

# **APPLICATION FOR TITLE V AIR OPERATING PERMIT**

## **APPENDIX C - VOLUME I MATERIAL SAFETY DATA SHEETS**

PREPARED FOR:

** HERCULES**

**CHEMICAL SPECIALTIES**

**HATTIESBURG, MISSISSIPPI  
FORREST COUNTY**

**JANUARY 1996**

PREPARED BY:

**Eco-Systems, Inc.**  
**Environmental Engineers and Scientists**



**2675 RIVER RIDGE ROAD  
JACKSON, MISSISSIPPI 39216  
PHONE (601) 366-0663**

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HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

DRESINOL\* 42  
MSDS No.: 909 6401 0200-02

Supersedes MSDS #: 909 6401 0200-01 Date: 06/29/90

I. PRODUCT IDENTIFICATION

CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

DRESINOL\* 42 Resin Dispersion

HMIS RATINGS:(1)

Health hazard: 1 Slight  
Flammability hazard: 0 Minimal  
Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Aqueous dispersion of partially decarboxylated rosin

APPEARANCE AND ODOR: Cream-colored liquid; slight ammonia odor

\* Registered Trademark of Hercules Incorporated.

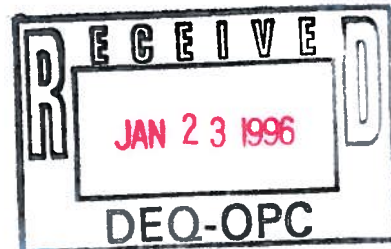
II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

Some ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH" for 1989-90.

FOOTNOTES

(1)Explanation of acronyms:  
HMIS: Hazardous Materials Identification System rating for product as supplied.  
N/A: Not applicable

Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.



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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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**BOILING POINT:** 100 C (212 F) (2) **SOLUBILITY IN WATER:** Dispersible in all proportions

**VAPOR PRESSURE @ 20 C:** Similar to water **SPECIFIC GRAVITY:** 1.02 - 1.04

**VAPOR DENSITY:** Lighter than air **pH:** 9.4

**VOLATILE (VOL.),%:** Negligible at 20 C **EVAPORATION RATE:** Similar to water  
(Based on solids)

**FREEZING POINT:** 0 C (32 F) (2)

(2) Based on water.

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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**FLASH POINT:** Noncombustible

**FLAMMABLE LIMITS:** N/A

**AUTOIGNITION TEMPERATURE:** N/A

**EXTINGUISHING MEDIA:**

Product is dispersed in water and as such will not burn. However, water spray, dry chemical, foam, or carbon dioxide may be used on fires involving this product.

**SPECIAL FIREFIGHTING PROCEDURES:** Use self-contained breathing apparatus.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** None

**STABILITY CONSIDERATIONS:**

Stable. Mixing with acids will cause dispersion to separate.

**INCOMPATIBILITY WITH:** None

**HAZARDOUS DECOMPOSITION PRODUCTS:** None

**HAZARDOUS PRODUCTS OF COMBUSTION:**

This product is an aqueous dispersion which will not support combustion. If heated to decomposition, it may evolve carbon monoxide, carbon dioxide, and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

**HAZARDOUS POLYMERIZATION:** Will not occur.

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V. HEALTH HAZARD DATA  
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CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

## SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: May cause eye irritation.  
SKIN: Prolonged and/or repeated contact may cause skin irritation.  
Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).  
INHALATION: Mist may cause irritation of the upper respiratory tract.  
INGESTION: May cause gastrointestinal tract irritation.

## EMERGENCY &amp; FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician.

INGESTION: If conscious, the person should immediately drink large quantities of liquid to dilute this product. Call a physician. NEVER give liquids to an unconscious person.

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MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this product after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

PRIMARY ROUTES OF ENTRY: Eyes, skin

## CANCER INFORMATION:

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are NOT regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have NOT been evaluated by the International Agency for Research on Cancer (IARC).

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**V. HEALTH HAZARD DATA**

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...Continued

**REPORTED HUMAN EFFECTS:**

Hercules Incorporated has not received any reports of adverse effects from workers handling this product.

**REPORTED ANIMAL EFFECTS**

Hercules Incorporated has not conducted any animal testing with this product.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

Incineration in accordance with local, state, and federal regulations. Supplemental fuel may be required.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing vapors or mists.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Chemical goggles  
Appropriate protective clothing

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Damaged by freezing. Store at temperatures of 4-35 C (40-95 F), in order to preserve product stability.

**ENGINEERING CONTROLS:** Provide adequate ventilation.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	DRESINOL* 42	N/A	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

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**VIII. ENVIRONMENTAL REGULATORY DATA**

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...Continued

**FOOTNOTES:**

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- EC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

DRESINOL\* 210B  
MSDS No.: 909 6401 1200-02

Supersedes MSDS #: 909 6401 1200-01

Date: 06/29/90

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**I. PRODUCT IDENTIFICATION**

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**CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.**DRESINOL\* 210B Resin Dispersion

HMIS RATINGS:(1)

Health hazard:	1	Slight
Flammability hazard:	0	Minimal
Reactivity hazard:	0	Minimal

CHEMICAL &amp; COMMON NAME: Aqueous dispersion of plasticized hydrogenated rosin

APPEARANCE AND ODOR: Cream-colored liquid; slight ammonia odor

\* Registered Trademark of Hercules Incorporated.

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**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

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The ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH" for 1989-90.

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**FOOTNOTES**

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(1)Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1000, March 1, 1989, revision)

N/A: Not applicable

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Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: 100 C (212 F) (2) SOLUBILITY IN WATER: Dispersible in all proportions  
VAPOR PRESSURE @ 20 C: Similar to water SPECIFIC GRAVITY: 1.02 - 1.04  
VAPOR DENSITY: Lighter than air pH: 9.4  
VOLATILE (VOL.),%: Negligible at 20 C EVAPORATION RATE: Similar to water  
(Based on solids)  
FREEZING POINT: 0 C (32 F) (2)

(2) Based on water.

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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FLASH POINT: Noncombustible

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: N/A

**EXTINGUISHING MEDIA:**

Product is dispersed in water and as such will not burn. However, water spray, dry chemical, foam, or carbon dioxide may be used on fires involving this product.

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

**STABILITY CONSIDERATIONS:**

Stable. Mixing with acids will cause dispersion to separate.

INCOMPATIBILITY WITH: None

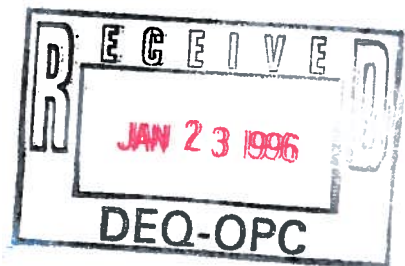
HAZARDOUS DECOMPOSITION PRODUCTS: None

**HAZARDOUS PRODUCTS OF COMBUSTION:**

This product is an aqueous dispersion which will not support combustion. If heated to decomposition, it may evolve carbon monoxide, carbon dioxide, and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** May cause eye irritation.  
**SKIN:** Prolonged and/or repeated contact may cause skin irritation. Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE**).  
**INHALATION:** Mist may cause irritation of the upper respiratory tract.  
**INGESTION:** May cause gastrointestinal tract irritation.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid to dilute this product. Call a physician. **NEVER** give liquids to an unconscious person.

---

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this product after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are NOT regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have NOT been evaluated by the International Agency for Research on Cancer (IARC).

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**V. HEALTH HAZARD DATA**

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...Continued

**REPORTED HUMAN EFFECTS:**

Hercules Incorporated has not received any reports of adverse effects from workers handling this product.

**REPORTED ANIMAL EFFECTS**

Hercules Incorporated has not conducted any animal testing with this product.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

Incineration in accordance with local, state, and federal regulations. Supplemental fuel may be required.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing vapors or mists.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Chemical goggles  
Appropriate protective clothing

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Damaged by freezing. Store at temperatures of 4-35 C (40-95 F), in order to preserve product stability.

**ENGINEERING CONTROLS:** Provide adequate ventilation.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	DRESINOL* 210B	N/A	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304* EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

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VIII. ENVIRONMENTAL REGULATORY DATA  
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Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard  
HC-2 Delayed (chronic) health hazard  
HC-3 Fire hazard  
HC-4 Sudden release of pressure hazard  
HC-5 Reactive hazard  
NHH Not a health hazard  
NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

  
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HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

DRESINOL\* 215A Resin dispersion  
 MSDS No.: 909 6401 1600-01

Date: 07/29/94

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 I. PRODUCT IDENTIFICATION  
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CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

DRESINOL\* 215A Resin dispersion

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard: 1 Slight  
 Flammability hazard: 0 Minimal  
 Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Aqueous dispersion of polymerized rosin

APPEARANCE AND ODOR: Cream-colored liquid; slight ammonia odor

\* Registered Trademark of Hercules Incorporated

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 II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS  
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The ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH".

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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**V. HEALTH HAZARD DATA**

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CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** May cause eye irritation.  
**SKIN:** Prolonged and/or repeated contact may cause skin irritation. Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE**).  
**INHALATION:** Mist may cause irritation of the upper respiratory tract.  
**INGESTION:** May cause gastrointestinal tract irritation.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid to dilute this product. Call a physician. NEVER give liquids to an unconscious person.

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**PRIMARY ROUTES OF ENTRY:** Eyes, skin

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VII. APPLICABLE CONTROL MEASURES

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**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Damaged by freezing. Store at temperatures of 4-35 C (40-95 F), in order to preserve product stability.

**ENGINEERING CONTROLS:**

Provide adequate ventilation.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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VIII. ENVIRONMENTAL REGULATORY DATA  
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## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

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NHH Not a health hazard

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NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

5/2/91  
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HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

DRESINOL\* 215

MSDS No.: 909 6401 1500-02

Supersedes MSDS #: 909 6401 1500-01

Date: 06/29/90

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**I. PRODUCT IDENTIFICATION**

---

CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

DRESINOL\* 215 Resin Dispersion

HMIS RATINGS:(1)

Health hazard:	1	Slight
Flammability hazard:	0	Minimal
Reactivity hazard:	0	Minimal

CHEMICAL &amp; COMMON NAME: Aqueous dispersion of polymerized rosin

APPEARANCE AND ODOR: Cream-colored liquid; slight ammonia odor

\* Registered Trademark of Hercules Incorporated.

---

**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

---

The ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH" for 1989-90.

---

**FOOTNOTES**

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(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

N/A: Not applicable

---

Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

V. HEALTH HAZARD DATA

CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: May cause eye irritation.  
SKIN: Prolonged and/or repeated contact may cause skin irritation.  
Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).  
INHALATION: Mist may cause irritation of the upper respiratory tract.  
INGESTION: May cause gastrointestinal tract irritation.

EMERGENCY & FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician.

INGESTION: If conscious, the person should immediately drink large quantities of liquid to dilute this product. Call a physician. NEVER give liquids to an unconscious person.

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this product after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

PRIMARY ROUTES OF ENTRY: Eyes, skin

CANCER INFORMATION:

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are NOT regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have NOT been evaluated by the International Agency for Research on Cancer (IARC).

Continued...

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	DRESINOL* 215	N/A	100

B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A

C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE & REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

E. OTHER

None

Continued...

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

DRESINOL\* 205  
MSDS No.: 909 6401 1000-02

Supersedes MSDS #: 909 6401 1000-01

Date: 06/29/90

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## I. PRODUCT IDENTIFICATION

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CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.

DRESINOL\* 205 Resin Dispersion

HMS RATINGS:(1)

Health hazard:	1 Slight
Flammability hazard:	0 Minimal
Reactivity hazard:	0 Minimal

CHEMICAL & COMMON NAME: Aqueous dispersion of hydrogenated rosin

APPEARANCE AND ODOR: Cream-colored liquid; slight ammonia odor

\* Registered Trademark of Hercules Incorporated.

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## II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

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The ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH" for 1989-90.

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### FOOTNOTES

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(1) Explanation of acronyms:

HMS: Hazardous Materials Identification System rating for product as supplied.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1000, March 1, 1989, revision)

N/A: Not applicable

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Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

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**V. HEALTH HAZARD DATA**

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**CAUTION! MAY CAUSE EYE AND SKIN IRRITATION.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** May cause eye irritation.  
**SKIN:** Prolonged and/or repeated contact may cause skin irritation. Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE**).  
**INHALATION:** Mist may cause irritation of the upper respiratory tract.  
**INGESTION:** May cause gastrointestinal tract irritation.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid to dilute this product. Call a physician. **NEVER** give liquids to an unconscious person.

---

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this product after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are NOT regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have NOT been evaluated by the International Agency for Research on Cancer (IARC).

Continued...



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**VIII. ENVIRONMENTAL & REGULATORY DATA**


---

The following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

**A. PRODUCT COMPOSITION**

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	DRESINOL* 205	N/A	100

**B. SARA TITLE III (See footnotes)**

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A

**C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE & REPORTABLE QUANTITIES)**

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

**D. RCRA INFORMATION**

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

**E. OTHER**

None

Continued...



