

The Facts About Amine-Induced Visual Disturbances: Halovision—Blue Haze—Glaucopsia

The medical terminology for the phenomenon known as blue haze or halovision is *glaucopsia*. Glaucopsia is a temporary disturbance in the clarity of vision experienced by workers exposed to elevated airborne concentrations of certain amine compounds. The process often occurs after exposure to amine vapor for a period of 30 minutes to several hours. This disturbance takes the form of clouding or fogging of vision, such that objects become blurred against a blue or blue-gray background. Halos may also appear around bright objects. The concentration of the amine in the atmosphere will influence how quickly symptoms are experienced. The effect is temporary, as vision slowly returns to normal, generally two to four hours after exposure ceases. A medical examination of the affected individual's eye will reveal the cornea (the transparent outer portion of the eye) as having a slightly hazy appearance. However, after a return to normal vision, no abnormalities can be detected.

Glaucopsia is caused by a slight increase in the water content of the outer layer of the cornea (corneal epithelium). The increased water content results in a slight increase in the thickness of the cornea, causing visual changes. Once removed from the exposure, the water content of the corneal epithelium reduces and the thickness of the cornea gradually returns to normal, leading to restored vision. At greater airborne amine concentrations, the individual may experience irritation to the eye characterized by stinging and reddening. It therefore can be concluded that glaucopsia represents the earliest and most sensitive effect of amines on the eye.

Glaucopsia is a temporary effect that disappears spontaneously within several hours following exposure. Although it is not detrimental to the eye per se, glaucopsia may place the individual at risk of accidental injury due to impaired vision and reduces the ability to undertake skilled tasks, such as driving an automobile or operating equipment.

Many amine compounds are known to cause glaucopsia. However, it is likely that any volatile amine has the potential for causing the effect. The following amine compounds are believed to cause glaucopsia: morpholine, methyl morpholine (Dabco[®] NMM), ethyl morpholine (Dabco NEM), tert-octylamine, dimethylamine, trimethylamine, tetramethylethylenediamine (TMEDA), dimethylaminopropylamine (DMAPA), triethylenediamine (TEDA, Dabco Crystal, Dabco 33 LV), tetramethylbutanediamine, and bis(dimethylaminoethyl)ether (Dabco BL-11, Dabco BL-19).

In summary, glaucopsia is a temporary disturbance of vision that is not considered to be detrimental to the eye but may place the affected individual at risk of harm resulting from the inability to view objects normally. The occurrence of glaucopsia in the workplace should be viewed as an indication that process ventilation may be inadequate and that chemical handling procedures should be reviewed.



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Phone: +1 (703) 741-5000
- Synthetic Organic Chemical Manufacturers Association (SOCMA)
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