

MATERIAL SAFETY DATA SHEET

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CHEMTREC EMERGENCY #: 1-800-424-9300

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DATE PREPARED: 09/19/94

I. PRODUCT IDENTIFICATION:

PRODUCT NAME: **HARTER - CLEAR FLAMMABLE**
PRODUCT: 968F - 969F - 970F - 973F
CHEMICAL FAMILY: Isocyanate
CHEMICAL NAME: Tris (4-Isocyanatophenyl) Thiophosphate in solvents

II. HAZARDOUS INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
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TRIS (4-ISOCYANATOPHENYL) Thiophosphate

4151-51-3	OSHA: Not established ACGIH: Not established	27%
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An exposure guideline of 0.005 ppm TWA, 0.02 ppm STEL is suggested based on the established exposure limits for Toluene Diisocyanate

Ethyl Acetate (EA)

141-78-6	OSHA: 400.000 ppm TWA ACGIH: 400.000 ppm TWA	70-72.5%
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Monochlorobenzene (MCB)

108-90-7	OSHA: 75.000 ppm TWA ACGIH: 75.000 ppm TWA	0.5-3.0%
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III. PHYSICAL PROPERTIES:

PHYSICAL FORM: Liquid
COLOR: Yellowish to brownish
ODOR: Of solvents
BOILING POINT: 171F (77C) @ 760 mmHg
MELTING/FREEZING POINT: Not established
VISCOSITY: Approx. 10 sec. flow time at 68F (20C)
SOLUBILITY IN WATER: Reacts slowly with water to liberate CO2 gas.
SOLUBILITY (NON AQUEOUS): Acetone, methylene chloride
SPECIFIC GRAVITY: 1.0 g/cm3 at 68F (20C)
BULK DENSITY: Not established
% VOLATILE BY VOLUME: 73
VAPOR PRESSURE: 0.00003 mmHG for Tris (4-Isocyanatophenyl) Thiophosphate; 75 mmHG at 68F for EA; 8.8 mmHG at 68F for MCB

HMIS RATINGS: Health 3* Flammability 3 Reactivity 1
0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe
* = Chronic Health Hazard

IV. FIRE AND EXPLOSION DATA:

FLASH POINT: 23.0 F (-5.0C)

FLAMMABLE LIMITS:

UPPER EXPLOSIVE LIMIT (UEL)(%): 11% Ethyl acetate
LOWER EXPLOSIVE LIMIT (LEL)(%): 2.2% Ethyl acetate
UPPER EXPLOSIVE LIMIT (UEL)(%): 7.1% Monochlorobenzene
LOWER EXPLOSIVE LIMIT (LEL)(%): 1.3% Monochlorobenzene

AUTO-IGNITION TEMPERATURE: 860 F (460C)

EXTINGUISHING MEDIA:

Dry Chemical: Carbon Dioxide; Foam; Water spray for large fires.

SPECIAL FIRE FIGHTING PROCEDURES:

Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by fire fighters. During a fire, isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion (see Section VIII). Cool fire-exposed containers with water spray. Heat will cause pressure buildup and may cause explosive rupture. Solvent vapors may be heavier than air. Under conditions of stagnant air, vapors may build up and travel along the ground to an ignition source which may result in a flash back to the source of the vapors.

V. HUMAN HEALTH DATA**ROUTE(S) OF ENTRY:**

Inhalation from product aerosols or vapors formed during heating or spraying; skin and eye contact with liquid and aerosols.

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE;**ACUTE INHALATION:**

Isocyanate vapors or mist at concentrations above the exposure guideline can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a preexisting nonspecific bronchial hyperactivity can respond to concentrations below the exposure limits with similar symptoms as well as asthma attack. Exposure well above the exposure guideline may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g. fever, chills) has also been reported. These symptoms can be delayed up to several hours after exposure. Solvent vapors are irritating to the eyes, nose, throat and respiratory tract resulting in red, itchy eyes, dryness of the throat and tightness in the chest. Other possible symptoms of overexposure include headache, nausea, narcosis, fatigue and loss of appetite. Ethyl Acetate (EA) odor may be objectionable at 200 ppm and is mildly irritating to the eyes, nose and throat at 400 ppm. At concentrations in excess of 13,000 ppm EA is only mildly narcotic. Monochlorobenzene vapors can cause eye and nasal irritation at 200 ppm at which the odor is both unpleasant and pronounced.

