

**MATERIAL
SAFETY DATA**

OCEAN NETWORK EMERGENCY PHONE 1-800-OLIN 911

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC. I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

I. PRODUCT IDENTIFICATION

REVISION NO. : 6
REVISION DATE : 7/14/98
PRODUCT CODE : HPE839498
FILE NUMBER : HPE00555.0005
PRODUCT NAME: **HNR 80 NEGATIVE RESIST**

SYNONYMS: None
CHEMICAL FAMILY: Organic mixture
FORMULA: Not Applicable/Mixture
USE DESCRIPTION: Negative photoresist
OSHA HAZARD CLASSIFICATION: Flammable liquid; skin, eye and respiratory irritant; lung, kidney, nervous system, blood and liver toxin

II. COMPONENT DATA**PRODUCT COMPOSITION**

CAS or CHEMICAL NAME: Xylenes
CAS NUMBER: 1330-20-7
PERCENTAGE RANGE: 65-75%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA (PEL)	ACGIH (TLV)
	ppm	ppm
	mg/cubic-meter	mg/cubic-meter
TWA:	100	100
CEILING:	None	None
STEL:	None	150

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To	Tony		From	Theresa	
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CAS or CHEMICAL NAME: Ethyl benzene

CAS NUMBER: 100-41-4

PERCENTAGE RANGE: 15-18%

HAZARDOUS PER 29 CFR 1910.1200: Yes

EXPOSURE STANDARDS:

OSHA (PEL) 100 ppm 100 mg/cubic-meter ACGIH (TLV) 100 ppm 100 mg/cubic-meter

TWA: 100

CEILING: None

STEL: None

100

None

125

CAS or CHEMICAL NAME: Cyclized polyisoprene

CAS NUMBER: 68441-13-4

PERCENTAGE RANGE: 9-15%

HAZARDOUS PER 29 CFR 1910.1200: Yes

EXPOSURE STANDARDS: None Established

CAS or CHEMICAL NAME: 2,6-Bis(4-azidobenzylidene)-4-methylcyclohexanone

CAS NUMBER: 5284-79-7

PERCENTAGE RANGE: 0.1-0.6%

HAZARDOUS PER 29 CFR 1910.1200: No

EXPOSURE STANDARDS: None Established

III. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY. AVOID CONTACT WITH SKIN, EYES AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER.

STORAGE CONDITIONS: Store in a cool, dry, well ventilated place away from all sources of ignition. Outside or detached storage is preferable. Inside storage should be in a standard flammable liquids storage room or cabinet.

DO NOT STORE AT TEMPERATURES ABOVE: 25 Deg.C (77 Deg.F)

DO NOT EXPOSE TO DIRECT LIGHT.

PRODUCT STABILITY AND COMPATIBILITY

SHELF LIFE LIMITATIONS: 1 Year

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: Refer to Section VII, "Incompatible Materials".

IV. PHYSICAL DATA

APPEARANCE: Clear, yellow solution

FREEZING POINT: No Data

BOILING POINT: No Data

DECOMPOSITION TEMPERATURE: No Data

SPECIFIC GRAVITY: 0.85-0.88

BULK DENSITY: No Data

pH @ 25 DEG.C: Not Applicable

VAPOR PRESSURE @ 20 DEG.C: 10 mm Hg

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SOLUBILITY IN WATER: Nil
VOLATILES, PERCENT BY VOLUME: 85-90%
EVAPORATION RATE: 0.75 (Butyl acetate = 1)
VAPOR DENSITY: 3.5-4 (Air = 1)
MOLECULAR WEIGHT: Not Applicable/mixture
ODOR: Xylene odor
COEFFICIENT OF OIL/WATER DISTRIBUTION: No data

V. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:**

RESPIRATORY PROTECTION: If air concentrations above the TLV are possible, wear a NIOSH/MSHA approved respirator.

VENTILATION: Use explosion-proof local exhaust ventilation to maintain levels to below the TLV.

SKIN AND EYE PROTECTIVE EQUIPMENT: Use chemical goggles and impermeable gloves.

