, it darkens the die surface, blocks the light, and thus dramatically depreciates the LED's luminous flux. Some materials may be more likely to cause LED darkening under specific conditions. Contaminants can also damage LEDs through corrosion, causing open circuits. The silicone encapsulant can be damaged due to swelling, bulk discoloration, and loss of adhesion.

VOC Concentration − High concentrations of VOCs will result in more severe darkening. The threshold levels are not well established. System designs that trap VOCs exacerbate the effect.

VOC-induced LED darkening results in discoloration, causing the LED surface to take on a yellow or brown color. Darkening can dramatically depreciate the luminous flux performance of the LED, causing it to emit significantly less light. With white LEDs, the color point can be shifted due to VOC darkening.

Some contaminates that may cause VOC Contamination

Note: The concentration levels that result in degradation are not easily quantified.

Acetic Acid
Acetone
Acrylates (all types)
Ammonia
Ammonium Sulfide
Aniline
Benzene
Bleach
Bromine
Butadiene Rubber
Butyl Rubber
Camphor Oil
Carbolic Acid
Carbon Disulfide
Carbon Tetrachloride
Chlorine-Containing Compounds
Chlorobutyl Rubber
Chlorosulphonated Polyethylene
Cutting Fluids
Cyanoacrylates
Cyclo Hexane
Diamyl Phthalate
Dichloromethane
Dipropylene Glycol Monomethyl Ether
Epichlorohydrin
Ethyl Acetate
Ethyl Amine
Ethyl Bromide
Ethylene Chlorohydrin
Formaldehyde
Glycol Ethers
Halogenated Hydrocarbons
Hydrochloric Acid
Hydrofluoric Acid
Hydrogen Peroxide
Iodine
Isoamyl Alcohol
Many types of inks (especially Sharpie® pens)
Kapton tape with acrylic-based adhesives (silicone-based adhesives are Ok)
Methacrylic Acid-Methyl Ester (MMA)
Methanol
Methyl Amine
Methyl Ethyl Ketone (MEK)
Methyl Isobutyl Ketone
Methyl or Ethyl Acetates
Methylene Chloride
Nitric Acid
Pesticides
Petroleum products (all)
Phenols
Polymer Plasticizers
Potassium Hydroxide
Rubber
Silicone Oil
Silicone Rubber (Acetic Acid Curing)
Sodium Hydroxide
Sodium Sulfide
Sulfur-Containing Compounds
Sulfuric Acid
Sulfur Dioxide
Sulphuryl Chloride
Toluene
Trimethyl Hexamethylene Diamine
Xylene

VOC-induced darkening is often reversible. The silicone dome and LED chip are generally not permanently affected by VOC contamination and contaminants can be driven out of the package by using a burn-in process. **In an open area with adequate ventilation, run your array on stage 5 for 2-3 hours with a fan blowing on the LEDs to completely burn away all the VOCs and revert the array back to its original state.** VOC-driven LED darkening will likely not be severe and will dissipate quickly.