PRODUCT NAME: HNR 120

I. PRODUCT AND COMPANY IDENTIFICATION

- REVISION DATE: 02-16-2001
- SUPERCEDES: 12-13-2000
- MSDS NO: 00555-0012 - 704510
- SYNONYMS: None
- CHEMICAL FAMILY: Organic mixture
- DESCRIPTION / USE: Negative photoresist
- FORMULA: Not applicable/Mixture

Arch Chemicals, Inc. 501 Merritt 7 PO Box 5204 Norwalk, CT 06856-5204

II. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS or CHEMICAL NAME</th>
<th>CAS #</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene, dimethyl-</td>
<td>1330-20-7</td>
<td>65 - 75</td>
</tr>
<tr>
<td>Benzene, ethyl-</td>
<td>100-41-4</td>
<td>15 - 18</td>
</tr>
<tr>
<td>Cyclized polyisoprene</td>
<td>68441-13-4</td>
<td>9 - 15</td>
</tr>
<tr>
<td>2,6-Bis(4-azidobenzylidene)-4-methylcyclohexanone</td>
<td>5284-79-7</td>
<td>0.1 - 0.6</td>
</tr>
</tbody>
</table>

III. HAZARDS IDENTIFICATION

- OSHA Hazard Classification: flammable, eye irritant, skin irritant, respiratory irritant, central nervous system depressant, liver toxin, blood toxin, kidney toxin, lung toxin

- Routes of Entry: Inhalation, skin, eyes, ingestion
- Chemical Interactions: No known interactions
- Medical Conditions Aggravated: Skin diseases, Respiratory diseases including asthma and bronchitis, Pre-existing liver diseases, Pre-existing kidney disease, cardiovascular disease
Human Threshold Response Data

Odor Threshold:
Xylene  20.0 ppm

Irritation Threshold:
Xylene  100.0 - 200.0 ppm

Hazardous Materials Identification System/National Fire Protection Association Classifications

<table>
<thead>
<tr>
<th>Hazard Ratings:</th>
<th>Health</th>
<th>Flammability</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS</td>
<td>2*</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>NFPA</td>
<td>Not established</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Immediate (Acute) Health Effects

Inhalation Toxicity: Not expected to cause significant toxicity unless there is prolonged exposure to high concentrations. Inhalation of high concentrations may result in central nervous system (CNS) effects such as dizziness, weakness, fatigue, nausea, headache, and lack of coordination.

Inhalation of high concentrations may cause cardiac sensitization leading to risk of arrhythmia (irregular heartbeat).

Inhalation Irritation: High concentrations are moderately irritating to the eyes, nose, throat, and lungs.

Skin Contact: Skin contact may cause moderate irritation consisting of transient redness and swelling. This irritant effect would not be expected to result in permanent redness.

Skin Absorption: No significant adverse effects to health would be expected to occur from dermal contact.

Eye Contact Contact may cause moderate irritation consisting of transient redness, swelling, and mucous membrane discharge to the conjunctiva. No corneal involvement or visual impairment is expected.

Ingestion Irritation: Ingestion may cause irritation of the gastrointestinal tract and gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting, lethargy or diarrhea.

Ingestion Toxicity: Slightly toxic if swallowed.

AcuteTarget Organ Toxicity: Central nervous system, Heart, Eyes, Skin, Respiratory Tract, Mucous membranes

Prolonged (Chronic) Health Effects

Carcinogenicity: The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 3 substance, Unclassifiable as to Its Carcinogenicity to Humans.

Reproductive and Developmental Toxicity: No reproductive or developmental risk to humans is expected from exposure to this product.

Inhalation: Prolonged or repeated exposure may cause kidney, liver and blood damage.

Skin Contact: Dermal contact may cause defatting of skin and/or dermatitis.

Skin Absorption: There are no known or reported effects from chronic exposure except for effects (if any) similar to those experienced from acute exposure.

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

Chronic Target Organ Toxicity: Liver, Blood, Skin, Kidneys

Supplemental Health Hazard Information: No additional health information available.

IV. FIRST AID
Inhalation: IF INHALED: Remove individual to fresh air. Seek medical attention if breathing becomes difficult.

Skin Contact: IF ON SKIN: Immediately flush skin with plenty of water for 15 minutes. If clothing comes in contact with the product, the clothing should be removed immediately and laundered before re-use. Call a physician.

Eyes: IF IN EYES: Immediately flush eyes with plenty of water for at least 15 minutes while holding eyelids apart. Call a physician immediately.

Ingestion: IF SWALLOWED: Call a physician immediately. DO NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person.

V. FIRE FIGHTING MEASURES

Flammability Summary (OSHA): Flammable.

Flammable Properties
Flash Point: 27 Deg. C. / 81 Deg. F. (Test Method: Tag Closed Cup)
Autoignition Temperature: No data
Upper Flammable/Explosive Limit, % in air: 7 %
Lower Flammable/Explosive Limit, % in air: 1 %

Fire/Explosion Hazards: Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can travel to a source of ignition and flash back.