EQUIPMENT SPECIFICATIONS (WHEN APPLICABLE):

RESPIRATOR TYPE: NIOSH/MSHA approved organic vapor respirator

PROTECTIVE CLOTHING TYPE: (This includes: gloves, boots, apron, protective suit) Viton or impervious

VI. FIRE AND EXPLOSION HAZARD INFORMATION**FLAMMABILITY DATA:**

FLAMMABLE: Yes

COMBUSTIBLE: Not Applicable

PYROPHORIC: No

FLASH POINT: 27 Deg.C (81 Deg.F) Test Method: Tag closed cup

AUTOIGNITION TEMPERATURE: No data

FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE (PERCENT VOLUME IN AIR): LEL - 1% UEL - 7%

NFPA RATINGS: Not Established

HMIS RATINGS:

Health: * 2

Flammability: 3

Reactivity: 0

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, water spray
OTHER: Alcohol resistant foam
FIRE FIGHTING TECHNIQUES AND COMMENTS: Use water to cool containers exposed to fire. See Section XI for protective equipment for fire fighting.

VII. REACTIVITY INFORMATION

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE:

TEMPERATURES ABOVE: 40 Deg.C (104 Deg.F)

MECHANICAL SHOCK OR IMPACT: No

ELECTRICAL (STATIC) DISCHARGE: Yes

HAZARDOUS POLYMERIZATION: Will not occur

INCOMPATIBLE MATERIALS: Strong oxidants such as chromic acid, chlorine, concentrated oxygen

HAZARDOUS DECOMPOSITION PRODUCTS: carbon dioxide, carbon monoxide, nitrogen oxides

OTHER CONDITIONS TO AVOID: Ignition sources of any kind

SUMMARY OF REACTIVITY:

OXIDIZER: No

PYROPHORIC: No

ORGANIC PEROXIDE: No

WATER REACTIVE: No

VIII. FIRST AID

EYES: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Call a physician at once.

SKIN: Immediately flush with water for at least 15 minutes. Call a physician. If clothing comes in contact with the product, the clothing should be removed immediately and should be laundered before re-use.

INGESTION: Immediately drink large quantities of water. DO NOT induce vomiting. Call a physician at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.

INHALATION: If person experiences nausea, headache or dizziness, person should stop work immediately and move to fresh air until these symptoms disappear. If breathing is difficult, administer oxygen, keep the person warm and at rest. Call a physician. In the event that an individual inhales enough vapor to lose consciousness, person should be moved to fresh air at once and a physician should be called immediately. If breathing has stopped, artificial respiration should be given immediately. In all cases, ensure adequate ventilation and provide respiratory protection before the person returns to work.

**MATERIAL
SAFETY DATA****IX. TOXICOLOGY AND HEALTH INFORMATION****ROUTES OF ABSORPTION**

Ingestion, inhalation, skin and eye contact

WARNING STATEMENTS AND WARNING PROPERTIES

MAY BE HARMFUL IF SWALLOWED. CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION. DO NOT INHALE MIST OR VAPOR. INHALATION OF HIGH CONCENTRATIONS MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION. MAY CAUSE CARDIAC ARRHYTHMIA (IRREGULAR HEARTBEAT). PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION.

HUMAN THRESHOLD RESPONSE DATA

ODOR THRESHOLD: No data for product. The odor threshold for mixed xylenes is reported as: odor detection threshold: 0.2-4 ppm; odor recognition threshold: 40 ppm.

IRRITATION THRESHOLD: No data for product; the irritation threshold for xylene is 100-200 ppm.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: No IDLH concentration has been established for this product. The IDLH concentration for xylenes (o,m and p isomers) is 900 ppm. The IDLH concentration for ethyl benzene is 800 ppm.

SIGNS, SYMPTOMS, AND EFFECTS OF EXPOSURE:**INHALATION****ACUTE:**

If inhaled, may cause irritation to the upper respiratory tract. Any irritation would be transient with no permanent damage expected. Inhalation of high concentrations may produce CNS depression, characterized by: headache, dizziness, weakness, drowsiness, fatigue, narcosis, tremors, impaired short term memory, mental confusion, nausea, vomiting and GI discomfort.

Inhalation of concentrations of xylene significantly above the TLV may sensitize the heart muscle resulting in cardiac arrhythmia. The face may appear flushed and reddened and there may be a feeling of increased body heat due to dilation of blood vessels in the skin.

CHRONIC:

Chronic exposure may result in labored breathing and impaired pulmonary function as well as respiratory tract irritation and inflammation. Studies also suggest that liver and kidney damage may occur after exposures to elevated levels. Anemia may result with hyperplasia of the bone marrow.

