

# Section 1

## Safety and Health Guidelines

Polyurea raw materials contain isocyanates and are corrosive.

### The hazards associated with processing polyurea spray elastomers:

- Inhalation route of isocyanate exposure
- Trans-dermal or through skin
- Corrosive and can cause skin irritation and chemical burns

### Minimum personal protection gear:

- Respirators and instruction in proper use and maintenance
- Tyvek type protective clothing and chemical resistance gloves
- Head and foot protection. Hardhats and steel-toed boots
- Eye protection
- Hearing protection
- Fall protection, where required
- Confined space program, where required
- READ the MSDS and Product Data sheets
- Spill response kit

### What are Isocyanates?

- Vary reactive family of chemicals, some with high vapor pressures. Characterized by having at least one (-N=C=O) isocyanate group.
- EXPOSURE LIMITS:
  1. OSHA Permissible Exposure Limit (PEL) 0.02 ppm ceiling
  2. 8-hour Time Weighted Average (TWA) 5.0 ppb (parts per billion)

### Effects of isocyanate exposure:

- Asthma-like symptoms
- Chest tightness upon respiration
- Shortness of breath
- Wheezing and coughing

### Effects of exposure to corrosive chemicals. Both “A-side” and “B-side” are corrosive chemicals.

- Redness and rashes in area of exposure
- Burning, itching, localized dermatitis
- If untreated, can develop into blisters and open sores

## Respirators

Two types of respirators are approved for use when working with isocyanate; full-face supplied air respirators and cartridge respirators with appropriate filters. **All respirators are to be supplied by the employer to each individual who may be exposed. The employer shall be responsible for the establishment and maintenance of the respiratory protection program as outlined in the OSHA CFR 29, Part 1910.14 section b.**

### Full-Face, supplied-air respirators:

- Provides best protection for applicators
- Protects face, eyes and respiratory system
- Positive air pressure provides extra protection from isocyanate vapors

- Mandatory for use in confined space applications. Refer to OSHA 20 CFR, Part 1910.134: Confined Space Regulations. See Section 6.
- Respirator users must be properly fit-tested and trained in the use and maintenance of their individual respirators

**Organic-vapor cartridge filters:**

- Organic-vapor cartridge filters are **NOT** approved by themselves. Must be used with a Dust/Mist (DM) or High Efficiency (HEPA) filter
- Must have a written and strictly adhered to filter “change-out” program
- Cartridge respirators do not provide eye and face protection
- Cartridge respirators do not have positive air pressure, and therefore rely totally on proper fit for isocyanate vapor protection
- Cartridge filter studies that purport the use of organic vapor cartridges with HEPA filters can be used for 40 hours were done with HDI isocyanate, not with MDI isocyanate. MDI is mainly used in polyurea spray applications, and has a lower vapor pressure

**Additional personal protection:**

- Eye protection. Glasses with side guards
- Chemical resistant gloves, especially when changing drums
- Tyvek type overalls will protect from over-spray during application. Isocyanate and amine aerosols are corrosive and can irritate exposed skin

**Hearing protection: OSHA 29 CFR Section 1910.05. See Section 7**

- Spray application vehicles should isolate noisy components such as generators and air compressors in a separate area of the application vehicle. Isolate with a noise-insulating bulkhead, if possible
- Excessive noise is one of the most pervasive health hazards in the construction industry
- OSHA limit is 85 decibels averaged over an 8-hour period (TWA)

**Medical testing:**

- Due to the hazards of isocyanate exposure and potential sensitivity to them, applicators should have a pre-placement physical exam and annual exams that include a pulmonary function test
- Applicators with a history of asthma, chronic respiratory problems, isocyanate sensitivity should consult a physician before working in polyurea applications
- During an application, if anyone exhibits breathing distress or other symptoms of exposure, they must be removed from the site and should be seen by a physician

**MDI Isocyanate Exposure Limits**

Monitoring Body	TLV/TWA <sup>2</sup>	PEL <sup>3</sup>	LIMIT	COMMENTS
ACGIH	0.051 mg/m3		8-hour day	
OSHA		0.2 mg/m3	Never exceed	At any time

ACGIH TLC's are recommended guidelines by the council of industrial hygienists. The values are not legally binding. Federal and State OSHA PEL's are legally binding exposure limits.

2 = TLV/TWA: Threshold Limit Values/Time Weighted Average

3 = PEL: Permissible Exposure Limit

**Other Safety and Health Considerations**

- **Scaffolding** – many states have laws governing the use and erection, maintenance and dismantling of scaffolding. Check with the local and state laws where your project is located
- **Hard Hats** – always a good idea
- **Boots** – preferably with steel toes. Many sites mandate steel-toed boots