**IDEAL**  
**CHEMICAL & SUPPLY COMPANY**  
 4025 AIR PARK STREET  
 MEMPHIS, TN 38118  
 901-363-7720 • 800-232-6776  
 FAX 901-366-0064

# MATERIAL SAFETY DATA SHEET

MSDS CODE NO. 5B05, 5B06, 5B09, 5B22 & 5B23

ORIGINAL ISSUE DATE: 5/80 REVISED: 2/94

## I. IDENTIFICATION

24 HOUR EMERGENCY TELEPHONE NUMBER  
 CHEMTREC 800-424-9300

PRODUCT NAME: Aqua Ammonia  
 COMMON NAMES: Aqua, Ammonium Hydroxide, Ammonia Solution  
 SHIPPING NAME: Ammonium Hydroxide, 8  
 UN2672, PGIII, RQ

MANUFACTURER AND/OR DISTRIBUTOR:  
 LaRoche Industries Inc.  
 1100 Johnson Ferry Road N.E.  
 Atlanta, GA 30342  
 (404) 851-0300; (404) 491-7987 after hours  
 Prepared By: R. C. Cannon

## II. INGREDIENTS AND RECOMMENDED OCCUPATIONAL EXPOSURE LIMITS

MATERIAL	FORMULA	CAS. NO.:	%WT.	EXPOSURE LIMITS		
				OSHA-STEL	ACGIH	
					TWA	STEL
Ammonia	NH <sub>3</sub>	7664-41-7	19-30	50 ppm (NH <sub>3</sub> )	25 ppm	35 ppm
Water	H <sub>2</sub> O	7732-18-5	81-70	None Established	None Established	None Established
Aqua Ammonia	NH <sub>4</sub> OH	1336-21-6	100	—	5mg/M <sup>3</sup>	—

## III. PHYSICAL DATA

BOILING POINT (°F) 83° (30% Soln.)	SPECIFIC GRAVITY (H <sub>2</sub> O = 1) 0.896 @ 60°F (30% Soln.)
MELTING POINT (°F) Approx. -98° (30% Soln.)	PERCENT VOLATILE BY VOLUME (%) 100
VAPOR PRESSURE (mm Hg.) 720 @ 80°F (30% Soln.)	pH Approximately 11.6 for 1 N Solution
VAPOR DENSITY (AIR = 1) 0.60 @ 32°F	SOLUBILITY IN WATER Complete

APPEARANCE AND ODOR: Colorless liquid with pungent odor.

## IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used) Not Applicable	NFPA HAZARD	HEALTH	2 (Moderate)
FLAMMABLE LIMITS 16-25% in air (NH <sub>3</sub> )	RATING FOR	FIRE	1 (Slight)
	AMMONIA VAPORS	REACTIVITY	0 (Least)
	Aqua Ammonia is not rated		

EXTINGUISHING MEDIA: Water fog or spray for escaping ammonia gas.

SPECIAL FIRE FIGHTING PROCEDURES: The mixture will not burn but escaping ammonia gas can burn in the range of 16-25% in air. Wear full protective clothing and self-contained breathing apparatus in the pressure demand mode.

## V. REACTIVITY DATA

STABILITY	Unstable		CONDITIONS TO AVOID: Heating above ambient temperatures causes the vapor pressure of ammonia to increase rapidly.
	Stable	X	

INCOMPATIBILITY (materials to avoid): Strong acids. Aqua ammonia reacts with chlorine, bromine, mercury, silver, silver solder, and hypochlorite (bleach) to form explosive compounds. Avoid use of metals containing copper or zinc.

HAZARDOUS DECOMPOSITION PRODUCTS: Heating and contact of vapors with very hot surfaces may form hydrogen. Certain metals, such as nickel, accelerate decomposition at as low as 575°F.

HAZARDOUS POLYMERIZATION	May Occur		CONDITIONS TO AVOID: Not Applicable.
	Will Not Occur	X	

NOTE: Ammonia is subject to the reporting requirements of SARA (1986, section 313 of Title III) and 40 CFR Part 372.

LaRoche INDUSTRIES INC.

## VI. SPILL OR LEAK PROCEDURES

TRANSPORTATION EMERGENCIES  
Call CHEMTREC 800-424-9300

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED: Releases will liberate irritating vapors. Spilled liquids should be contained and not washed into sewers or ground water. Prevent large quantities from contact with vegetation or waterways. Aqua ammonia is a regulated material and reporting of any release may be required.

A release of 1,000 lbs. or more of aqua ammonia ( $NH_4OH$ ) within 24 hours must be reported to the National Response Center at 800-424-8802, as well as appropriate local and state agencies. Immediate (within minutes) reporting is required.

### WASTE DISPOSAL METHOD:

Consult local, state or federal regulatory agencies for acceptable disposal procedures and disposal locations.

Disposal in streams or sewers may be contrary to federal, state and local regulations.

For hazardous waste regulations call 800-424-9346, the RCRA Hotline.

EPA Waste Identification No.

Not Applicable

## VII. HEALTH HAZARD DATA

### EFFECTS OF OVEREXPOSURE:

Oral  $LD_{50}$  = 350 mg  $NH_3$ /Kg (Rats)

Inhal.  $LC_{50}$  = 4230 ppm  $NH_3$  (Mice)

IDLH Level = 500 ppm  $NH_3$

### MAJOR EXPOSURE HAZARD

INHALATION  SKIN CONTACT  EYE CONTACT  INGESTION

Ammonia is very alkaline and reacts corrosively with all body tissues. Inhalation: The gas can be suffocating and is irritating to the mucous membranes and lung tissues. Skin Contact: High concentrations can cause severe irritation and burns. Eye Contact: May be severely irritating upon liquid exposure, with mild irritation from fumes. Ingestion: Can cause vomiting, nausea and corrosive burns to the esophagus and stomach. The exact nature and intensity of toxic effects following ingestion of varying amounts of strong aqua ammonia solution (e.g. 28%) is unpredictable. The most accepted view is that any amount from one teaspoon or greater can be dangerous if ingested. Ammonia is not a listed carcinogen by IARC, NPT, or OSHA.

### EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove from exposure. If breathing has stopped or is difficult, administer artificial respiration or oxygen as needed. Seek medical aid. Skin Contact: Immediately flush with large quantities of water while removing contaminated clothing. Eye Contact: Flush with large amounts of water for at least 15 minutes. Seek medical aid. Ingestion: Do not induce vomiting. Rinse mouth with water and give plenty of milk or water to drink. Immediately seek medical aid.

## SPECIAL PROTECTION INFORMATION

### RESPIRATORY:

Respiratory protection approved by NIOSH/MSHA for ammonia must be used when exposure limits are exceeded. Appropriate protection depends on the type and magnitude of exposure. (See Section IX).

### SKIN:

Rubber gloves and rubber or PVC/Nylon/PVC laminate protective clothing should be used to prevent skin contact. A face shield should be used when appropriate to prevent contact with splashed liquid.

### EYE:

Employees should be required to wear chemical safety goggles to prevent eye contact.

### VENTILATION:

Local exhaust ventilation should be used to control release of air contaminants in the work place. General dilution ventilation may assist with the reduction of air contaminant concentrations.

### OTHER PROTECTIVE EQUIPMENT:

Emergency eye wash stations and deluge showers should be available in the work area.

## IX. SPECIAL PRECAUTIONS

### PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Store in vented containers or pressure vessels away from heat. Open containers cautiously in case of pressure build up. Zinc, copper and copper alloys such as brass are rapidly corroded by aqua ammonia.

### OTHER COMMENTS:

Prolonged inhalation of high concentrations may cause bronchitis and/or pneumonia, with some residual reduction in pulmonary functions. Symptoms of lung edema are often latent (usually a few hours), and are aggravated by physical effort. (Handling Chemicals Safely, Dutch Assoc. Safety Experts et al. 1980). Rare allergic manifestations (urticaria) may occur from inhalation (Occupational Diseases: A Guide to Their Prevention, U.S. Dept. H.E.W., 1977). Contact lenses should not be worn when working with ammonia. Whether a chemical cartridge respirator or a self-contained breathing apparatus is sufficient for effective respiratory protection depends upon the type and magnitude of exposure.

This information is taken from sources or based upon data believed to be reliable. However, LaRoche Industries Inc. makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.



# VININGS

*Sub. for Biocatic*

AMA-35D

Intermediate For  
Manufacturing Use

TetraHydro-3,5-Dimethyl-2H-  
1,3,5-Thiadiazine-2-Thione\*

Vinings' AMA-35D is a nearly odorless, dustless, free flowing crystalline solid. It is an excellent Fungicide and is intended only for use in the formulating and/or compounding of Pesticides only.

Vinings markets AMA-35D solely as an industrial technical grade organic intermediate. As such, formulators are responsible for providing data to support the registration for their formulated products.

Each of the components in the above product have been cleared for use in the manufacture of paper and paperboard that contact food. See FDA Food Additive Regulation, 121.2505 and 121.2529.

## COMPOSITION:

Active Ingredients:

Tetrahydro-3,5-Dimethyl-2H-1,3,5-Thiadiazine-2-Thione.\* 99.0%

## PHYSICAL PROPERTIES:

Color:	White
Odor:	Nearly Odorless
Physical Form:	Crystalline Solid
Melting Point:	102-105 degrees C
Solubility:	Water - 0.12%; Acetone - 19.5%; Trichloroethylene - 26%; Ethylene Chloride - 21%

## STABILITY:

Stable in alkaline systems, pH8 and above. Decreased stability as pH decreases. However, the breakdown of AMA-35D in water solutions is necessary for its biological action. The handling and storage characteristics of AMA-35D are superior to those of its active decomposition products. Therefore, the instability of AMA-35D in water solutions is desirable. The presence of heavy metal salts accelerates the breakdown of AMA-35D. Chlorine in excess of 10 ppm in water solutions, also accelerates the breakdown but in addition reduces the biological activity of the decomposition products.

100 Lbs. of Tetrahydro-3,5-Dimethyl-2H-1,3,5-Thiadiazine-2-Thione (DMTT)-  
99% material can be put into solution by the following manner.

Add 86# of 50% caustic to 20 gallons of water - making sure that the temperature does not go above 80° F or below 70° F. Then add DMTT (100 lbs.) slowly stirring.  
NOTE: TEMPERATURE CONTROL IS IMPORTANT WHEN ADDING DMTT.

\*(DMTT)

# VININGS

*Sub. for Biocide*

AMA-35D

Intermediate For  
Manufacturing Use

TetraHydro-3,5-Dimethyl-2H-  
1,3,5-Thiadiazine-2-Thione\*

Vinings' AMA-35D is a nearly odorless, dustless, free flowing crystalline solid. It is an excellent Fungicide and is intended only for use in the formulating and/or compounding of Pesticides only.

Vinings markets AMA-35D solely as an industrial technical grade organic intermediate. As such, formulators are responsible for providing data to support the registration for their formulated products.

Each of the components in the above product have been cleared for use in the manufacture of paper and paperboard that contact food. See FDA Food Additive Regulation, 121.2505 and 121.2529.

## COMPOSITION:

Active Ingredients:

Tetrahydro-3,5-Dimethyl-2H-1,3,5-Thiadiazine-2-Thione.\* 99.0%

## PHYSICAL PROPERTIES:

Color:	White
Odor:	Nearly Odorless
Physical Form:	Crystalline Solid
Melting Point:	102-105 degrees C
Solubility:	Water - 0.12%; Acetone - 19.5%; Trichloroethylene - 26%; Ethylene Chloride - 21%

## STABILITY:

Stable in alkaline systems, pH8 and above. Decreased stability as pH decreases. However, the breakdown of AMA-35D in water solutions is necessary for its biological action. The handling and storage characteristics of AMA-35D are superior to those of its active decomposition products. Therefore, the instability of AMA-35D in water solutions is desirable. The presence of heavy metal salts accelerates the breakdown of AMA-35D. Chlorine in excess of 10 ppm in water solutions, also accelerates the breakdown but in addition reduces the biological activity of the decomposition products.

100 Lbs. of Tetrahydro-3,5-Dimethyl-2H-1,3,5-Thiadiazine-2-Thione (DMTT)-  
99% material can be put into solution by the following manner.

Add 86# of 50% caustic to 20 gallons of water - making sure that the temperature does not go above 80° F or below 70° F. Then add DMTT (100 lbs.) slowly stirring.  
NOTE: TEMPERATURE CONTROL IS IMPORTANT WHEN ADDING DMTT.

\*(DMTT)

MATERIAL SAFETY DATA SHEET

SECTION I

Manufacturer's Name & Address  
 Erie Foods International, Inc.  
 401 - 7th Avenue  
 Erie, IL 61250

Telephone Number  
 800-447-1887

Date of Preparation: 09/15/94

Chemical Name/Synonyms  
 Casein

Trace Name/Synonyms  
 Acid Casein

Chemical Family  
 CAS # 9000-71-9

SECTION II

Paints, Preservatives, & Solvents % TLV (Units) Alloys & Metallic Coatings % TLV (Units)

THIS MATERIAL IS NOT HAZARDOUS AS DEFINED BY OSHA 1910.1200\*

"Hazardous chemical" means any chemical which is a physical hazard to health hazard.

"Health hazard" means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes or mucous membranes.

"Physical hazard" means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive or water reactive).

\*See also Section X, Special Precautions.

