

1. What type of environment is the product going to be used in, ventilation, etc.?

- Environment: The product, Dicyclohexylmethane-4,4'-Diisocyanate (HMDI), is always used in industrial settings where it may be heated, sprayed, or aerosolized (e.g., manufacturing, coating applications, or polyurethane production). Environments where airborne concentrations could exceed safe limits if not controlled, are poorly ventilated or confined spaces are a risk without proper measures.
 - Ventilation: Local exhaust ventilation is required to maintain HMDI levels below the ACGIH Threshold Limit Value (TLV) of 0.005 ppm (time-weighted average). This requires a controlled environment with mechanical ventilation systems designed to remove vapors, mists, or aerosols at the source. Inadequately ventilated areas are explicitly noted as problematic when the substance is processed in ways that increase airborne exposure (spraying, heating, etc.).
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2. What type of training will employees have before use?

- Inferred Training: While not explicitly detailed, employees must be trained to comply with OSHA standards (e.g., 29 CFR 1910 Subpart I for PPE and 29 CFR 1910.134 for respiratory protection). Training should include:
 - Hazard Awareness: Understanding the risks of HMDI exposure (skin sensitization, respiratory reactions) and the importance of preventing skin contact and inhalation.
 - PPE Use: Proper selection, use, maintenance, and limitations of gloves, eye protection, skin barriers, and respirators.
 - Ventilation Protocols: How to ensure local exhaust systems are operational and effective.
 - Respiratory Protection: Training on fitting, using, and maintaining atmosphere-supplying respirators (e.g., SCBA, SAR) or air-purifying respirators (APR), including cartridge change-out schedules and recognizing end-of-service life indicators (ESLI).
 - Emergency Procedures: Handling spills, splashes, or overexposure incidents.
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3. Written Respirator Program

- Requirements: Per OSHA's Respiratory Protection Standard (29 CFR 1910.134), a written respirator program is mandatory when respiratory protection is required (i.e., when HMDI concentrations exceed 0.005 ppm in inadequately ventilated conditions). The program must include:
 - Basis for Cartridge Change-Out: If using an APR without an ESLI, the program must detail a change-out schedule based on objective data (e.g., exposure levels, usage duration, cartridge capacity) to ensure cartridges are replaced before their service life ends.
 - Procedures: Steps for selecting, fitting, inspecting, and maintaining respirators.
 - Training Documentation: Evidence of employee training on respirator use.
 - Medical Evaluations: Confirmation that employees are medically fit to wear respirators.
 - Program Evaluation: Regular review to ensure effectiveness.
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4. List Planned Use of Proper PPE for Hands, Eyes, Skin, Respirator

- Hands:
 - PPE: Nitrile rubber gloves, butyl rubber gloves, or neoprene gloves.
 - Use: Worn during all handling to prevent skin contact; inspected for deterioration and replaced as needed.
- Eyes:
 - PPE: Chemical safety goggles; add a full-face shield if splash risk is high.

- Use: Required when directly handling liquid HMDI to protect against splashes or aerosols.
- Skin:
 - PPE: Permeation-resistant barriers (e.g., butyl or nitrile rubber gloves, neoprene apron, chemical suit); full chemical suit for major splash risks; full permeation-resistant suit (including head covering, face shield, gloves, overshoes) for airborne vapor/mist exposure.
 - Use: Covers all potentially exposed skin areas, escalating with exposure risk (e.g., breaking lines or mist generation).
- Respirator:
 - PPE:
 - Option 1: Atmosphere-supplying respirator (SCBA or SAR in positive pressure/continuous flow mode).
 - Option 2: Air-purifying respirator (APR) with organic vapor/particulate filter combination cartridge (OV/P100), provided:
 - Cartridge has an NIOSH-certified ESLI, or a change-out schedule is implemented.
 - Airborne HMDI concentration is ≤ 10 times the TLV (0.05 ppm).
 - Use: Mandatory in inadequately ventilated environments when HMDI is sprayed, heated, or aerosolized, ensuring compliance with OSHA 29 CFR 1910.134.