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, dry chemical, or vaporizing liquid extinguishing agents. Water spray or fog may also be effective for extinguishing or to absorb heat and keep exposed material from being damaged by fire.

Fire Fighting Instructions: Response to this material requires the use of a full encapsulated suit and full-face (NIOSH approved) self-contained breathing apparatus (SCBA). Use water to cool containers.

Hazardous Combustion Products: Oxides of nitrogen, carbon monoxide, carbon dioxide

VI. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations: Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to boots, impervious gloves, hard hat, splash-proof goggles, impervious clothing, i.e., chemically impermeable suit, self-contained breathing apparatus.

Spill Mitigation Procedures
Air Release: Hazardous concentrations in air may be found in local spill area and immediately downwind. Vapors may be suppressed by the use of water fog. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste.

Water Release: This material is lighter than water. This material is insoluble in water. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste. Notify all downstream users of possible contamination. Divert water flow around spill if possible and safe to do so.

Land Release: Create a dike or trench to contain materials. Absorb spill with inert material (e.g., dry sand, clay, earth or commercial absorbent), then place in a chemical waste container. Decontaminate all clothing and the spill area using a detergent.
and flush with large amounts of water. Contain all contaminated water for
readily and also flush with large amounts of water. Contain all contaminated water for
disposal and/or treatment.

Additional Spill Information: Remove all sources of ignition. Stop source of spill as soon as possible and
notify appropriate personnel. Utilize emergency response personal protection
equipment prior to the start of any response. Evacuate all non-essential
personnel. Dispose of spill residues per guidelines under Section XIII, Disposal
Consideration.

VII. HANDLING AND STORAGE

Handling: Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid breathing mist or vapor. Ground and bond containers when transferring material.

Storage: Store in a cool dry ventilated location, away from sources of ignition or other incompatible conditions and chemicals. Keep container(s) closed. Do not expose to direct light. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet.

Shelf Life Limitations: See label or certificate of analysis for shelf life if applicable.

Incompatible Materials for Storage: Refer to Section X, "Incompatible Materials."

Do Not Store At temperatures Above: 25 Deg. C. 77 Deg. C.

VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Local exhaust ventilation or other engineering controls are normally required when handling or using this product to keep exposure to airborne contaminants below the TLV, PEL, or other recommended exposure limit and/or maintain operator comfort. Use explosion-proof ventilation equipment when handling this product.

Protective Equipment for Routine Use of Product

Respiratory Protection: Wear a NIOSH approved respirator if levels above the exposure limits are possible. A NIOSH approved air purifying respirator with organic vapor cartridge. Air purifying respirators should not be used in oxygen deficient or IDLH atmospheres or if exposure concentrations exceed ten (10) times the published limit.

Skin: Wear impervious gloves to avoid skin contact. Follow good industrial hygiene practices.

Eyes: Use chemical goggles.

Protective Clothing Type: Polyvinylalcohol - Do not use this material with water applications., VitonTM, Polyethylene and ethylene vinyl alcohol copolymer such as 4H.

Exposure Limit Data

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>OSHA PEL / STEL</th>
<th>ACGIH LIMITS</th>
<th>ACGIH WEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes (o-, m-, p- isomers)</td>
<td>1330-20-7</td>
<td>100 ppm TWA; 435 mg/m3</td>
<td>150 ppm STEL</td>
<td>Not Established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>100 ppm TWA</td>
<td></td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>100-41-4</td>
<td>100 ppm TWA; 435 mg/m3</td>
<td>125 ppm STEL</td>
<td>Not Established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>100 ppm TWA</td>
<td></td>
</tr>
</tbody>
</table>

NIOSH Immediately Dangerous to Life or Health:

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>NIOSH IMMEDIATELY DANGEROUS TO LIFE OR HEALTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylenes (o-, m-, p- isomers)</td>
<td>900 ppm IDLH</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>800 ppm IDLH (10 percent lower explosive limit)</td>
</tr>
</tbody>
</table>

IX. PHYSICAL DATA
Physical State: clear Solution
Color: yellow
Odor: aromatic
Molecular Weight: Not Applicable/Mixture
pH (@ 25 Deg. C): Not applicable
Octanol/Water Coeff: No data
Solubility in Water: nil
Bulk Density: No data
Specific Gravity: 0.85 - 0.88
Vapor Density: 3.5 - 4.00 (air =1)
Vapor Pressure: (@20 Deg. C) 10 mmHg
Evaporation Rate: 0.75 (n-Butyl acetate = 1)
Volatiles, % by vol.: 85 - 90 %
Boiling Point: No data
Freezing Point: No data

X. STABILITY AND REACTIVITY

Stability and Reactivity Summary: Stable under normal conditions. Static discharge may cause ignition at temperatures at or above the flash point.
Reactive Properties: Flammable, Not sensitive to mechanical shock., Product is sensitive to electrical static discharge.
Hazardous Polymerization: Will not occur
Conditions to Avoid: High temperatures  Temperatures above the flash point in combination with sparks, open flames, or other sources of ignition.
Chemical Incompatibility: strong oxidizing agents
Hazardous Decomposition Products: oxides of nitrogen, carbon dioxide, carbon monoxide
Decomposition Temperature: No data
Product May Be Unstable At Temperatures Above: < 40 Deg. C. > 104 Deg. F.