SECTION III - PHYSICAL DATA

Boiling Point ( F )	N/A	Specific Gravity (H2O=1)	N/A
Vapor Pressure (mmHg)	N/A	Percent Volatile by Volume (%)	10-12
Vapor Density (AIR=1)	N/A	Evaporation Rate	N/A
Solubility in Water	YES. MEDIUM		
Appearance and Odor	FREE FLOWING POWDER WITH A BLAND ODOR		

SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point (Method Used)	N/A	Flammable Limits Lel	N/A	Uel	N/A
Extinguishing Media	N/A				
Special Fire Fighting Procedures	N/A				



SECTION V - LISTED IN

NTP	IARC	OSHA	OTHER
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SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value NONE LIMITED

Permissible Exposure Limit N/A

Other N/A

Effects of Overexposure N/A

Emergency First Aid Procedures N/A

Primary Routes of Entry - AIRBORNE DUST FROM POWDER DURING FURTHER PROCESSING

SECTION VII - REACTIVITY DATA

STABILITY - Unstable Conditions to Avoid N/A  
Stable X

Incompatibility (Materials to Avoid) N/A

Hazardous Decomposition Products N/A

Hazardous Polymerization - May Occur Conditions to Avoid N/A  
Will Not Occur X

SECTION VIII - SPILL OR LEAK PROCEDURES

Steps To Be Taken In Case Material Is Released Or Spilled  
DRY CLEAN-UP, IE VACUUM, SWEEPING ETC. USE DILUTE CAUSTIC SODA FOR WET CLEAN-UP

Waste Disposal Method MAY BE DISPOSED OF AS WASTE FOOD INGREDIENT

SECTION IX - SPECIAL PROTECTION INFORMATION

Respiratory Protection (specify type)

Ventilation	Local Exhaust	N/A	Special
	Mechanical (general)	N/A	Other

Protective Gloves N/A Eye Protection

Other Protective Equipment N/A

SECTION X - SPECIAL PRECAUTIONS

Precautions To Be Taken In Handling And Storing  
STORE IN COOL, DRY PLACE NOT DIRECTLY AGAINST FLOOR OR OUTSIDE WALLS

Other Precautions - KEEP STORAGE CONTAINER SEALED. DESPITE NOT BEING HAZARDOUS IT'S ADVISABLE TO FOLLOW PRUDENT PRACTICES OF AVOIDING BREATHING OF ANY DRY POWDER MATERIAL.

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

HERCULES\* GUM 42 ROSIN  
~~Molten or solid~~

MSDS No.: 999 0210 3001-02

Supersedes MSDS No.: 999 0210 3001-01

Date: 06/30/93

I. PRODUCT IDENTIFICATION

A. HERCULES\* GUM 42 ROSIN, MOLTEN

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
 PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Amber, viscous liquid at 120-180 C (248-356 F); terpene  
 rosin odor

B. HERCULES\* GUM 42 ROSIN, SOLID

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
 FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
 MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
 (FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
 ADDITIONAL HAZARDS).

APPEARANCE AND ODOR: Amber semi-solid; terpene rosin odor

CASRN: 8050-18-8

HMIS RATINGS: (1)

Health hazard:	0	Minimal
Flammability hazard:	1	Slight
Reactivity hazard:	0	Minimal

CHEMICAL & COMMON NAME: Decarboxylated rosin

\* Registered Trademark of Hercules Incorporated

(1) Explanation of acronyms:

- HMIS: Hazardous Materials Identification System rating for product as supplied.
- CASRN: Chemical Abstracts Service Registry Number
- AIHA WEEL: American Industrial Hygienists Association - Workplace  
 Environmental Exposure Level.
- OSHA: Occupational Safety and Health Administration.
- TLV: Registered trademark of American Conference of Governmental Industrial  
 Hygienists for Threshold Limit Values.
- TWA: Time Weighted Average
- STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)
- C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)
- SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)
- N/A: Not applicable

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

**A. MOLTEN product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

---

**B. SOLID product**

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
ADDITIONAL HAZARDS).

---

FLASH POINT: Above 204 C (400 F) COC

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

**SPECIAL FIREFIGHTING PROCEDURES:**

Use self-contained breathing apparatus.

Apply water to MOLTEN RESIN fires from a safe, protected location to avoid  
body contact with hot resin.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None expected

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some  
aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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...Continued

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

Not listed as a carcinogen by NTP (National Toxicology Program); not regulated as a carcinogen by OSHA (Occupational Safety & Health Administration); not evaluated by IARC (International Agency for Research on Cancer).

**REPORTED HUMAN EFFECTS:**

See above: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

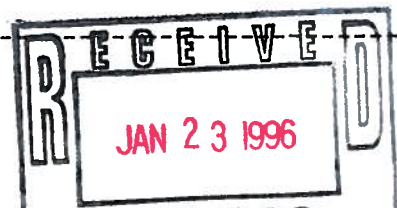
**REPORTED ANIMAL EFFECTS:**

Oral LD50, rats - 7.6 g/kg  
Oral LD50, mice - 4.6 g/kg  
Oral LD50, guinea pig - 4.1 kg/kg  
Dermal LD50, rabbits - greater than 2.5 g/kg.

Two-year feeding studies have been conducted in dogs and rats with gum, wood, and tall oil rosins. At a dietary level of 1% rosin, the rats showed a slight decrease in body weight gain and both species showed increased liver sizes. Microscopic examination of the liver and other tissues did not reveal any abnormalities that could be attributed to the test material. At dietary levels of 0.2% or less, the rats and dogs did not have any abnormalities that could be related to the resin (rosin) acids. Tumor incidence was equal to, or less than, that in control animals.

**OTHER:**

The following resin acid components of rosin were all negative in the Ames IN VITRO bioassay: Abietic, dehydroabietic, levopimaric, pimaric, isopimaric, and sandaracopimaric. Abietic acid was also negative in the DNA assay with E. COLI.



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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**A. MOLTEN product - HANDLING AND STORAGE PRECAUTIONS:**

If allowed to solidify to solid or flake form, this product can exhibit the characteristics of solid or flake rosin, and may form flammable dust-air mixtures. See HANDLING AND STORAGE PRECAUTIONS for solid product below. Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

-----

**B. SOLID product - HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:  
**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater), the following warning applies:  
**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. **ATTENTION! A GROUNDING CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!**

Flaked forms are prone to gradual oxidation. Control inventory. Use oldest material first.

-----

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.  
Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.  
Keep area clean. Product will burn.

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

-----  
HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

POLY-PALE\*  
Partially polymerized rosin  
MOLTEN or SOLID

MSDS No.: 853 2171 0100-05

Supersedes MSDS #: 853 2171 0100-04

Date: 04/23/93

-----  
I. PRODUCT IDENTIFICATION  
-----

A. POLY-PALE\* Partially polymerized rosin, MOLTEN

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Straw-colored viscous liquid at 100-175 C (212-347 F);  
rosin odor  
-----

B. POLY-PALE\* Partially polymerized rosin, SOLID

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE  
VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL  
HAZARDS).

APPEARANCE AND ODOR: Amber solid or flake; low odor  
-----

CASRN: 65997-05-9

HMIS RATINGS:(1)

Health hazard: 0 Minimal  
Flammability hazard: 1 Slight  
Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Partially polymerized (dimerized) rosin

\* Registered Trademark of Hercules Incorporated

-----  
(1)Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

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As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a health hazard.

If this product is used in a manner that could generate particulates (dust), Hercules recommends that the dust be treated as a NUISANCE PARTICULATE (Particulates Not Otherwise Classified) as defined by the American Conference of Governmental Industrial Hygienists (ACGIH) or (Particulates not otherwise Regulated) as defined by OSHA.

**RECOMMENDED AIRBORNE LEVELS  
1992-1993**

	OSHA TWA	TLV-TWA
Particulates not Otherwise classified/regulated	15 mg/m3 total 5 mg/m3 respirable fraction	10 mg/m3

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m3 (as formaldehyde), for rosin core solder pyrolysis products should be observed.

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: N/A

SOLUBILITY IN WATER: Negligible

VAPOR PRESSURE AT 20 C: Not determined

SPECIFIC GRAVITY: 1.07

VAPOR DENSITY: N/A

pH: N/A

VOLATILE (WT.),%: Not determined

EVAPORATION RATE: Slower than  
butyl acetate

SOFTENING POINT: 98-105 C (208-221 F)



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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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**A. MOLTEN product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

---

**B. SOLID product**

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

---

FLASH POINT: 218 C (424 F) Cleveland Open Cup

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

**SPECIAL FIREFIGHTING PROCEDURES:**

Use self-contained breathing apparatus.

Apply water to MOLTEN RESIN fires from a safe, protected location to avoid body contact with hot resin.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**A. MOLTEN product**

**DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Burns can cause irreversible eye injury and blindness. Smoke or fumes from rosin products may cause eye irritation with redness, tearing and discomfort.
- SKIN:** Serious burns will result from contact with molten product. Repeated or prolonged contact may cause an allergic skin reaction (sensitization) in susceptible individuals. See MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.
- INHALATION:** Breathing smoke or fumes from molten rosin products may produce breathing discomfort, coughing and sore throat.
- INGESTION:** None known

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** Cool burns with plenty of low-pressure water. Get medical attention immediately.

**SKIN:** Immediately cool burn area with cold water and cold packs for at least 15 minutes. Do NOT put ice directly on the skin. Do NOT attempt to remove solidified resin from the skin as severe tissue damage may result. Get medical attention.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen and soften the material.

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**B. SOLID product****SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Dust may cause irritation by mechanical abrasion.
- SKIN:** Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).
- INHALATION:** None known. None expected.
- INGESTION:** None known.

Continued...

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**V. HEALTH HAZARD DATA**

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**B. SOLID product...Continued****EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules' medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

**REPORTED ANIMAL EFFECTS:**

Two-year chronic feeding studies were conducted with rats and dogs fed diets containing 1% and 0.05% of each of the partially and fully polymerized rosins. At the 1% dietary levels, food consumption of the rats was approximately 10% less than the control animals, and the growth of the rats was slightly depressed. Liver enlargement was noted in both species at the 1% dietary levels with both rosins but not at the 0.05% level. Microscopic examination of the tissues, including the livers, revealed no tissue changes that could be attributed to ingestion of the test diets. Tumor incidence was not statistically different from that of the control animals.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of waste material in a permitted facility in accordance to local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.

Avoid breathing dust or vapor.

Wash thoroughly after handling, and before eating, drinking or smoking.

**A. MOLTEN product - PERSONAL PROTECTIVE EQUIPMENT:**

Face shield, safety glasses and hard hat

Long-sleeve protective shirt, long pants and work shoes

Long-cuff lined gloves

Lined rain suit with protective hood or shoulder shroud or full aluminized or thermal suit with hood

Protective clothing should be made of six-ounce (6 oz) or greater fabric; polyester should be avoided.

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

---

**B. SOLID product - PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves

Safety glasses

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

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Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**A. MOLTEN product - HANDLING AND STORAGE PRECAUTIONS:**

If allowed to solidify to solid or flake form, this product can exhibit the characteristics of solid or flake resin, and may form flammable dust-air mixtures. See HANDLING AND STORAGE PRECAUTIONS for solid product below. Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

---

**B. SOLID product - HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. **ATTENTION! A GROUNDING CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!**

Flaked forms are prone to gradual oxidation. Control inventory. Use oldest material first.

---

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate sources of ignition.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

---

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	POLY-PALE* Partially polymerized rosin	65997-05-9	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
-----

...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

-----  
HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

HERCOLYN\* D Methyl ester of rosin,  
partially hydrogenated

MSDS No.: 844 3520 0200-03

Supersedes MSDS # 844 3520 0200-02

Date: 12/11/92

-----  
I. PRODUCT IDENTIFICATION  
-----

HERCOLYN\* D Methyl ester of rosin,  
partially hydrogenated

HMIS RATINGS:(1)

Health hazard: 0 Minimal  
Flammability hazard: 1 Slight  
Reactivity hazard: 0 Minimal

CASRN: 8050-15-5

CHEMICAL & COMMON NAME: Food grade methyl ester of rosin, partially  
hydrogenated; hydrogenated methyl ester of rosin

APPEARANCE AND ODOR: Light amber viscous liquid; resinous odor

\* Registered Trademark of Hercules Incorporated

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II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS  
-----

As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a health hazard.

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m3 (as formaldehyde), for rosin core solder pyrolysis products should be observed.

-----  
(1)Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable



---

**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

---

BOILING POINT: 360-364 C (680-687 F) SOLUBILITY IN WATER: Negligible  
VAPOR PRESSURE AT 20 C: < 0.1 mm Hg SPECIFIC GRAVITY: 1.02  
VAPOR DENSITY: Heavier than air pH: N/A  
VOLATILE (WT.),%: Negligible at 20 C EVAPORATION RATE: Slower than butyl acetate  
FREEZING POINT: Not determined

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

FLASH POINT: 198 C (388 F)  
FLAMMABLE LIMITS: Not determined  
AUTOIGNITION TEMPERATURE: Not determined  
EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon  
SPECIAL FIREFIGHTING PROCEDURES: None  
UNUSUAL FIRE AND EXPLOSION HAZARDS: None  
STABILITY CONSIDERATIONS: Stable  
INCOMPATIBILITY WITH: None  
HAZARDOUS DECOMPOSITION PRODUCTS: None  
HAZARDOUS PRODUCTS OF COMBUSTION:  
Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.  
HAZARDOUS POLYMERIZATION: Will not occur.

---

**V. HEALTH HAZARD DATA**

---

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

EYES: None known.  
SKIN: None known.  
INHALATION: None known.  
INGESTION: None known.

Continued...

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

---

**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

---

**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.  
Discard contaminated shoes and other leather articles.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Chemical goggles  
Appropriate protective clothing  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:** None

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep fumes or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.  
Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.  
Keep area clean. Product will burn.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

---

**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

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**VII. APPLICABLE CONTROL MEASURES**

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Impervious gloves  
Chemical goggles  
Appropriate protective clothing  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS: None****ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep fumes or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.  
Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.  
Keep area clean. Product will burn.

---

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

---

**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.  
Discard contaminated shoes and other leather articles.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Chemical goggles  
Appropriate protective clothing  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:** None

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep fumes or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.  
Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.  
Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	HERCOLYN* D Methyl ester of rosin, partially hydrogenated	8050-15-5	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, NPH	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

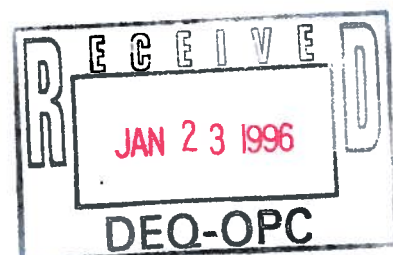
## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...



