



Chemicals, Contact Lenses, and Respirators

FACT SHEET 63-006-1112

Historical Perspective

The principle of a contact lens to correct vision has been around since 1508 when Leonardo da Vinci sketched several forms that might be possible. However, the reality of a comfortable lens that would correct vision by being placed on the cornea of the eye began around 1950 and became a fairly common form of optical correction in the later 1950's and early 1960's. The soft lens came to the marketplace in 1971. The use of contact lenses in industry was generally discouraged in the early days of their use, particularly where there was a potential for chemical splash or exposure to chemical vapors or dust.

In 1978, the National Institute of Occupational Safety and Health (NIOSH) began recommending that workers exposed to chemicals that present an eye irritation or injury hazard not wear contact lenses. The determination was made by committee members based on current literature and best professional opinion. The primary concern was that a rigid lens would trap chemicals under it or a soft lens would absorb the chemical and hold it against the cornea. Either case would increase the likelihood of chemical injury.

New Guidance

In a recent review of chemical exposures in industrial environments, newer experimental literature and updated professional opinions, NIOSH has revised its restrictions on contact lens wear in chemical environments in the NIOSH Current Intelligence Bulletin (CIB) #59, June 2005.¹ The new guidance does not preclude the use of ANSI Z87.1 compliant eyewear where a chemical splash hazard exists, but does allow wear of contact lenses under Z87.1 protective eyewear in

most chemically hazardous conditions. The CIB still prohibits wear of contact lenses when working with acrylonitrile, methylene chloride, 1,2 dibromo-3-chloropropane, ethylene oxide, and methylene dianiline.



Restrictions Before Approving Use

NIOSH recommends allowing contact lens wear "when handling hazardous chemicals provided that the safety guidelines listed here are followed and that contact lenses are not banned by regulation or contraindicated by medical or industrial hygiene recommendations."¹ The following steps are outlined in the CIB to be performed before authorizing worker use of contact lenses in hazardous chemical environments:

1. Conduct an eye injury hazard evaluation in the workplace that includes an assessment of:
 - Chemical exposures
 - Contact lens wear
 - Appropriate eye and face protection for contact lens wearers
2. Provide suitable eye and face protection for all workers exposed to eye injury hazards, regardless of contact lens wear.
3. Establish a written policy documenting general safety requirements for wearing contact lenses, including the eye and face protection required and any contact lens wear restriction by work location or task.
4. Comply with current OSHA regulations on contact lens wear and eye and face protection.

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5. Notify workers and visitors about any defined areas where contact lenses are restricted.
6. Identify to supervisors all contact lens wearers working in chemical environments to ensure that the proper hazard assessment is completed and the proper eye protection and first aid equipment are available.
7. Train medical and first aid personnel in the removal of contact lenses and have the appropriate equipment available.
8. In the event of a chemical exposure, begin eye irrigation immediately and remove the contact lenses as soon as practical.
9. Instruct workers who wear contact lenses to remove the lenses at the first signs of eye redness or irritation.
10. Evaluate restrictions on contact lens wear on a case-by-case basis.¹

What Isn't Specifically Covered – Where Health and Safety Must Make Professional Decisions

1. Use under respirators. The respirator presents a unique environment to the eye. In most cases where there is a full face respirator, air is either filtered with the breathing process or provided by a remote source such as tank or pump. The constant air flow may cause the eye tissues and/or lens to dry to the point that the lens wear becomes uncomfortable or potentially injurious to the eye.
2. Military field training or deployment. Military personnel are prohibited from wearing contact lenses in field training or deployments.² Civilian support personnel in these operations are prohibited from contact lens use where the hazard is such that the respirator or mask cannot be removed without the worker exiting the chemical exposure area or undergoing decontamination prior to removal of the respirator and subsequently the contact lenses. This is particularly the case in military unique operations where nerve, blister, or other agents present an exposure hazard. Extended use of contact lenses in these settings may lead to problems of over wear with resultant corneal irritation, abrasion, or possible ulceration.

What must be done if an Installation wants to Approve use of Contact Lenses in the Chemical Environment?

1. Follow the 10 points of guidance from the NIOSH CIB as listed above.
2. Ensure a complete paper trail of the decision (include names and specialties of those making the authorization), what operations/hazardous areas are authorized to have workers using contact lenses, and who is authorized contact lens use.
3. Ensure a clean area is available in the work area for the removal and reinsertion of contact lenses for both routine wear procedures and in the case of an exposure.
4. In certain hazardous operations, especially military unique operations such as working with nerve, blister, or other agents, prohibit use all together unless approved by the installation Commander, Preventive Medicine Officer, Safety Officer, and Optometrist or Ophthalmologist familiar with the potential ramifications of exposure to the hazard.

The process of approving contact lens use in hazardous chemical areas is involved but may be of value for some installations where the risks to the employee are not particularly high or where the benefits outweigh the risks.

1. "*Current Intelligence Bulletin #59*", June 2005, NIOSH Publication No. 2005-139.
2. Department of the Army Pamphlet 40-506, The Army Vision Conservation and Readiness Program, Jul 2009.