XI. TOXICOLOGICAL INFORMATION

Component Animal
Oral LD50 value:
Benzene, dimethyl- Oral LD50 Rat = 4.3 g/kg
Dermal LD50 value:
Benzene, dimethyl- Dermal LD50 Rabbit > 2 g/kg
Inhalation LC50 value:
Benzene, dimethyl- Inhalation LC50 (4h) Rat = 6700 ppm

Product Animal Toxicity
Oral LD50 value:
Rat Believed to be 4 - 5 g/kg
Dermal LD50 value:
Rabbit Believed to be > 2 g/kg
Skin Irritation: This material is expected to be moderately irritating.
Eye Irritation: This material is expected to be moderately irritating.

Reproductive and Developmental Toxicity:
Component Data:
Benzene, dimethyl- This material at concentrations above the occupational exposure limits has caused developmental effects in animals. However, these effects were observed only at those doses that resulted in maternal toxicity. Industrial exposures kept at
or below occupational exposures standards should not pose a reproductive or
developmental toxicity hazard.

**Benzene, ethyl-**

This material at concentrations above the occupational exposure limits has
caused developmental effects in animals. However, these effects were observed only at those doses that resulted in maternal toxicity.

**Mutagenicity:** Not known or reported to be mutagenic.

Component Data:
- **Benzene, dimethyl-** This chemical has been shown to be non-mutagenic based on a battery of assays.
- **Benzene, ethyl-** This material has been shown to be non-mutagenic in the majority of a battery of assays. Not expected to be a mutagenic hazard.

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

Component Data:
- **Benzene, dimethyl-** The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 3 substance, Unclassifiable as to Its Carcinogenicity to Humans.

**XII. ECOLOGICAL INFORMATION**

Ecological Toxicity Values:
- **Benzene, dimethyl-** Fathead minnow, 96 hr. LC50: = 13.4 mg/l (flow-through).
  
  Rainbow trout (Salmo gairdneri) 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).

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

**XIII. DISPOSAL CONSIDERATIONS**

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.

Waste Disposal Summary: Spent or discarded material may be a hazardous waste.

Potential US EPA Waste Codes: D001

Disposal Methods: 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.

Components subject to land ban restrictions: Xylenes (α-, m-, p- isomers)

Ethyl benzene

**XIV. TRANSPORTATION INFORMATION**

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT Description (49 CFR)
- **Land (U.S. DOT):** HYDROCARBONS LIQUID, N.O.S. 3 UN3295 PGIII
- **Air (IATA/ICAO):** HYDROCARBONS, LIQUID N.O.S., 3, UN3295, PG III
- **Water (IMO):** HYDROCARBONS, LIQUID N.O.S., 3.3. UN3295, PG III

Flash Point: (C) 27
Hazard Label/Placard: (Primary) FLAMMABLE
Xylenes (isomers and mixture) final RQ = 100 pounds (45.4 kg); also listed as Xylene; also listed as Xylene (mixed); also listed as Benzene, dimethyl-
Ethyl benzene final RQ = 1000 pounds (454 kg)

Emergency Response Guide Number: 128

XV. REGULATORY INFORMATION

UNITED STATES:
Toxic Substances Control Act (TSCA): The components of this product are listed on the TSCA Inventory of Existing Chemical Substances.
Pesticide acceptance indication: US EPA Registration Number: Not applicable
Superfund Amendments and Reauthorization Act (SARA) Title III:
Hazard Categories Sections 311/312 (40 CFR 370.2):
Health: Acute
Chronic
Physical: Fire
Extremely Hazardous Substance Section 302 - Threshold Planning Quantity: Not applicable
Reportable Quantity (40 CFR 302.4):
Benzene, dimethyl-
Ethyl benzene
final RQ = 100 pounds (45.4 kg)
final RQ = 1000 pounds (454 kg)
Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components
Xylene (mixed isomers) form R reporting required for 1.0% de minimis concentration
Ethyl benzene form R reporting required for 1.0% de minimis concentration
Clean Air Act Socmi: Xylenes (nos)
Ethyl benzene
Clean Air Act Organic HAP 40 CFR Section 61.01(b) Xylenes (nos)
Ethyl benzene
Clean Air Act VOC Section 111 Xylenes (nos)
Ethyl benzene
Clean Air Act Haz. Air Pollutants Section 112 Xylenes (isomers and mixture)
Ethyl benzene,

State Right-to-Know Regulations Status of Ingredients
Pennsylvania: Benzene, dimethyl-
Benzene, ethyl-
New Jersey: Xylenes (o-, m-, p- isomers)
Ethyl benzene
Massachusetts: Xylene, Ethyl benzene

XVI. ADDITIONAL INFORMATION
MAJOR REFERENCES:


Other references available upon request.