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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard  
HC-2 Delayed (chronic) health hazard  
HC-3 Fire hazard  
HC-4 Sudden release of pressure hazard  
HC-5 Reactive hazard  
NHH Not a health hazard  
NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

**MATERIAL SAFETY DATA SHEET**

**STAYBELITE® Resin**

Hydrogenated rosin

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, Delaware, 19894  
Phone Number: (302) 594-5000 (all hours)

MSDS No.: -853 2155 0100-1

Date: 06/27/86  
Page: 1 of 3

**I. PRODUCT IDENTIFICATION**

CAUTION! MAY FORM FLAMMABLE DUST - AIR MIXTURES.

**STAYBELITE® Resin**

Hydrogenated rosin

HMIS*	Rating
Health hazard:	0 Minimal
Flammability hazard:	1 Slight
Reactivity hazard:	0 Minimal

CAS #: [65997-06-0]

Appearance and odor: Light yellow solid; rosin odor

**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

None of the components of this product are listed in 29CFR1910 Subpart Z and they do not appear in the current Threshold Limit Values for Chemical Substances in the Work Environment adopted by the American Conference of Governmental Industrial Hygienists (ACGIH).

If these materials are used in a manner that could generate particulates (dust), Hercules recommends that the resin dust be treated as a nuisance particulate according to the American Conference of Governmental Industrial Hygienists (ACGIH).

**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

Boiling point:	N/A	Solubility in water:	Negligible
Vapor pressure @ 20°C:	N/A	Specific gravity:	1.05
Vapor density:	N/A	pH:	N/A
% volatile (vol.):	Negligible at 20°C	Evaporation rate:	Slower than butyl acetate
Softening point:	75°C (167°F)		

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

CAUTION! MAY FORM FLAMMABLE DUST - AIR MIXTURES.

Flash point:	203°C (397°F) COC	Flammable limits:	N/A
Autoignition temperature:	Not determined.		
Extinguishing media:	Water spray, dry chemical, foam, or carbon dioxide		

Continued...

\*HMIS (Hazardous Materials Identification System) Rating for the product as it is supplied.  
N/A - not applicable

We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combination for their own purposes. Unless otherwise agreed in writing, we sell the products without warranty, and buyers and users assume all responsibility and liability for loss or damage arising from the handling and use of our products, whether used alone or in combination with other products.



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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

Special fire-fighting procedures: None

Unusual fire &amp; explosion hazards: May form flammable dust - air mixtures.

Stability considerations: Stable

Incompatibility with: None

Hazardous decomposition products: None

Hazardous products of combustion: Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

Hazardous polymerization: Will not occur.

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**V. HEALTH HAZARD DATA**

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**Signs & symptoms of overexposure in the workplace:**

Eyes: Dust may cause irritation by mechanical abrasion.

Skin: Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (see below - "Medical conditions generally recognized as being aggravated by exposure").

Inhalation: None known. None expected.

Ingestion: None known.

**EMERGENCY & FIRST AID PROCEDURES:**

EYES: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water.

**MOLTEN RESINS:** If molten material comes in contact with the skin, cool under a running stream of water. Do NOT attempt to remove the resin from the skin. Removal could result in severe tissue damage. Get medical attention.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician.

INGESTION: If swallowed, do NOT induce vomiting. Call a physician.

NOTE TO PHYSICIAN: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

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**Medical conditions generally recognized as being aggravated by exposure:** This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause skin sensitization in susceptible individuals. Individuals sensitized to other rosin derivatives may also react when exposed to this product.**Primary Routes of Entry:** Eyes, skin,

None of the components of this product are listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).



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**VI. SPILL & LEAK PROCEDURES**

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**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:** If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**Waste Disposal Method:** Incineration of waste material in a permitted facility in accordance to local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

This product is not listed in federal hazardous waste regulations 40CFR261.33 paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40CFR261 Subpart C. State or local hazardous waste regulations may apply if different from the federal.

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**VII. APPLICABLE CONTROL MEASURES**

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- Appropriate hygienic practices:** Do not allow eye or skin contact.  
Avoid breathing dust.  
Wash thoroughly after handling, and before eating, drinking or smoking.
- Personal protective equipment:** Impervious gloves  
Safety glasses  
Appropriate respirator selected and used in accordance with OSHA Subpart I (29CFR1910.134) required when exposure to airborne contaminant is likely to exceed acceptable limits.  
Appropriate protective clothing when handling molten product.
- Work practices:** Eyewash fountains and safety showers should be easily accessible.
- Handling and storage precautions:** Keep away from sparks and open flame.
- Engineering controls:** Adequate ventilation should be provided to keep dust concentrations below acceptable exposure limits.
- Protective measures during repair & maintenance:** Eliminate sources of ignition.
-

*Safely*

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WILLMUT GAS  
AND OIL  
COMPANY

MATERIAL SAFETY DATA SHEET

Section 1. Identity of Material

Product Name or Number Natural Gas 117 117

Synonyms Synonyms are methane and marsh gas.

Formula CH4 CAS Number UN 1971/1972 Chemical Family hydrocarbon

DOT Proper Shipping Name Natural Gas

Regulated Identification NA Shipping ID Number NA EPA Hazardous Waste Id Number NA

Hazardous Ingredients Methane (95%), with lesser amounts of Ethane 9%, Propane (3%), Nitrogen (2%), and Butane (1%) CAS Number UN 1971/1972

Section 2. Hazard Specifications

Known Hazards Under 29 CFR 1910.1200 Not listed, listed are Methane, Butane and Propane TLV = No Federal Limits mg/m<sup>3</sup>

Permissive Exposure Limits in Air (PEL) Not listed, suggest using the PEL for Propane - 1,800 mg/m<sup>3</sup> mg/ft<sup>3</sup>

Combustible Liquid <u>Yes</u>	Skin Hazard <u>Yes</u>	NEPA HAZARD SIGNAL
Flammable Material <u>Yes</u>	Eye Hazard <u>Yes</u>	Health <u>Flammability</u>
Pyrophoric Material <u>No</u>	Toxic Agent <u>No</u>	Stability <u>Special</u>
Explosive Material <u>Yes</u>	Highly Toxic Agent <u>No</u>	DOT Hazard Waste Class
Unstable Material <u>No</u>	Sensitizer <u>No</u>	No DOT Listing
Water Reactive Material <u>No</u>	Carcinogen <u>NO</u>	
Oxidizer <u>No</u>	Reproductive Toxin <u>No</u>	EPA Hazard Waste Class
Organic Peroxide <u>No</u>	Blood Toxin <u>No</u>	
Corrosive Material <u>No</u>	Nervous System Toxin <u>No</u>	
Compressed Gas <u>Yes</u>	Lung Toxin <u>No</u>	No EPA Listing
Irritant <u>No</u>	Liver Toxin <u>No</u>	
	Kidney Toxin <u>No</u>	

Section 3. Safe Usage Data

Protective Equipment Eyes: Wear eye protection when exposed to blowing gas. Respiratory: Maintain oxygen level above 18% by volume or wear a self contained breathing apparatus.

Ventilation Gloves: Wear gloves when exposed to blowing gas. Maintain oxygen concentration above 18% by volume, use mechanical ventilation devices when necessary.

Precautions when Interrupt gas supply before working on gas operated equipment.

Handling and Storage Only use approved fittings and components for Natural Gas.

WILLMUT GAS  
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#### Section 4. Emergency Response Data

Fire If fire must be extinguished before supply of gas can be interrupted, utilize a fire extinguishing agent with a BC rating. If fire is extinguished before gas supply can be shut off, reignition or explosion may be possible.

Exposure Simple asphyxiant. Maintain oxygen concentration above 18% by volume.

Spills Evacuate, eliminate ignition sources, shut off supply, ventilate, repair cause of release or spillage.

Waste Disposal Method Flaring.

#### Section 5. Physical Hazard Data

Flammability LFL 5% Flashpoint 1100 - 1200 degrees F  
UFL 15%

Incompatibility Open flame.

Stability Stable Conditions to Avoid: Ignition Sources

#### Section 6 Health Hazard Data

Effects of Exposure Simple asphyxiant.

Emergency Treatment If exposed move victim to gas free atmosphere and apply artificial respiration/mouth to mouth techniques.

#### Section 7. Physical and Chemical Properties

Boiling Pt: -259.9 F Vapor Density (Air = 1): 0.5539 Volatile Components

Vapor Press at -161.5 degrees CE 700

Solubility in H<sub>2</sub>O: Slightly soluble 24mg/L Specific Gravity (H<sub>2</sub>O = 1): 0.5549

Appearance: Clear gas

Odor: Odorless, odorized with Mercaptans

#### Section 8. Manufacturer or Supplier Data

Firm's Name & Mailing Address Name: THE COMPANY  
Engineering Department  
Address  
City, State, Zip Code



**ADDITIONAL DATA**

**TRADE NAME AND SYNONYMS: (Continued)**

Liquid Nitrogen; LIN; Nitrogen, refrigerated liquid (cryogenic liquid)

**HEALTH HAZARD DATA: (Continued)**

Note: Except where specified, the health hazard data and most of the other data in this material safety data sheet are for gaseous nitrogen. One volume of liquid nitrogen, at its boiling point and atmospheric pressure will vaporize into approximately 695 volumes of gaseous nitrogen at 70°F (21.1°C) and 1 atmosphere.

**SYMPTOMS OF EXPOSURE: (Continued)**

- o Weakened speech leading to the inability to utter sounds;
- o Rapid reduction in the ability to perform movements;
- o Reduced consciousness of the surroundings;
- o Loss of tactile sensations;
- o Heightened mental activity.

It should be recognized that it is possible that none of the above symptoms may occur in nitrogen asphyxia so that there are no definite warning symptoms.

Contact with the cryogenic liquid or cold piping containing the liquid can cause tissue freezing or frostbite on dermal contact or if splashed into the eyes.

\* For additional information, refer to L'Air Liquide's Encyclopedie des Gaz.

**NOTE re SPILL OR LEAK PROCEDURES:**

Liquid nitrogen is delivered to a customer into stationary vacuum-jacketed vessels at the customer's location or in portable vacuum-jacketed "liquid" cylinders.

Stationary customer-site vessels should be operated in accordance with the manufacturer's and Liquid Air Corporation's instructions. Do not attempt to repair, adjust, or in any other way modify the operation of these vessels. If there is a malfunction or other type of operational problem with the vessel, contact the closest Liquid Air Corporation location immediately.

Liquid nitrogen cylinders should be used only in well-ventilated areas and in accordance with the manufacturer's and Liquid Air Corporation's instructions. These cylinders must always be kept in an upright position. Specialized hand trucks are needed for their movement. A "first in-first out" inventory system should be used with these cylinders.

**LOCAL EXHAUST: (Continued)**

To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.

## HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

None

## PHYSICAL DATA

BOILING POINT -320.445°F (-195.803°C)	LIQUID DENSITY AT BOILING POINT 50.48 lb/ft <sup>3</sup> (808.607 kg/m <sup>3</sup> )
VAPOR PRESSURE @ 70°F (21.1°C) above the critical temp. of -232.51°F (-146.95°C)	GAS DENSITY AT 70°F 1 atm .07245 lb/ft <sup>3</sup> (1.1605 kg/m <sup>3</sup> )
SOLUBILITY IN WATER @ 68°F (20°C) Bunsen coefficient = .01557	FREEZING POINT -346.004°F (-210.002°C)
APPEARANCE AND ODOR Clear, colorless, odorless liquid	

## FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME N/A
EXTINGUISHING MEDIA Nonflammable, inert	ELECTRICAL CLASSIFICATION Nonhazardous	
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

## REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID
Stable	X	
INCOMPATIBILITY (Materials to avoid) None		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	

## SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED See note on last page.
WASTE DISPOSAL METHOD See note on last page.

## EMERGENCY RESPONSE INFORMATION

IN CASE OF EMERGENCY INVOLVING THIS MATERIAL. CALL DAY OR NIGHT (800) 231-1366



## MATERIAL SAFETY DATA SHEET

MSDS NUMBER : M32415

MSDS DATE : 12-30-93

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)  
(For specific products - see Section XI)

1/27/94

24 HOUR EMERGENCY PHONE: 1-800-733-3665 OR 716-278-7021

### I. PRODUCT IDENTIFICATION

#### HMIS HAZARD RATINGS

HEALTH HAZARD 3      FIRE HAZARD 0      REACTIVITY 2  
Based on the National Paint & Coatings Association HMIS rating system.

#### SARA/TITLE III HAZARD CATEGORIES (See Section X)

Immediate (ACUTE) Health: YES      Reactive Hazard: YES  
Delayed (Chronic) Health: NO      Sudden Release of Pressure: NO  
Fire Hazard: NO

MANUFACTURER'S: Occidental Chemical Corporation  
NAME AND ADDRESS : Customer Service, Occidental Tower,  
P O Box 809050, Dallas, Texas 75380      Telephone (1-800-752-5151)

CHEMICAL NAME: Sodium Hydroxide      CAS NUMBER: 1310-73-2

SYNONYMS/Common Names: Sodium Hydroxide; NaOH

CHEMICAL FORMULA: NaOH

PRODUCT USE: Metal Finishing; Industrial Cleaners; Chemical Processing; Petroleum Industry

DOT PROPER SHIPPING NAME: Sodium Hydroxide, Solution

DOT HAZARD CLASS: 8

DOT IDENTIFICATION NUMBER: UN1824

DOT PACKING GROUP: II

DOT HAZAROUS SUBSTANCE: RQ 1000 lbs. (Sodium Hydroxide)

DOT MARINE POLLUTANT: NA

ADDITIONAL DESCRIPTION REQUIREMENT: NA



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## II. HEALTH HAZARD INFORMATION (Continued)

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### EFFECTS OF OVEREXPOSURE

#### ACUTE:

Corrosive to all body tissues by all routes of exposure. The effect of local dermal exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness.