SKIN**ACUTE:**

Skin contact may produce irritation consisting of transient redness. This irritant effect would not result in permanent damage.

CHRONIC:

Prolonged or repeated skin contact may cause defatting leading to dermatitis.

EYE

Contact with the eyes would be expected to cause irritation consisting of painful stinging or burning of eyes and lids, redness, swelling, and mucous discharge to the conjunctiva. Contact with the eyes may cause corneal clouding (opaqueness of cornea) which may result in permanent eye damage leading to loss of sight.

INGESTION**ACUTE:**

Ingestion may cause gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting, lethargy, or diarrhea. If significant quantities are ingested, may cause C.N.S depression with symptoms similar to those listed under acute inhalation exposure.

CHRONIC:

There are no known or reported effects from chronic exposure except for effects similar to those experienced from single exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Skin contact may aggravate an existing dermatitis. Persons with liver, kidney, nervous system or respiratory disorders may be more susceptible to the effects of this product.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY:

None known

ANIMAL TOXICOLOGY**ACUTE TOXICITY:**

Inhalation LC 50: No Data

Dermal LD 50: Believed to be > 2g/kg (rabbit), based on constituents

Oral LD 50: Believed to be 4-5 g/kg (rat), based on constituents

Irritation: Eye and mucous membrane irritant; respiratory and skin irritant

**MATERIAL
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Irritation of the eyes, mucous membranes, skin and respiratory tract may result from contact with liquid or vapor. If inhaled or ingested, product may cause C.N.S. depression.

CHRONIC TARGET ORGAN TOXICITY:

Inhalation, ingestion, or dermal contact of significant amounts of this product may cause C.N.S. depression. May cause liver, kidney and blood damage.

REPRODUCTIVE AND DEVELOPMENTAL TOXICITY:

This product is not known or reported to effect reproductive function or fetal development.

The relevant routes of industrial exposure to this product are through inhalation and dermal contact. Xylene has been tested in laboratory animals using the inhalation and dermal routes of exposure. Xylene was found not to produce any reproductive and developmental effects at non-maternally toxic doses. However, through oral administration to CD-1 mice, mixed xylene isomers (contaminated with 17% ethylbenzene) was reported to produce fetotoxicity and embryotoxicity, cleft palate and wavy ribs at a dose producing minimal toxicity in the dams. Cleft palate and wavy ribs are two types of spontaneous malformations commonly found in CD-1 mice. Under normal industrial uses and practices, xylene is not considered to be a reproductive or developmental hazard.

CARCINOGENICITY:

This product is not known or reported to be carcinogenic by any reference source including: IARC, OSHA, NTP or EPA.

Xylenes have been tested by NTP for carcinogenicity in rats and mice by the oral route of exposure. There was no evidence of carcinogenicity of xylenes for either male or female rats and mice. Xylenes have also been tested in a skin painting study in rats and produced no evidence of carcinogenicity. IARC has evaluated several carcinogenicity studies conducted on laboratory animals using xylenes. IARC has classified xylenes as having inadequate evidence for carcinogenicity to humans and animals. IARC therefore considered xylenes to be not classifiable as to its carcinogenicity to humans.

MUTAGENICITY:

This product is not known or reported to be mutagenic.

Xylenes and its components (o-xylene, m-xylene, p-xylene or ethylbenzene) have been tested in a battery of in vivo and in vitro mutagenicity and genotoxicity assays and test systems. Based on these studies, the weight of evidence suggests that exposure to xylenes and its components does not pose a mutagenic or genotoxic hazard.