CHRONIC INHALATION:

As a result of previous repeated overexposure or a single large dose, certain individuals develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the exposure limits. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthma attack, could be immediate or delayed (up to several hours after exposure). Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Overexposure to isocyanates has also been reported to cause lung damage (including decrease in lung function) which may be permanent. Sensitization can either be temporary or permanent. Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage. Symptoms include loss of memory, loss of intellectual ability and loss of coordination. Based on animal data, overexposure to monochlorobenzene vapors may cause liver and kidney effects (see Section XII).

ACUTE SKIN CONTACT:

Product may react with skin protein and moisture and may cause irritation which may include the following symptoms: reddening, swelling, rash, scaling or blistering. Cured material is difficult to remove.

CHRONIC SKIN CONTACT: Prolonged contact may cause reddening, swelling, rash, scaling, blistering, and in some cases, skin sensitization. Individuals who have developed a skin sensitization can develop these symptoms as a result of contact with very small amounts of liquid material or as a result of exposure to vapor. Repeated or prolonged skin contact with the solvents can result in dry, defatted and cracked skin causing increased susceptibility to infection. In addition dermatitis and skin rash and redness may occur from skin contact. EA does not readily penetrate the skin to cause systemic toxic effects.

ACUTE EYE CONTACT: Product liquid, aerosols or vapors are irritating and can cause tearing, reddening and swelling. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible. See Section VI for treatment.

CHRONIC EYE CONTACT: May cause conjunctivitis.

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ACUTE INGESTION: Can result in irritation and corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea. If aspirated (liquid enters the lung) Monochlorobenzene may be rapidly absorbed through the lungs and result in effects similar to those described above for inhalation.

CHRONIC INGESTION:
None Found

CARCINOGENICITY:
The components of this product are not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE;
Liver and kidney disorders, asthma, other respiratory disorders (bronchitis, emphysema, bronchial hyperactivity), skin allergies, eczema.

EXPOSURE LIMITS:
No exposure limits have been established for product as a whole. See Section II for exposure limits and/or exposure guidelines of the hazardous ingredients.

VI. EMERGENCY AND FIRST AID PROCEDURES:

FIRST AID FOR EYES:
Flush with copious amounts of water, preferably, lukewarm water for at least 15 minutes, holding eyelids open all the time. Refer individual to physician or ophthalmologist for immediate follow-up.

FIRST AID FOR SKIN:
Remove contaminated clothing. Wash affected skin thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists after the area is washed.

FIRST AID FOR INHALATION:
Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Consult physician should this occur.

FIRST AID FOR INGESTION: DO NOT INDUCE VOMITING.

Give 1 to 2 cups of milk or water to drink. **DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.** Consult physician.

NOTE TO PHYSICIAN:

Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Work place isocyanate vapors have produced reversible corneal epithelial edema impairing vision. **Skin:** Isocyanates are known skin sensitizers. Treat symptomatically as for contact dermatitis or thermal burns. If burned, treat as thermal burn. **Ingestion:** Treat symptomatically. There is no specific antidote for isocyanates. For Monochlorobenzene, administration of adrenaline is not recommended. **Respiratory:** Isocyanates are known pulmonary sensitizers. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS:

EYE PROTECTION REQUIREMENTS:

Liquid chemical goggles or full-face shield. Contact lenses should not be worn.

SKIN PROTECTION REQUIREMENTS:

Chemical resistant gloves (butyl rubber, nitrile rubber, polyvinyl alcohol). However, please note that PVA degrades in water. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area covered by the cream to a minimum.