#### CHRONIC:

No known chronic effects.

#### TOXICOLOGY DATA:

Caustic soda is a corrosive material.

#### Sodium Hydroxide:

Acute dermal LD50 (rabbit) 1350 mg/kg

#### Human Dermal Exposure

Regardless of concentrations, the severity of damage and extent of its irreversibility increases with length of contact time. Prolonged contact with sodium hydroxide solutions of  $\geq 1\%$  can cause a high degree of tissue destruction. The latent period, following skin contact during which no sensation of irritation occurs, varies from several hours for 0.4 - 4% solution to 3 minutes with concentrations of 25% or greater.

#### SYNERGISTIC MATERIALS:

None known.



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## VIII. HANDLING AND STORAGE

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### HANDLING AND STORAGE PRECAUTIONS:

Do not get into eyes, on skin, on clothing.  
Avoid breathing dust, mists, or spray.  
Do not take internally.  
Use with adequate ventilation and wear respiratory protection when exposure to dust, mist or spray is possible.  
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.  
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.  
Keep container closed.  
Product can react violently with water, acids, and other substances - read Special Mixing and Handling Instructions below carefully before using.  
Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.  
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1).

### SPECIAL MIXING AND HANDLING INSTRUCTIONS

Product can react violently with water. Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

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## XI. PREPARATION INFORMATION

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For additional Non-Emergency health, safety, or environmental information telephone (716) 286-3081, or write to:  
Occidental Chemical Corporation  
Product Stewardship Department  
360 Rainbow Boulevard South  
Niagara Falls, NY 14302

For Emergencies: 24 HOUR EMERGENCY PHONE: 1-800-733-3665

To request an MSDS: 716-286-3400

This Material Safety Data Sheet (MSDS) covers the following materials

- |                 |                 |
|-----------------|-----------------|
| - DIAPHRAGM 50% | - RAYON 25%     |
| - RAYON 18%     | - SOLUTION 50%  |
| - DIAPHRAGM 73% | - MEMBRANE 50%  |
| - PURIFIED 50%  | - RAYON 50%     |
| - RAYON 10%     | - RAYON 30%     |
| - DIAPHRAGM 30% | - DIAPHRAGM 25% |
| - RAYON 20%     | - DIAPHRAGM 20% |
| - DIAPHRAGM 18% | - DIAPHRAGM 35% |
| - DIAPHRAGM 45% | - DIAPHRAGM 10% |
| - DIAPHRAGM 28% | - MEMBRANE 30%  |
| - LIQUID        | - MEMBRANE 10%  |
| - DIAPHRAGM 24% |                 |

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## WARNING LABEL INFORMATION (Continued)

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### HANDLING AND STORAGE:

Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL prescribed protective clothing. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

### DISPOSAL:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of disposal.

### INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This product contains:

CAS#	NAME
7732185	Water
1310732	Sodium hydroxide (Na(OH))
7647145	Sodium chloride (NaCl)
7775099	Chloric acid, sodium salt

HMS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

FOR INDUSTRIAL USE ONLY

LABEL 113M32415



# MATERIAL SAFETY DATA SHEET

EXXON CHEMICAL AMERICAS

A Division of EXXON CHEMICAL COMPANY, A Division of EXXON CORPORATION

TOLUENE

PAGE: 1  
DATE PREPARED: MAR 1, 1995  
MSDS NO.: 92931650

## SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** TOLUENE

**CHEMICAL NAME:**

Toluene

CAS 108-88-3

**CHEMICAL FAMILY:**

Aromatic Hydrocarbon

**PRODUCT DESCRIPTION:**

Aromatic odor.

Clear, colorless liquid.

### CONTACT ADDRESS:

EXXON CHEMICAL AMERICAS  
P.O. BOX 3272, HOUSTON, TEXAS 77253-3272

\*\* EMERGENCY TELEPHONE NUMBERS: (24 Hours) \*\*  
\*\* CHEMTREC (800) 424-9300 \*\*  
\*\* EXXON CHEMICAL AMERICAS (800) 726-2015 \*\*

NON EMERGENCY TELEPHONE NUMBERS : (8am-5pm M-F)  
FOR HEALTH AND SAFETY INFORMATION CALL : (713) 870-6884  
FOR GENERAL PRODUCT INFORMATION CALL : (713) 870-6000

## SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse. This product is hazardous as defined in 29 CFR1910.1200, based on the following compositional information:

OSHA HAZARD	COMPONENT
Flammable	Toluene
OSHA PEL; ACGIH TLV	Toluene
Eye Irritant	Toluene

## SECTION 3 HAZARDS IDENTIFICATION

### POTENTIAL HEALTH EFFECTS

#### EYE CONTACT:

Irritating, but does not injure eye tissue.

#### SKIN CONTACT:

Frequent or prolonged contact may irritate and cause dermatitis. Occasional brief contact with the liquid will not result in significant irritation unless evaporation is impeded. Skin contact may aggravate an existing dermatitis condition.

#### INHALATION:

High vapor/aerosol concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, central nervous system effects, brain damage and possibly death.

#### INGESTION:

Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death.

#### CHRONIC EFFECTS

WARNING: Concentrated, prolonged or deliberate inhalation of this product may





# MATERIAL SAFETY DATA SHEET

EXXON CHEMICAL AMERICAS

A Division of EXXON CHEMICAL COMPANY, A Division of EXXON CORPORATION

TOLUENE

PAGE: 3  
DATE PREPARED: MAR 1, 1995  
MSDS NO.: 92931650

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### LAND SPILL

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 15 REGULATORY INFORMATION) notify the National Response Center. Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust.

Recover by pumping (use an explosion proof or hand pump) or with a suitable absorbent.

Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

### WATER SPILL

Eliminate sources of ignition. Warn occupants and shipping in surrounding and downwind areas of fire and explosion hazard and request all to stay clear.

Remove from surface with suitable adsorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in non-confined waters.

Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

## SECTION 7 STORAGE AND HANDLING

### ELECTROSTATIC ACCUMULATION HAZARD:

Yes, use proper grounding procedure

### STORAGE TEMPERATURE, °F:

Ambient

### STORAGE/TRANSPORT PRESSURE, mmHg:

Atmospheric

### LOADING/UNLOADING TEMPERATURE, °F:

Ambient

### LOADING/UNLOADING VISCOSITY, cSt:

0.7

### STORAGE AND HANDLING:

Keep container closed. Handle and open containers with care.

Store in a cool, well ventilated place away from incompatible materials.

Do NOT handle or store near an open flame, heat or other sources of ignition. Protect material from direct sunlight.

Material will accumulate static charges which may cause an electrical spark (ignition source). Use proper grounding procedures.

Do NOT pressurize, cut, heat, or weld containers. Empty product containers may contain product residue. Do NOT reuse empty containers without commercial cleaning or reconditioning.

## SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

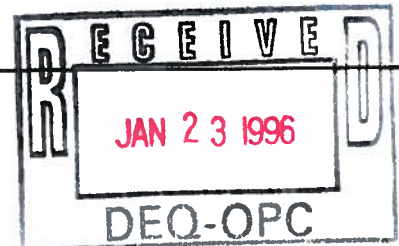
### EXPOSURE CONTROLS

The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces.

See respiratory protection recommendations.

Use explosion-proof ventilation equipment.

Continues on page 4







# MATERIAL SAFETY DATA SHEET

EXXON CHEMICAL AMERICAS

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TOLUENE

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DATE PREPARED: MAR 1, 1995  
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## SECTION 12 ECOLOGICAL INFORMATION

No specific ecological data are available for this product. Please refer to Section 6 for information regarding accidental releases and Section 15 for regulatory reporting information.

## SECTION 13 DISPOSAL CONSIDERATIONS

Please refer to Sections 5, 6, and 15 for disposal and regulatory information.

## SECTION 14 TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):  
DOT SHIPPING DESCRIPTION: TOLUENE, 3, UN 1294, II

## SECTION 15 REGULATORY INFORMATION

### TSCA:

This product is listed on the TSCA Inventory as a UVCB (Unknown, Variable Composition or Biological) Chemical at CAS Registry Number 108-88-3

### CERCLA:

If the reportable quantity of this product is accidentally spilled, the incident is subject to the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and must be reported to the National Response Center by calling 800-424-8802.

The reportable spill quantity of this product is 1,000 pounds.

This product contains:

Toluene.

### SARA TITLE III:

Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories: Immediate health, Delayed Health, Fire.

This information may be subject to the provisions of the Community Right-to-Know Reporting Requirements (40 CFR 370) if threshold quantity criteria are met.

This product contains the following Section 313 Reportable Ingredients:

COMPONENT	CAS NO.	MAXIMUM %
Toluene	108-88-3	100.0

## SECTION 16 OTHER INFORMATION

### HAZARD RATING SYSTEMS:

This information is for people trained in:  
National Paint & Coatings Association's (NPCA)  
Hazardous Materials Identification System (HMIS)  
National Fire Protection Association (NFPA 704)  
Identification of the Fire Hazards of Materials

	NPCA-HMIS	NFPA 704	KEY
HEALTH	2	2	4 = Severe
FLAMMABILITY	3	3	3 = Serious
REACTIVITY	0	0	2 = Moderate
			1 = Slight
			0 = Minimal



## MATERIAL SAFETY DATA SHEET

### SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME AND SYNONYMS: LYTOR® 80, LYTOR® 100, LYTOR® 101, LYTOR® 302 Tall Oil Rosin Acids, Tall Oil Rosin.

CAS NO. AND NAME: Mixture. See Section X.

CHEMICAL FAMILY: Organic Acids.

CHEMICAL FORMULA: C<sub>20</sub> cyclic organic acids.

MANUFACTURER'S NAME AND ADDRESS: Georgia-Pacific Resins, Inc.  
P. O. Box 520  
Crossett, AR 71635  
(501) 567-7200

EMERGENCY TELEPHONE NO.: (800) 424-9300 CHEMTREC

### SECTION II - HAZARDOUS COMPONENTS

<u>COMPONENT (CAS Registry No.)</u>	<u>WT. %</u>	<u>ACGIH TLV®</u>	<u>OSHA PEL</u>
None established	----	----	----

### SECTION III - PHYSICAL PROPERTIES

APPEARANCE AND ODOR: Amber solid with a bland odor.

MOLECULAR WEIGHT: Approximately 302.

BOILING POINT (DEGREES FAHRENHEIT): >500.

MELTING POINT (DEGREES FAHRENHEIT): 130-165.

VAPOR PRESSURE (mm OF MERCURY): Not available.

SPECIFIC GRAVITY (WATER = 1): 1.03.

SECTION VI - HEALTH HAZARD INFORMATION

EXPOSURE FROM ROUTINE USE: This product is not hazardous under normal conditions of use. Hot material can cause thermal burns on contact with skin or eyes.

EFFECTS OF OVEREXPOSURE: Prolonged exposure to liquid, vapor or mist may cause irritation in eyes, nose, mouth and/or throat.

PROBABLE ROUTES OF EXPOSURE: Skin, eyes.

EMERGENCY AND FIRST AID PROCEDURES:

EYE CONTACT: Rinse immediately with water. Remove contact lenses; then flush eyes with water for at least 15 minutes, including under eyelids. Consult a physician, if necessary.

SKIN CONTACT: Wash skin with soap and water. Seek medical attention if irritation persists. Launder contaminated clothing before reuse.

INHALATION: Remove to fresh air. Rest in half upright position. Seek medical attention, if necessary.

INGESTION: Rinse mouth. Immediately dilute by drinking large quantities of water. After dilution, induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious person.

SECTION VII - TOXICITY DATA

ORAL: Not found.

DERMAL: Not found.

INHALATION: Not found.

CARCINOGENICITY: Not listed as a carcinogen by IARC, NTP, ACGIH or OSHA.

OTHER PERTINENT DATA: Not found.

WASTE DISPOSAL METHODS: Dispose of contaminated material in accordance with all federal, state and local regulations.

CLEAN WATER ACT REQUIREMENTS: Not applicable.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REQUIREMENTS: Not applicable.

### SECTION X - REGULATORY INFORMATION

FDA: Tall oil rosins as defined in Section 178.3870 (Rosin and Rosin Derivatives) is cleared by FDA for the following uses (all references are to 21 CFR):

- 175.105 (Adhesives).
- 175.300 (Resinous and Polymeric Coatings).
- 175.380 (Xylene-Formaldehyde Resins Condensed with 4,4' Isopropylidenephenol Epichlorohydrin Epoxy Resins).
- 175.390 (Zinc-Silicon Dioxide Matrix Coatings).
- 176.170 (Components of Paper and Paperboard in Contact with Aqueous and Fatty Foods).
- 176.180 (Components of Paper and Paperboard in Contact with Dry Food).
- 176.200 (Defoaming Agents Used in Coatings).
- 176.210 (Defoaming Agents Used in the Manufacture of Paper and Paperboard).
- 177.1200 (Cellophane).
- 177.1400 (Water-Insoluble Hydroxyethyl Cellulose Film).
- 178.3120 (Animal Glue).
- 179.45 (Packaging Materials for Use During Radiation of Prepackaged Foods).

SECTION XI - SPECIAL PRECAUTIONS AND COMMENTSPRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Avoid skin and eye contact with molten material.  
Store under inert gas blanket at temperatures above 300°F.  
Do not swallow.

OTHER PRECAUTIONS: Not applicable.

