

7. REGULATIONS AND ADVISORIES

The national and state regulations and guidelines regarding HDI in air, water, and other media are summarized in Table 7- 1. No international regulations were identified for HDI.

Diisocyanates such as HDI represent a group of chemicals that primarily target the upper and lower respiratory tract, resulting in chronic pulmonary irritation and asthmatic reaction in humans. HDI is also known to be a potent respiratory and dermal sensitizing agent. Because of its potential to cause adverse health effects in exposed people, a number of regulations and advisory values have been established for HDI.

ATSDR has derived an intermediate-duration inhalation MRL of 3.0×10^{-5} ppm for HDI, based on an NOAEL of 0.005 ppm for respiratory effects in rats in a study by Mobay Corporation (1984).

ATSDR has derived a chronic-duration inhalation MRL of 1.0×10^{-5} ppm for HDI, based on a LOAEL of 0.0001 ppm based on changes in percent closing volume (%CV) in a study of 3 groups of garage workers by Alexandersson et al. (1987).

HDI has not been evaluated by the EPA for evidence of human carcinogenic potential (IRIS 1997). However, the EPA has established an inhalation reference concentration (RfC) of 1×10^{-5} mg/m³ for HDI (IRIS 1997).

An Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for HDI does not exist.

Hexamethylene- 1,6-diisocyanate is listed as a hazardous air pollutant (HAP) under to Section 112 (b) of the Clean Air Act (CAA) (U.S. Congress 1990). The national emission standards for hazardous air pollutants (NESHAP) which were established pursuant to Section 112 of the CAA (as amended November 15, 1990), regulate specific categories of stationary sources that emit or have the potential to emit one or more HAPS. HDI is listed as a volatile HAP for wood furniture manufacturing operations in Title 40 of the Code of Federal Regulations (CFR), Part 63, Subpart JJ (EPA 1995).

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On November 30, 1994, EPA added HDI and 285 other chemicals to the list of toxic chemicals that are subject to reporting under Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and Section 6607 of the Pollution Prevention Act of 1990 (EPA 1994). Section 313 of Title III of EPCRA requires owners and operators of certain facilities that manufacture, import, process, or otherwise use the chemicals on this list to report annually their release of those chemicals to any environmental media.

In 1989, the Interagency Testing Committee (ITC) designated HDI for health effects testing for chronic toxicity, oncogenicity, and reproductive and development effects. This decision was partially based on the potential for a substantial number of workers to be exposed to the chemical during its production and use in polyurethane paint systems (EPA 1997). EPA later responded to the ITC designation by issuing a proposed testing rule which also required testing for mutagenicity, neurotoxicity, pharmacokinetics, and hydrolysis. As the proposed rule was not finalized and EPA has reviewed new scientific data addressing chronic toxicity, subchronic toxicity, mutagenicity, and hydrolysis, the final scope of the testing requirements proposed earlier have changed. On September 30, 1997, EPA issued a testing consent order that incorporated an enforceable consent agreement with several companies to perform certain health effects tests on HDI (EPA 1997).

Table 7-1. Regulations and Guidelines Applicable to Hexamethylene Diisocyanate

Agency	Description	Information	References
<u>INTERNATIONAL</u>			
Guidelines:			
WHO	Guidelines for Drinking-water Quality	No information given	WHO 1984
<u>NATIONAL</u>			
Regulations:			
a. Air:			
	Listed as Hazardous Air Pollutant	Yes	U.S. Congress 1990
	National Emission Standards for Wood Furniture Manufacturing Operations—Table 2. List of Volatile Hazardous Air Pollutants	Yes	40 CFR 63, Subpart JJ EPA 1995
b. Other:			
DOT	Hazardous Materials and Special Provisions - Table 1	Yes	49 CFR 172.101 DOT 1976
EPA OERR	List of Hazardous Substances and Reportable Quantities	100 pounds (45.4 kg)	40 CFR 302.4 60 FR 30926 EPA 1995
	Toxic Chemical Release Reporting	Yes	40 CFR 372.65 59 FR 61432 EPA 1994
Guidelines:			
a: Air:			
ACGIH	Ceiling Limit for Occupational Exposure (TLV-TWA)	0.005 ppm	ACGIH 1994
NIOSH	Recommended Exposure Limit for Occupational Exposure (TWA)	0.005 ppm (35 µg/m ³)	NIOSH 1997
	Recommended Exposure Limit for Occupational Exposure (Ceiling-10 min.)	0.020 ppm (140 µg/m ³)	
b. Other:			
EPA	Reference Concentration (RfC)(inhalation)	1x10 ⁻⁵ mg/m ³ (1.45x10 ⁻⁶ ppm)	IRIS 1997
<u>STATE</u>			
Regulations and Guidelines:			
a. Air:			
	Average Acceptable Ambient Air Concentrations *		NATICH 1992
CT	8 hours	7x10 ⁻¹ µg/m ³ (1.02x10 ⁻⁴ ppm)	
FL-Pinella	8 hours	3.50x10 ⁻¹ µg/m ³ (5.09x10 ⁻⁵ ppm)	
	24 hours	8.40x10 ⁻² µg/m ³ (1.22x10 ⁻⁵ ppm)	

Table 7-1. Regulations and Guidelines Applicable to Hexamethylene Diisocyanate (continued)

Agency	Description	Information	References
<u>STATE (cont.)</u>			
ND	8 hours	3.40×10^{-4} mg/m ³ (4.94×10^{-5} ppm)	
OK	24 hours	3.44×10^{-1} µg/m ³ (5.00×10^{-5} ppm)	
TX	30 minutes	3.40×10^{-1} µg/m ³ (4.94×10^{-5} ppm)	
	Annual	3.40×10^{-2} µg/m ³ (4.94×10^{-6} ppm)	
VA	24 hours	5.7×10^{-1} µg/m ³ (8.28×10^{-5} ppm)	
WA-SWEST	24 hours	1×10^{-1} µg/m ³ (1.45×10^{-5} ppm)	

^a The values listed in NATICH 1992 as acceptable ambient concentrations may not be categorized as such by individual states and localities. Conversions in parenthesis are made using conversion factors in Chapter 3.

ACGIH = American Conference of Governmental Industrial Hygienists; DOT = Department of Transportation; EPA = Environmental Protection Agency; IRIS = Integrated Risk Information System; NATICH = National Air Toxics Information Clearinghouse; NESHAP = National Emission Standards for Hazardous Air Pollutants; NIOSH = National Institute for Occupational Safety and Health; OERR = Office of Emergency and Remedial Response; OSHA = Occupational Safety and Health Administration; OWRS = Office of Water Regulations and Standards; TLV = Threshold Limit Value; TWA = Time Weighted Average; WHO = World Health Organization