RESPIRATOR REQUIREMENTS:

Concentrations greater than the exposure guideline can occur when isocyanates are sprayed, heated or used in a poorly ventilated area. In such cases, or whenever concentrations of isocyanates and solvents exceed the exposure guideline or limits, respiratory protection must be worn. A supplied-air respirator or a self-contained breathing apparatus is recommended. In situations where isocyanates are not sprayed or heated and a supplied-air or self-contained apparatus is unavailable or its use impractical, at least an air-purifying respirator equipped with a particulate filter must be worn. **HOWEVER, THIS SHOULD BE PERMITTED ONLY FOR SHORT PERIODS OF TIME (LESS THAN ONE HOUR) AT RELATIVELY LOW CONCENTRATIONS (AT OR NEAR THE EXPOSURE GUIDELINE OR LIMITS).** However, due to the poor warning properties of isocyanates, proper fit and timely replacement of filter elements must be ensured. Observe OSHA regulations for respirator use (29 CFR 1910.134).

VENTILATION REQUIREMENTS:

Local exhaust should be used to maintain levels below the exposure limits or guidelines. For spray applications, an air-supplied respirator must be worn. Standard reference sources regarding industrial ventilation (i.e., ACGIH Industrial Ventilation) should be consulted for guidance about adequate ventilation.

MONITORING:

Isocyanate exposure levels must be monitored by accepted monitoring techniques to ensure that the exposure limits are not exceeded. (Contact PANG for guidance) See Volume I (Chapter 17) and Volume 3 (Chapter 3) in Patty's Industrial Hygiene and Toxicology for sampling strategy.

MEDICAL SURVEILLANCE: Medical supervision of all employees who handle or come in contact with isocyanates are recommended. These should include pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with isocyanates. Once a person is diagnosed as sensitized to isocyanates, no further exposure can be permitted.

ADDITIONAL PROTECTIVE MEASURES: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions.

VIII. REACTIVITY DATA:

STABILITY: Stable under normal conditions.

HAZARDOUS POLYMERIZATION:
May occur; may occur if in contact with moisture or other materials which react with isocyanates.

INCOMPATIBILITIES:
Water, amines, alcohols, acids and alkali. Avoid heat, sparks, flames.

INSTABILITY CONDITIONS:
Excessive heat

DECOMPOSITION TEMPERATURE:
Above 171F (77C)

DECOMPOSITION PRODUCTS:

By high heat and fire: carbon monoxide, NO_x, PO_x, SO_x, HCl, isocyanate vapors, and small amounts of phosgene, chlorine and HCN.

IX. SPILL AND LEAK PROCEDURES:

SPILL OR LEAK PROCEDURES: Evacuate and ventilate spill area; dike spill to prevent entry into water system; wear full protective equipment, including respiratory equipment during clean up. (See Section VII). **Major Spill:** Call CHEMTREC 800-424-9300. If temporary control of isocyanate vapor is required, a blanket of protein foam (available at most fire departments) may be placed over the spill. Large quantities may be pumped into closed, but not sealed, container for disposal. **Minor Spill:** Absorb isocyanates with sawdust or other absorbent, shovel into suitable unsealed containers, transport to well-ventilated area (outside) and treat with neutralizing solution: mixture of water (80%) with non-ionic surfactant Tergitol TMN-10 (20%), or water (90%) concentrated ammonia (3-8%) and detergent (2%). Add about 10 parts of neutralizer per part of isocyanate, with mixing. Allow to stand uncovered for 48 hours to let CO₂ escape. **Clean-up:** Decontaminate floor with decontamination solution letting stand for at least 15 minutes.

WASTE DISPOSAL METHOD: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. **DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH.** (See Sections IV and VIII) Vapors and gases may be highly toxic.

X. SPECIAL PRECAUTIONS & STORAGE DATA:

STORAGE TEMPERATURE (MIN/MAX): Ambient 122F (50C)

SHELF LIFE: 6 months

SPECIAL SENSITIVITY:

If container is exposed to high heat it can be pressurized and possibly rupture. Isocyanates react slowly with water to form CO₂ gas. This gas can cause sealed containers to expand and possibly rupture.