REGISTRATIONS/CERTIFICATIONS: Not applicable.

EFFECTIVE DATE: May 20, 1992

SUPERSEDES: April 2, 1992

This symbol "Ⓢ" indicates revision from previous issue.

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MATERIAL SAFETY DATA SHEET

EM SCIENCE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER.....:

EM SCIENCE  
A DIVISION OF EM INDUSTRIES  
P.O. BOX 70  
480 DEMOCRAT RD.  
GIBBSTOWN, N.J. 08027

PREPARATION DATE.: 03/03/94

DATE MSDS PRINTED.: MAR 18, 1994

INFORMATION PHONE NUMBER.: 609-354-9200  
HOURS: MON. TO FRI. 8:30-5  
CHEMTREC EMERGENCY NUMBER: 800-424-9300  
HOURS: 24 HRS A DAY :

CATALOG NUMBER(S):

714	732	748	SX1242	SX1242U	SX1244
SX1244I	SX1244PC	SX1244PS	SX1244T	SX1244TP	SX1244Y

CHEMICAL NAME.....:

SULFURIC ACID

TRADE NAME.....:

OIL OF VITRIOL

CHEMICAL FAMILY.: MINERAL ACID

FORMULA.....:

H2SO4

MOLECULAR WEIGHT.: 98.08

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS #	APPR %
SULFURIC ACID	7664-93-9	100%

APPROXIMATE PER CENT INDICATES THAT THIS PRODUCT IS A CONCENTRATED ACID. SULFURIC ACID IS APPROXIMATELY 95-98%.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

- CAUSES SEVERE BURNS.
- MAY BE FATAL IF INHALED OR SWALLOWED.
- MAY CAUSE DAMAGE TO RESPIRATORY PASSAGES AND LUNGS.
- REACTS VIOLENTLY WITH WATER.
- STRONG OXIDIZER.

APPEARANCE.....:

MSDS (CONTINUED) - SX1242

PAGE # 1

CLEAR, COLORLESS VISCOUS LIQUID;  
SHARP ODOR

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

SYMPTOMS OF EXPOSURE:

CAUSES SEVERE BURNS ON CONTACT WITH ANY BODY TISSUE.  
POSSIBLY FATAL BY INHALATION OR INGESTION.  
INHALATION OF MIST MAY DAMAGE RESPIRATORY TRACT AND LUNGS.

MEDICAL COND. AGGRAVATED BY EXPOSURE:  
RESPIRATORY CONDITIONS

ROUTES OF ENTRY.....:  
INHALATION, INGESTION OR SKIN CONTACT.

CARCINOGENICITY.....:  
THE MATERIAL IS NOT LISTED (IARC, NTP, OSHA) AS CANCER CAUSING  
AGENT.

4. FIRST AID MEASURES

EMERGENCY FIRST AID:

GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.  
INGESTION: DO NOT INDUCE VOMITING; DILUTE BY GIVING MILK OR WATER  
IF CONSCIOUS; GET MEDICAL ATTENTION IMMEDIATELY  
SKIN: FLUSH THOROUGHLY WITH WATER; REMOVE ALL CONTAMINATED CLOTHING  
AND SHOES; GET IMMEDIATE MEDICAL ATTENTION  
EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES, LIFTING UPPER & LOWER  
LIDS OCCASIONALLY; CONTINUE FLUSHING WHILE WAITING FOR MEDICAL HELP  
INHALATION: REMOVE TO FRESH AIR; GET IMMEDIATE MEDICAL ASSISTANCE

5. FIRE FIGHTING MEASURES

FLASH POINT (F).....: NONCOMBUSTIBLE  
FLAMMABLE LIMITS LEL (%): N/A  
FLAMMABLE LIMITS UEL (%): N/A  
EXTINGUISHING MEDIA.....:  
DRY CHEMICAL OR SAND; DO NOT USE WATER OR FOAM

FIRE FIGHTING PROCEDURES.:

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

FIRE & EXPLOSION HAZARDS.:

REACTS WITH MOST METALS TO FORM EXPLOSIVE HYDROGEN GAS WHICH CAN FORM  
EXPLOSIVE MIXTURES WITH AIR. MAY IGNITE COMBUSTIBLE MATERIAL ON  
CONTACT.

6. ACCIDENTAL RELEASE MEASURES



**SPILL RESPONSE:**

EVACUATE THE AREA OF ALL UNNECESSARY PERSONNEL.

WEAR SUITABLE PROTECTIVE EQUIPMENT LISTED UNDER EXPOSURE / PERSONAL PROTECTION.

ELIMINATE ANY IGNITION SOURCES UNTIL THE AREA IS DETERMINED TO BE FREE FROM EXPLOSION OR FIRE HAZARDS.

CONTAIN THE RELEASE AND ELIMINATE ITS SOURCE, IF THIS CAN BE DONE WITHOUT RISK.

TAKE UP AND CONTAINERIZE FOR PROPER DISPOSAL AS DESCRIBED UNDER DISPOSAL.

COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS ON REPORTING RELEASES. REFER TO REGULATORY INFORMATION FOR REPORTABLE QUANTITY AND OTHER REGULATORY DATA.

EM SCIENCE RECOMMENDS SPILL-X NEUTRALIZERS AND ABSORBENT AGENTS FOR VARIOUS TYPES OF SPILLS.

ADDITIONAL INFORMATION ON THE SPILL-X PRODUCTS CAN BE PROVIDED THROUGH THE EM SCIENCE TECHNICAL SERVICE DEPARTMENT (609) 354-9200.

THE FOLLOWING EM SCIENCE SPILL-X NEUTRALIZER AND ABSORBENT IS RECOMMENDED FOR THIS PRODUCT:

SX0861

ACID SPILL TREATMENT KIT

**7. HANDLING AND STORAGE**

**HANDLING & STORAGE:**

KEEP CONTAINER CLOSED AND PROTECTED AGAINST PHYSICAL DAMAGE.

KEEP UPRIGHT; SEPARATE FROM ALL INCOMPATIBLE MATERIALS, COMBUSTIBLE MATERIALS AND OXIDIZING AGENTS.

WHEN DILUTING: ADD ACID TO WATER; NEVER ADD WATER TO ACID.

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

RETAINED RESIDUE MAY MAKE EMPTY CONTAINERS HAZARDOUS; USE CAUTION!

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:**

**VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION**

RESPIRATORY PROTECTION: IF WORKPLACE EXPOSURE LIMIT(S) OF PRODUCT OR ANY COMPONENT IS EXCEEDED (SEE TLV/PEL), A NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING AND/OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

MATERIAL MUST BE HANDLED OR TRANSFERRED IN AN APPROVED FUME HOOD

MSDS (CONTINUED) - SX1242

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OR WITH EQUIVALENT VENTILATION.  
 PROTECTIVE GLOVES (NATURAL RUBBER, NEOPRENE OR EQUIVALENT) MUST BE WORN TO PREVENT SKIN CONTACT.  
 PROTECTIVE CLOTHING (NATURAL RUBBER, NEOPRENE OR EQUIVALENT) SHOULD BE WORN WHEN HANDLING THIS MATERIAL.  
 SAFETY GLASSES WITH SIDE SHIELDS MUST BE WORN AT ALL TIMES.

WORK / HYGENIC PRACTICES:  
 WASH THOROUGHLY AFTER HANDLING.  
 DO NOT TAKE INTERNALLY.  
 EYE WASH AND SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.

EXPOSURE GUIDELINES

OSHA - PEL:

COMPONENT	TWA		STEL		CL		SKIN
	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	
SULFURIC ACID		1					

ACGIH - TLV:

COMPONENT	TWA		STEL		CL		SKIN
	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	
SULFURIC ACID		1		3			

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (C 760 MMHG): 290+C  
 MELTING POINT (C): @ -10C  
 SPECIFIC GRAVITY (H2O = 1): 1.844 60/60F  
 VAPOR PRESSURE (MM HG): 1 146C  
 PERCENT VOLATILE BY VOL (%): N/A  
 VAPOR DENSITY (AIR = 1): N/A  
 EVAPORATION RATE (BUAC = 1): <1  
 SOLUBILITY IN WATER (%): MISCIBLE  
 APPEARANCE: CLEAR, COLORLESS VISCOUS LIQUID;  
 SHARP ODOR

10. STABILITY AND REACTIVITY

STABILITY: YES

HAZARDOUS POLYMERIZATION:  
 DOES NOT OCCUR

HAZARDOUS DECOMPOSITION.:  
SOX, HYDROGEN (IN PRESENCE OF METALS)

CONDITIONS TO AVOID.....:

ADDING WATER TO ACID CAN CAUSE VIOLENT, EXOTHERMIC REACTION,  
POSSIBLY CAUSING FIRE. CAN REACT VIOLENTLY WITH ALKALIES.

MATERIALS TO AVOID.....:

(X) WATER  
( ) ACIDS  
(X) BASES  
( ) CORROSIVES  
(X) OXIDIZERS  
(X) OTHER :  
REDUCING AGENTS, METAL POWDERS, CARBIDES, ACETIC ACID,  
COMBUSTIBLE MATERIAL

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:

ORL-RAT LD50: 2140 MG/KG            IHL-GPG LC50: 18 MG/CU.M.

TOXICOLOGICAL FINDINGS:

NONE  
CITED IN REGISTRY OF TOXIC EFFECTS OF SUBSTANCES (RTECS)

DISPOSAL CONSIDERATIONS

EPA WASTE NUMBERS: D002

TREATMENT:

SPECIFIED TECHNOLOGY - NEUTRALIZE TO PH 6-9. CONTACT YOUR LOCAL  
PERMITTED WASTE DISPOSAL SITE (TSD) FOR PERMISSIBLE TREATMENT  
SITES.  
ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE  
COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME...:

SULFURIC ACID

DOT ID NUMBER.....: UN1830

14. REGULATORY INFORMATION

TSCA INVENTORY.....:

THE CAS NUMBER OF THIS PRODUCT IS LISTED ON THE TSCA INVENTORY.

COMPONENT	SARA EHS (302)	SARA EHS TPQ (LBS)	CERCLA RQ (LBS)
SULFURIC ACID	Y	1000	1000

COMPONENT	OSHA FLOOR LIST	SARA 313	DEMINIMIS FOR SARA 313 (%)
SULFURIC ACID	Y	Y	1.0

15. OTHER INFORMATION

COMMENTS:

NONE

NFPA HAZARD RATINGS:

HEALTH : 3  
 FLAMMABILITY : 0  
 REACTIVITY : 2  
 SPECIAL HAZARDS : W

REVISION HISTORY:

8/01/81 08/01/84 04/17/86 12/06/86 06/19/87 10/27/87 01/26/88  
 09/26/88 03/01/91 05/31/91 11/26/91 05/11/93

- = REVISED SECTION  
 N/A = NOT AVAILABLE  
 N/E = NONE ESTABLISHED

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Safety

CSJ

## MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.\* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 25576

Page: 1

PRODUCT NAME: DOWTHERM (R) A HEAT TRANSFER FLUID

Effective Date: 07/27/89 Date Printed: 01/03/90

MSDS:000412

### 1. INGREDIENTS: (% w/w, unless otherwise noted)

Diphenyl oxide (phenyl ether)	CAS# 000101-84-8	73%
Diphenyl (biphenyl)	CAS# 000092-52-4	27%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

### 2. PHYSICAL DATA:

BOILING POINT: 495F, 257C  
VAP. PRESS: 0.025 mmHg @ 25C  
VAP. DENSITY: Greater than 1  
SOL. IN WATER: 13.8ppm @ 60F  
SP. GRAVITY: 1.050-1.075 @ 25/25C  
APPEARANCE: Straw-colored liquid.  
ODOR: Aromatic odor.

### 3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: 232F, 111C  
METHOD USED: TCC

FLAMMABLE LIMITS  
LFL: 0.8% (347F, 175C)  
UFL: 7.0% (347F, 175C)

EXTINGUISHING MEDIA: Water fog, foam, CO2, dry chemical!

FIRE & EXPLOSION HAZARDS: When burning, may produce dense, black smoke. Some foaming will occur if water is applied to hot liquid.

(Continued on Page 2)

(R) Indicates a Trademark of The Dow Chemical Company

\* An Operating Unit of The Dow Chemical Company

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.\* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 25576

Page: 2

PRODUCT NAME: DOWTHERM (R) A HEAT TRANSFER FLUID

Effective Date: 07/27/89 Date Printed: 01/03/90

MSDS:000412

3. FIRE AND EXPLOSION HAZARD DATA: (CONTINUED)

FIRE-FIGHTING EQUIPMENT: Positive-pressure, self-contained breathing apparatus may be needed in enclosed spaces.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Excellent thermal stability characteristics at typical use temperatures.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: As with all commercially available aromatic heat transfer fluids, the potential exists for trace amounts of benzene to form when used at elevated temperatures. Similarly, with this product, small amounts of phenol may form. Both components are likely to concentrate in the vent pipe header.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Dike to contain spill. Recover if possible. Small spills can be covered with absorbent material.

DISPOSAL METHOD: Incineration in approved equipment in accordance with applicable federal, state and local regulations.

(Continued on Page 3)

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# MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.\* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 25576

Page: 3

PRODUCT NAME: DOWTHERM (R) A HEAT TRANSFER FLUID

Effective Date: 07/27/89 Date Printed: 01/03/90

MSDS:000412

## 6. HEALTH HAZARD DATA:

**EYE:** May cause pain. May cause slight transient eye irritation. Vapors may irritate eyes.

**SKIN CONTACT:** Prolonged or repeated exposure may cause skin irritation, even a burn. Caution required when maintaining vent piping due to potential presence of phenol.

