

## Safetygram #32

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

The medical terminology for the phenomenon known as blue haze or halovision is *glauropsia*. Glauropsia is a temporary disturbance in the clarity of vision experienced by workers exposed to elevated airborne concentrations of certain amine compounds. 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 symptoms often occur after exposure to amine vapor for a period of 30 minutes to several hours.

Glauropsia is caused by the swelling of the outer layer of the cornea (corneal epithelium) in combination with the development of small sacs of fluid (microcysts). Temporary visual disturbances may occur as the result of diffuse corneal cloudiness. Once removed from the exposure, the thickness of the cornea gradually returns to normal, leading to restored vision.

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.

Although it is not detrimental to the eye per se, glauropsia may place the individual at risk of accidental injury due to impaired vision and may reduce the ability to undertake skilled tasks, such as driving an automobile or operating equipment.

At greater airborne amine concentrations, the individual may experience irritation to the eye characterized by stinging and reddening. It therefore can be concluded that glauropsia represents the earliest and most sensitive effect of amines on the eye. Thus, the occurrence of glauropsia in the workplace should be viewed as an indication that process ventilation may be inadequate and that chemical handling procedures should be reviewed.

Many amine compounds are known to cause glauropsia. However, it is likely that any volatile amine has the potential for causing the effect. Based on published literature findings, amine-induced glauropsia thresholds for several individual amines have been estimated (Table 1).<sup>1</sup>

In summary, glauropsia 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.

**Table 1**

*Glauropsia Thresholds and ACGIH Threshold Limit Values<sup>1</sup>*

<b>Substance</b>	Glauropsia Threshold (ppm)	ACGIH Threshold Limit Values (ppm)
Bis(dimethylaminoethyl)ether	4.6	0.05 (TWA8) 0.15 STEL
Diisopropylamine	25	5 (TWA8)
Ethyl morpholine	40	5 (TWA8)
Triethylamine	1.5	1 (TWA8) 3 (STEL)

ACGIH: American Conference of Governmental Industrial Hygienists  
TWA8: time-weighted average concentration over 8 hours  
STEL: short-term exposure limit (15 minutes)

1. Ballantyne, B., 2004, "Glauropsia: An Occupational Ophthalmic Hazard," *Toxicol. Rev.* 23 (2).



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