AQUATIC TOXICITY:

No data for product: individual constituents are as follows:

Xylene:

Fathead minnow, 96 hr. LC50: 13.4 mg/l (measured flow-through)
Rainbow trout, 96 hr. LC50: 13.5-17.3 mg/l (nominal)
Daphnia magna, 24 hr. LC50: 150 mg/l (nominal, static)
Bluegill, 96 hr. LC50: 24.5 mg/l (measured, static)
Bluegill, 96 hr. LC50: 15.7 mg/l (measured, flow-through)

Ethyl benzene:

Daphnia magna, 48 hr. LC50: 75 mg/l (nominal, static)
Fathead minnow, 96 hr. LC50: 9.1-12.1 mg/l (measured, flow-through)

X. TRANSPORTATION INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT DESCRIPTION FROM THE HAZARDOUS MATERIALS TABLE 49 CFR 172.101:

LAND (U.S. DOT): HYDROCARBONS LIQUID N.O.S., 3, UN 3295, PG III

WATER (IMO): HYDROCARBONS LIQUID N.O.S., 3.3, UN 3295, PG III (FLASH POINT 27 DEG.C)

AIR (ICAO/IATA): SAME AS LAND

HAZARD LABEL/PLACARD: FLAMMABLE 3

REPORTABLE QUANTITY: Xylenes - 100 lbs. (Per 49 CFR 172.101, Appendix)
Ethyl benzene - 1000 lbs.

EMERGENCY GUIDE NUMBER: 128

XI. SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.

REPORTABLE QUANTITY: This product is subject to a Reportable Quantity with respect to xylene and ethyl benzene. RQs are subject to change and reference should be made to 40 CFR 302.4 for the current requirements

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Evacuation procedures must be placed into effect. Evacuate all non-essential personnel. Hazardous concentrations in air may be found in local spill area and immediately downwind. This product may represent an explosion hazard if bulk containers are exposed to heat or flame. Remove all sources of ignition. Stop source of spill as soon as possible and notify appropriate personnel.

AIR RELEASE: Vapors may be suppressed by the use of water fog or spray. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste.

WATER RELEASE: This material is lighter than and insoluble in water. Notify all downstream users of possible contamination. Divert water flow around spill if possible and safe to do so. If unable to divert, create a bypass dam to divert water and contain material. Continue to handle as described in land spill.

LAND SPILL: Create a dike or trench to contain materials. Spill materials may be absorbed using sand, clay, earth or non-combustible absorbents. Do not place spill materials back in their original containers. Containerize and label all spill materials properly. Decontaminate all clothing and the spill area using a strong soap solution and flush with large amounts of water.

SPILL RESIDUES:

Dispose of per guidelines under Section XII, WASTE DISPOSAL.

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS:

Response to this material requires the use of a full encapsulated suit and self-contained breathing apparatus (SCBA).

Compatible material for response to this material is viton or impervious.

A hazardous physical characteristic of this product is flammable.

XII. WASTE DISPOSAL

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste number: D001.

If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly.

As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by incineration.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

XIII. ADDITIONAL REGULATORY STATUS INFORMATION**TOXIC SUBSTANCES CONTROL ACT:**

The components of this product are listed on the Toxic Substance Control Act inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT TITLE III:**HAZARD CATEGORIES, PER 40 CFR 370.2:****HEALTH:**

Immediate (Acute)

Delayed (Chronic)

PHYSICAL:

Fire

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:**EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:**

None Established

SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:

This mixture or tradename product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

CHEMICALS LISTED ARE: Xylenes (mixed isomers)

Ethyl benzene

**MATERIAL
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MSDS REVISION STATUS: Revision to Transportation Information

XV. MAJOR REFERENCES

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6. Toxicological Profile for Ethyl benzene, Agency for Toxic Substances and Disease Registry, October 1989.
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12. Hood, Ronald D. and Myron S. Ottley, Developmental Effects Associated with Exposure to Xylene: A Review. Drug and Chemical Toxicology, Vol. 8, No. 4, pp. 281-297, 1985.
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 15. Hudak, Aranka, and G. Ungvary, Embryotoxic Effects of Benzene and Its Methyl Derivatives: Toluene, Xylene. Toxicology, Vol II, pp 55-63, 1978.
 16. Barlow, Susan, M. and Frank M. Sullivan, Reproductive Hazards of Industrial Chemicals. Academic Press, NY, 1982.
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 19. Toxicological Profile for Total Xylenes, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October, 1989.
 20. Carpenter, C.P., et al. Petroleum Hydrocarbon Toxicity Studies. V. Animal and Human Responses to Vapors of Mixed Xylenes. Toxicology and Applied Pharmacology, Vol. 33, pp, 543-588, 1975.

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MATERIAL SAFETY DATA SHEET IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT OLIN AT THE PHONE NUMBER LISTED BELOW TO MAKE CERTAIN THAT THIS SHEET IS CURRENT.

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