**SKIN ABSORPTION:** A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The dermal LD50 has not been determined.

**INGESTION:** Single dose oral toxicity is low. The oral LD50 for rats is >2000 mg/kg. Amounts ingested incidental to industrial handling are not likely to cause injury; however, ingestion of larger amounts may cause injury. Observations in animals include liver and kidney injury. Ingestion of large amounts may cause headache, vomiting and diarrhea.

**INHALATION:** Excessive exposure may cause irritation to upper respiratory tract and lungs. Signs and symptoms of excessive exposure may be nausea and/or vomiting.

**SYSTEMIC & OTHER EFFECTS:** Excessive exposures may cause liver, kidney and gastrointestinal effects, and possibly central and peripheral nervous system disorders. Available data are inadequate to evaluate carcinogenicity. Biphenyl did not cause birth defects in laboratory animals; however, at excessive doses, there were other toxic effects on the mother and fetus. Results of in vitro ("test tube") mutagenicity tests have been negative. Results of mutagenicity tests on biphenyl in animals have been negative.

(Continued on Page 4)

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# MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.\* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 25576

Page: 4

PRODUCT NAME: DOWTHERM (R) A HEAT TRANSFER FLUID

Effective Date: 07/27/89 Date Printed: 01/03/90

MSDS:000412

## 7. FIRST AID:

**EYES:** Irrigate immediately with water for at least 5 minutes.

**SKIN:** Wash off in flowing water or shower.

**INGESTION:** Induce vomiting if large amounts are ingested.  
Consult medical personnel.

**INHALATION:** Remove to fresh air if effects occur. Consult a physician.

**NOTE TO PHYSICIAN:** If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

## 8. HANDLING PRECAUTIONS:

**EXPOSURE GUIDELINE(S):** Diphenyl oxide (phenyl ether): ACGIH TLV is 1 ppm TWA, 2 ppm STEL. OSHA PEL is 1 ppm.  
1,1-biphenyl (diphenyl): ACGIH TLV and OSHA PEL are 0.2 ppm.

**VENTILATION:** Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

**RESPIRATORY PROTECTION:** Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

**SKIN PROTECTION:** For brief contact, no precautions other than clean body-covering clothing should be needed. Use impervious gloves when prolonged or frequently repeated contact could occur, such as during vent header maintenance. Remove contami-

(Continued on Page 5)

(R) Indicates a Trademark of The Dow Chemical Company

\* An Operating Unit of The Dow Chemical Company

# MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.\* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 25576

Page: 5

PRODUCT NAME: DOWTHERM (R) A HEAT TRANSFER FLUID

Effective Date: 07/27/89 Date Printed: 01/03/90

MSDS:000412

## 8. HANDLING PRECAUTIONS: (CONTINUED)

nated clothing no later than the end of the work period and clean before reuse. Contaminated leather items, such as shoes, belts and watchbands, should be removed and destroyed.

EYE PROTECTION: Use safety glasses. If vapor exposure causes eye discomfort, use a full-face respirator.

## 9. ADDITIONAL INFORMATION:

### REGULATORY REQUIREMENTS:

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and

Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard  
A delayed health hazard

### SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Practice reasonable care and caution. Avoid breathing vapors if generated. Avoid direct contamination of water because of fish toxicity.

MSDS STATUS: Revised Sections 7 and 8.

### SARA 313 INFORMATION:

This product contains the following substances subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

(Continued on Page 6)

(R) Indicates a Trademark of The Dow Chemical Company

\* An Operating Unit of The Dow Chemical Company

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.\* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 25576

Page: 6

PRODUCT NAME: DOWTHERM (R) A HEAT TRANSFER FLUID

Effective Date: 07/27/89 Date Printed: 01/03/90

MSDS:000412

9. ADDITIONAL INFORMATION: (CONTINUED)

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
BIPHENYL	000092-52-4	27 %

(R) Indicates a Trademark of The Dow Chemical Company  
The Information Herein Is Given In Good Faith, But No Warranty,  
Express Or Implied, Is Made. Consult The Dow Chemical Company  
For Further Information.

\* An Operating Unit of The Dow Chemical Company

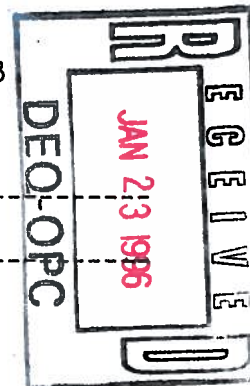
HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone Number: (302) 594-5000 (24 hrs)

MELHI\* Dark resin  
 MOLTEN or SOLID

MSDS No.: 860 2165 0100-03

Supersedes MSDS No.: 860 2165 0100-02

Date: 09/24/93



I. PRODUCT IDENTIFICATION

A. MELHI\* Dark resin, MOLTEN

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
 PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Dark brown liquid at 100-170 C (212-338 F); typical  
 rosin odor

B. MELHI\* Dark resin, SOLID

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
 FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
 MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
 (FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
 ADDITIONAL HAZARD INFORMATION).

APPEARANCE AND ODOR: Dark brown solid or flake; typical rosin odor

CASRN: Mixture

HMIS RATINGS: (1)

Health hazard:	0	Minimal
Flammability hazard:	1	Slight
Reactivity hazard:	0	Minimal

CHEMICAL & COMMON NAME: Thermoplastic dark resin obtained from modified rosin

Registered Trademark of Hercules Incorporated

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
 Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
 Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

**A. MOLTEN product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

---

**B. SOLID product**

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
ADDITIONAL HAZARD INFORMATION).

---

FLASH POINT: Above 150°C (300 F)

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, or carbon dioxide

**SPECIAL FIREFIGHTING PROCEDURES:**

Use self-contained breathing apparatus. Apply water to molten resin fires from a safe, protected location to avoid body contact with hot resin.

UNUSUAL FIRE & EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

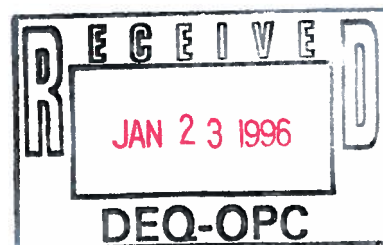
HAZARDOUS DECOMPOSITION PRODUCTS: None

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**B. SOLID product...Continued****EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water. **MOLTEN RESINS:** If molten material comes in contact with the skin, cool under a running stream of water. Do NOT attempt to remove the resin from the skin. Removal could result in severe tissue damage. Get medical attention.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**INGESTION:** If swallowed, do NOT induce vomiting. Call a physician.

**NOTE TO PHYSICIAN:** No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

---

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

None of the components of this product are listed as carcinogens by the National Toxicology Program (NTP). They have not been regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION 11.

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

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**A. MOLTEN product - HANDLING AND STORAGE PRECAUTIONS:**

If allowed to solidify to solid or flake form, this product can exhibit the characteristics of solid or flake resin, and may form flammable dust-air mixtures. See HANDLING AND STORAGE PRECAUTIONS for solid product below. Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

-----

**B. SOLID product - HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:  
**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater), the following warning applies:  
**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. **ATTENTION! A GROUNDING CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!**  
Avoid dust accumulations and suspending dust in air.

-----

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE**

Eliminate sources of ignition.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

- Keep area clean. Product will burn.

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

A

Section I

AREA'S NAME

Glidden-Durkee Division of SCM Corporation

STREET ADDRESS  
 P. O. Box 389

CITY, STATE, AND ZIP CODE  
 Jacksonville, Florida 32201

EMERGENCY TELEPHONE NO.  
 Business calls- 904-764-1719 - Emergency calls- 904-227-2631

CHEMICAL NAME AND SYNONYMS  
 Mixture of rosin acids.  
 Mostly abietic and dehydroabietic acids.

TRADE NAME

Sylvaros 20 Tall Oil Rosin.

CHEMICAL FAMILY

Sesquiterpene acids.

FORMULA

Mostly  $C_{20}H_{26}O_2$  and  $C_{20}H_{30}O_2$ .

PAINTS, PRESERVATIVES, & SOLVENTS

COMMENTS	%	TLV (Units)	SOLVENTS	%	TLV (Unit)
None			None		
CATALYST			ADDITIVES		
None			None		
			OTHERS		
None			None		

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

No hazardous mixtures.

MELTING POINT (°F.)	9 mm about	480°F.	SPECIFIC GRAVITY (H <sub>2</sub> O=1)	about	1.03
VAPOR PRESSURE (mm Hg.)		unknown	PERCENT VOLATILE BY VOLUME (%)		unknown
VAPOR DENSITY (AIR=1)		about 10.8	EVAPORATION RATE (H <sub>2</sub> O=1)		unknown
SOLUBILITY IN WATER		i			
APPEARANCE AND ODOR	Clear solid at room temperature with light rosin odor.				

FLASH POINT (METHOD USED)

about 424°F. (C.D.C.)

FLAMMABLE LIMITS

unknown

HAZARDOUS EFFECTS  
 Irritant, flammable, dry powder, CO<sub>2</sub>. Avoid liquid water if possible.

UNUSUAL FIRE FIGHTING PROCEDURES

UNUSUAL REACTIONS

HAZARD IDENTIFICATION

ROCKS OF OVER-EXPOSURE  
Resin dust from powdered, solid, rosin should be avoided. Liquid rosin presents dangers from thermal burns followed by solidifying on, and adhering to skin.

EMERGENCY AND FIRST AID PROCEDURES

Treat for burn injuries. Do not attempt to remove rosin from 2nd or 3rd degree burns. Use solvents to remove rosin from minor 1st degree burns.

ABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

COMPATIBILITY (Materials to avoid)  
Avoid STRONG BASES.

HAZARDOUS DECOMPOSITION PRODUCTS  
None

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

HAZARDOUS MATERIAL IS RELEASED OR SPILLED  
SWEEP UP SOLID ROSIN. Allow liquid rosin to solidify and then scrape up.

SITE DISPOSAL METHOD  
Burn or bury.

RESPIRATORY PROTECTION (If dust is present)  
AVOID breathing dust from pulverized solid rosin.

VENTILATION Remove vapors from hot liquid rosin.	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)		OTHER

PROTECTIVE GLOVES  
To prevent burns

EYE PROTECTION  
Yes, especially with hot liquid rosin

USE PROTECTIVE EQUIPMENT  
Do not use eye goggles covered with face shield to prevent injuries when transferring the hot liquid rosin.

HAZARDS TO BE TAKEN IN HANDLING AND STORAGE  
If stored liquid, must be kept hot and usually is under an inert gas. It usually is hot enough to cause burns and may be near ignition temperature.

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

DYMEREX\* Dimerized rosin

MSDS No.: 853 2175 0100-02

Supersedes MSDS #: 853 2175 0100-01

Date: 09/24/93

---

**I. PRODUCT IDENTIFICATION**

---

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
ADDITIONAL HAZARD INFORMATION).

DYMEREX\* Dimerized rosin

HMIS RATINGS: (1)

CASRN: 65997-05-9

Health hazard:	0	Minimal
Flammability hazard:	1	Slight
Reactivity hazard:	0	Minimal

CHEMICAL &amp; COMMON NAMES: Polymerized rosin; dimerized rosin

APPEARANCE AND ODOR: Amber solid or flake; low odor

\* Registered Trademark of Hercules Incorporated

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**(1) Explanation of acronyms:**

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

...Continued

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, or carbon dioxide

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

---

**V. HEALTH HAZARD DATA**

---

SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: Dust may cause irritation by mechanical abrasion.  
SKIN: None known. (see below - MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).  
INHALATION: None known.  
INGESTION: None known.

EMERGENCY AND FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water. **MOLTEN RESINS:** If molten material comes in contact with the skin, cool under a running stream of water. Do NOT attempt to remove the resin from the skin. Removal could result in severe tissue damage. Get medical attention.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician.

INGESTION: If swallowed, do NOT induce vomiting. Call a physician.

NOTE TO PHYSICIAN: Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen and soften the material.

Continued...

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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Continued...

**WASTE DISPOSAL METHOD:**

Incineration of waste material in a permitted facility in accordance to local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

---

**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing dust or vapor.  
Wash thoroughly after handling, and before eating, drinking or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Safety glasses  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.  
Appropriate protective clothing

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:  
**WARNING! STATIC CHARGES GENERATED, BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

Continued...

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	DYMEREX* Dimerized rosin	65997-05-9	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulations 40CFR261.33, paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40CFR261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...



HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, OE 19894  
Phone #: (302) 594-5000 (24 hrs)

CONTO\* Dark rosin resin,  
MOLTEN or SOLID  
MSDS No.: 853 2146 2000-03

Supersedes MSDS#: 853 2146 2000-02

Date: 04/16/93

-----  
I. PRODUCT IDENTIFICATION  
-----

A. CONTO\* Dark rosin resin, MOLTEN

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Dark, opaque viscous liquid at 100-170 C (212-338 F);  
tall oil rosin odor  
-----

B. CONTO\* Dark rosin resin, SOLID

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR  
NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
ADDITIONAL HAZARDS).

APPEARANCE AND ODOR: Dark brown solid; tall oil rosin odor  
-----

CASRN: 8050-09-7

HMIS RATINGS: (1)

Health hazard: 0 Minimal  
Flammability hazard: 1 Slight  
Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Dark rosin-derived resin

\* Registered Trademark of Hercules Incorporated  
-----

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

---

## II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

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As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a health hazard.

If this product is used in a manner that could generate particulates (dust), Hercules recommends that the dust be treated as a NUISANCE PARTICULATE (Particulates Not Otherwise Classified) as defined by the American Conference of Governmental Industrial Hygienists (ACGIH) or (Particulates not otherwise Regulated) as defined by OSHA.