HANDLING/STORAGE PRECAUTIONS: Keep away from heat, sparks or open flame. Ground container during storage and transfer operation. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Avoid contact with skin and eyes. Do not breathe aerosols or vapors. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent chronic overexposure from inhalation. Isocyanates can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Exposure to vapors of heated isocyanates can be extremely dangerous.

HANDLING/STORAGE PRECAUTIONS (continued)

Employee education and training in the safe use of handling of this compound are required under the OSHA Hazard Communication Standard.

XI. SHIPPING INFORMATION

D.O.T. SHIPPING NAME: Flammable Liquid, NOS
TECHNICAL SHIPPING NAME: Tris (4-Isocyanatophenyl) Thiophosphate In Ethyl Acetate and Chlorobenzene
D.O.T. HAZARD CLASS: Flammable Liquid
U.N./N.A. NUMBER: UN1993
PRODUCT RQ (lbs.): 3333
D.O.T. LABEL: Flammable Liquid
D.O.T. PLACARD: Flammable
FREIGHT CLASS BULK: Chemicals, NOI
FREIGHT CLASS PACKAGE: Chemicals, NOI, (NMFC 60000)
PRODUCT LABEL: HARTER

XII. ANIMAL TOXICITY DATA:

TOXICITY DATA FOR: A similar product

ACUTE TOXICITY

- ORAL LD50:** Above 2000 mg/kg (rat)
- EYE EFFECTS:** Slightly irritating to rabbit eyes
- SKIN EFFECTS:** Non-irritating to rabbit skin

TOXICITY DATA FOR: Ethyl Acetate

ACUTE TOXICITY

- ORAL LD50:** 5600 mg/kg (rat)
- INHALATION LC50:** Above 8000 ppm (rat)**

MUTAGENICITY: Positive effects were observed in hamster oral feeding studies and in yeasts exposed to high vapor concentrations.**

**NIOSH, Registry of Toxic Effects of Chemical Substances, 1985-86.

TOXICITY DATA FOR: Monochlorobenzene

ACUTE TOXICITY

- ORAL LD50:** 2910 mg/kg (rat) ***

CHRONIC TOXICITY: Dally oral administration of Monochlorobenzene to mice and rats is reported to have caused reduced body weights and/or decreased survival in a NTP study. Dose related liver abnormalities were also observed ***

REPRODUCTION: A two-generation inhalation exposure study in rats exposed to monochlorobenzene reported liver abnormalities and adverse testicular effects. However, other studies have found monochlorobenzene to be without teratogenic or mutagenic effects.***

*** Supplier Material Safety Data Sheet.

XIII. REGULATORY INFORMATION

OSHA STATUS: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

TSCA STATUS: On TSCA Inventory

CERCLA REPORTABLE QUANTITY: Ethyl Acetate - 5000 lbs.;
Monochlorobenzene 100 lbs.

SARA TITLE III:
SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: None
SECTION 311/312 HAZARDOUS CATEGORIES: Immediate Health Hazard; Delayed Health Hazard; Fire Hazard; Reactive Hazard; Sudden Pressure Release Hazard

SECTION 313 TOXIC CHEMICALS:

Monochlorobenzene (CAS # 108-90-7) 0.5-3.0%

RCRA STATUS:

When discarded in its purchased form, this product meets the criteria of ignitability, and should be managed as a hazardous waste (EPA Hazardous Waste Number D001). (40 CFR 261.20-24).

XIV. STATE REGULATORY INFORMATION:

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE
Tris(4-Isocyanatophenyl) 4151-51-3	Thiophosphate 27%	PA3
Ethyl Acetate (EA) 141-78-6	70-72.5%	PAI, MA, NJ
Monochlorobenzene (MCB) 108-90-7	0.5-3.0%	PAI, MA, NJ

MA = Massachusetts Hazardous Substance List

NJ = New Jersey Hazardous Substance List

PAI = Pennsylvania Hazardous Substance List

PA3 = Pennsylvania Non-hazardous present at 3% or greater

CALIFORNIA PROPOSITION 65

To the best of our knowledge, this product contains no levels of listed substances, which the State of California has found to cause cancer, birth defects or other reproductive effects.

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