### RECOMMENDED AIRBORNE LEVELS 1992-1993

	OSHA TWA	TLV-TWA
Particulates not Otherwise classified/regulated	15 mg/m <sup>3</sup> total 5 mg/m <sup>3</sup> respirable fraction	10 mg/m <sup>3</sup>

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup> (as formaldehyde), for rosin core solder pyrolysis products should be observed.

---

## III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS

---

BOILING POINT: N/A	SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE AT 20 C: Negligible	SPECIFIC GRAVITY: Not determined
VAPOR DENSITY: Heavier than air	pH: N/A
VOLATILE (WT.),%: Not determined	EVAPORATION RATE: Slower than butyl acetate
SOFTENING POINT (DROP): 70-80 C (158-176 F)	

---

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

**A. MOLTEN product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

---

**B. SOLID product**

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES. (FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

---

FLASH POINT: Not determined

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

**SPECIAL FIREFIGHTING PROCEDURES:**

Use self-contained breathing apparatus.

Apply water to MOLTEN RESIN fires from a safe, protected location to avoid body contact with hot resin.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable.

INCOMPATIBILITY WITH: None

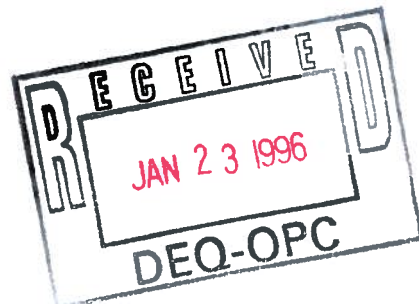
HAZARDOUS DECOMPOSITION PRODUCTS: None expected.

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**A. MOLTEN product**

**DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Burns can cause irreversible eye injury and blindness. Smoke or fumes from rosin products may cause eye irritation with redness, tearing and discomfort.
- SKIN:** Serious burns will result from contact with molten product. Repeated or prolonged contact may cause an allergic skin reaction (sensitization) in susceptible individuals. See **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**
- INHALATION:** Breathing smoke or fumes from molten rosin products may produce breathing discomfort, coughing and sore throat.
- INGESTION:** None known

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** Cool burns with plenty of low-pressure water. Get medical attention immediately.

**SKIN:** Immediately cool burn area with cold water and cold packs for at least 15 minutes. Do NOT put ice directly on the skin. Do NOT attempt to remove solidified resin from the skin as severe tissue damage may result. Get medical attention.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen and soften the material.

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**B. SOLID product****SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Dust may cause irritation by mechanical abrasion. Smoke or fumes from decomposition of rosin products heated to high temperatures may cause redness, tearing and discomfort.
- SKIN:** May cause irritation by mechanical abrasion. See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**
- INHALATION:** None known from dust. Breathing smoke or fumes from decomposition of rosin products heated to high temperatures may produce breathing discomfort, coughing and sore throat.
- INGESTION:** None known.

Continued...

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**V. HEALTH HAZARD DATA**

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**B. SOLID product...Continued****EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water.

**INHALATION:** Remove to fresh air. Call a physician if irritation persists.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

The components of this product are not listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

See **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE**. A similar resin has been tested in a repeated insult human patch test. No signs of skin irritation or sensitization were noted in the study.

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**REPORTED ANIMAL EFFECTS:**

Hercules Incorporated has not conducted animal testing with this product. Data from studies on similar materials indicate that it has a low order of acute toxicity by mouth or by skin contact and may produce mechanical irritation following skin and eye contact. Subchronic administration of similar materials in the diet of rats led to food rejection and starvation at 5% concentration in the diet. Liver enlargement without pathologic abnormalities was noted at 1%. There were no significant effects noted below dietary levels of 1%.

An inhalation study of thermal decomposition products was conducted by heating a related product to 180 C (356 F). Rats were exposed to vapor and/or decomposition products for 6 hours. No deaths or significant adverse reactions were noted.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility equipped with leachate collection is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing fumes, dust or vapor.  
Wash thoroughly after handling, and before eating, drinking or smoking.

Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

A. **MOLTEN product - PERSONAL PROTECTIVE EQUIPEMNT:**

Face shield, safety glasses and hard hat

Long-sleeve protective shirt, long pants and work shoes

Long-cuff lined gloves

Lined rain suit with protective hood or shoulder shroud or full aluminized or thermal suit with hood

Protective clothing should be made of six-ounce (6 oz) or greater fabric; polyester should be avoided.

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart 1 (29 CFR 1910.134) and manufacturer's recommendations.

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B. **SOLID product - PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves

Safety glasses

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart 1 (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

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**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

A. **MOLTEN product - HANDLING AND STORAGE PRECAUTIONS:**

If allowed to solidify to solid or flake form, this product can exhibit the characteristics of solid or flake rosin, and may form flammable dust-air mixtures. See **HANDLING AND STORAGE PRECAUTIONS** for solid product below. Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

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Continued...



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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**B. SOLID product - HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater), the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. **ATTENTION! A GROUNDING CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!**

Flaked forms are prone to gradual oxidation. Control inventory.

Use oldest material first.

Store below 32 C (90 F) to preserve product integrity.

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**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep fumes, dust, or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate sources of ignition.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	CONTO* Dark rosin resin	8050-09-7	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

MATERIAL SAFETY DATA SHEET

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

ROSIN NITRILE PROCESS INTERMEDIATE  
(Crude and distilled)

MSDS No.: 999 0420 3007-01

Date: 11/30/90

I. PRODUCT IDENTIFICATION

DANGER! MAY CAUSE EYE BURNS AND SKIN IRRITATION.

ROSIN NITRILE PROCESS INTERMEDIATE  
(Crude and distilled)

HMIS RATINGS: (1)  
Health hazard: 3 Serious  
Flammability hazard: 0 Minimal  
Reactivity hazard: 0 Minimal

APPEARANCE AND ODOR: Amber semi-solid; ammonia odor

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

CHEMICAL & COMMON NAMES:	%	RECOMMENDED AIRBORNE LEVELS (1)	
		OSHA TWA	TLV-TWA
Rosin nitrile	60-90	Not established.	

(1) Explanation of acronyms:

- HMIS: Hazardous Materials Identification System rating for product as supplied.
- AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.
- OSHA: Occupational Safety and Health Administration.
- TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.
- TWA: Time Weighted Average
- STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)
- C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)
- SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)
- N/A: Not applicable

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### III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS

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BOILING POINT: Not determined. SOLUBILITY IN WATER: Slight  
VAPOR PRESSURE @ 20 C: Not determined. SPECIFIC GRAVITY: Not determined.  
VAPOR DENSITY: Heavier than air pH: N/A  
VOLATILE (VOL.), %: 90=Crude EVAPORATION RATE: Slower than butyl  
60=Distilled acetate  
MELTING POINT: Not determined.  
SOFTENING POINT: 18.9 C=Crude  
15.2 C=Distilled

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### IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA

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FLASH POINT: Not determined.  
FLAMMABLE LIMITS: Not determined.  
AUTOIGNITION TEMPERATURE: Not determined.  
EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon  
SPECIAL FIREFIGHTING PROCEDURES: None  
UNUSUAL FIRE & EXPLOSION HAZARDS: None  
STABILITY CONSIDERATIONS:  
Stable. Nitriles can be reacted at high temperatures and in the presence of catalysts and other reactants to form amines, amides, carboxylic acids and esters, aldehydes, ketones, imines, and other compounds.  
INCOMPATIBILITY WITH: None  
HAZARDOUS DECOMPOSITION PRODUCTS: None  
HAZARDOUS PRODUCTS OF COMBUSTION:  
Carbon monoxide, carbon dioxide, ammonia and hydrogen cyanide. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.  
HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**DANGER! MAY CAUSE EYE BURNS AND SKIN IRRITATION.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** May cause eye burns which could result in loss of vision. Smoke or fumes from decomposition of rosin products heated to high temperatures may cause redness, tearing and discomfort.
- SKIN:** May cause severe skin irritation. Prolonged contact may cause burns. See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**
- INHALATION:** This material has a relatively low vapor pressure. Workplace vapor concentrations are not expected to reach levels that could cause injury. Breathing smoke or fumes from decomposition of rosin products heated to high temperatures may produce breathing discomfort, coughing and sore throat.
- INGESTION:** May cause severe injury to the mouth and gastrointestinal tract; swallowing may also cause nausea, vomiting, dizziness, headache.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse. Discard contaminated leather articles.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid. Induce vomiting. Call a physician. NEVER give liquids to or attempt to induce vomiting in an unconscious person.

**INHALATION:** Remove to fresh air. Call a physician if irritation persists.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

Repeated exposure to smoke or fumes of decomposition products of rosin or rosin derivatives heated to high temperatures may produce an asthmatic (respiratory sensitization) reaction in sensitive individuals.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

PRIMARY ROUTES OF ENTRY: Eyes, skin

**CANCER INFORMATION:**

Not listed as a carcinogen by NTP (National Toxicology Program); not regulated as a carcinogen by OSHA (Occupational Safety & Health Administration); not evaluated by IARC (International Agency for Research on Cancer).

**REPORTED HUMAN EFFECTS:**

See above- MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE. If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup>, (as formaldehyde) for rosin core solder pyrolysis products should be observed.

**REPORTED ANIMAL EFFECTS:**

Oral LD50, rats greater than 3.2 g/kg.

Animal studies showed that related materials cause severe eye injury.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility equipped with leachate collection is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.

Avoid breathing dust, smoke and fumes.

Wash thoroughly after handling, and before eating, drinking, or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves

Safety glasses

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:** Slight ammonia odor (when crude)

**ENGINEERING CONTROLS:**

Provide adequate ventilation.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	ROSIN NITRILE PROCESS INTERMEDIATE (Crude and distilled)	N/A	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

This product contains Rosin nitrile that is listed as a "Toxic Pollutant" under Section 307 of the Clean Water Act, and specific discharge limitations on wastewaters containing it may apply. Refer to the Effluent Guidelines for your industry (40 CFR 401 through 469).

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

HERCULES\* GUM ROSIN  
MOLTEN OR SOLID  
MSDS No.: 852 3991 0600-04

Supersedes MSDS #: 852 3991 0600-03

Date: 04/30/93

I. PRODUCT IDENTIFICATION

A. HERCULES\* GUM ROSIN, MOLTEN

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Amber, viscous liquid at 100-175 C (212-347 F); terpene  
rosin odor

B. HERCULES\* GUM ROSIN, SOLID

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
ADDITIONAL HAZARDS).

APPEARANCE AND ODOR: Amber solid; terpene rosin odor

CASRN: 8050-09-7

HMIS RATINGS:(1)

Health hazard: 0 Minimal  
Flammability hazard: 1 Slight  
Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Gum rosin

\* Registered Trademark of Hercules Incorporated

(1)Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

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As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a hazardous material.

If this product is used in a manner that could generate particulates (dust), Hercules recommends that the dust be treated as a NUISANCE PARTICULATE (Particulates Not Otherwise Classified) as defined by the American Conference of Governmental Industrial Hygienists (ACGIH) or (Particulates not otherwise Regulated) as defined by OSHA.

**RECOMMENDED AIRBORNE LEVELS  
1992-1993**

	OSHA TWA	TLV-TWA
Particulates not Otherwise classified/regulated	15 mg/m3 total 5 mg/m3 respirable fraction	10 mg/m3

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m3 (as formaldehyde), for rosin core solder pyrolysis products should be observed.

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: 318 C (604 F)	SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE AT 317 C: 100 mm Hg	SPECIFIC GRAVITY: 1.07
VAPOR DENSITY: N/A	pH: N/A
VOLATILE (WT.),%: Negligible @ 20 C	EVAPORATION RATE: N/A
SOFTENING POINT: 82 C (180 F)	

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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**A. MOLTEN product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

---

**B. SOLID product**

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR  
FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR  
ADDITIONAL HAZARDS).

---

FLASH POINT: 204 C (400 F) COC

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

**SPECIAL FIREFIGHTING PROCEDURES:**

Use self-contained breathing apparatus.

Apply water to MOLTEN RESIN fires from a safe, protected location to avoid  
body contact with hot resin.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None expected

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some  
aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

---

**A. MOLTEN product**

**DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Burns can cause irreversible eye injury and blindness. Smoke or fumes from rosin products may cause eye irritation with redness, tearing and discomfort.
- SKIN:** Serious burns will result from contact with molten product. Repeated or prolonged contact may cause an allergic skin reaction (sensitization) in susceptible individuals. See MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.
- INHALATION:** Breathing smoke or fumes from molten rosin products may produce breathing discomfort, coughing and sore throat.
- INGESTION:** None known

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** Cool burns with plenty of low-pressure water. Get medical attention immediately.

**SKIN:** Immediately cool burn area with cold water and cold packs for at least 15 minutes. Do NOT put ice directly on the skin. Do NOT attempt to remove solidified resin from the skin as severe tissue damage may result. Get medical attention.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen and soften the material.

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**B. SOLID product****SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Dust may cause irritation by mechanical abrasion.
- SKIN:** None known. (See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.)

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

Continued...



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**V. HEALTH HAZARD DATA**

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...Continued

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

Not listed as a carcinogen by NTP (National Toxicology Program); not regulated as a carcinogen by OSHA (Occupational Safety & Health Administration); not evaluated by IARC (International Agency for Research on Cancer).

**REPORTED HUMAN EFFECTS:**

See above: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

**REPORTED ANIMAL EFFECTS:**

Oral LD50, rats - 7.6 g/kg  
Oral LD50, mice - 4.6 g/kg  
Oral LD50, guinea pig - 4.1 kg/kg  
Dermal LD50, rabbits - greater than 2.5 g/kg.

Two-year feeding studies have been conducted in dogs and rats with gum, wood, and tall oil rosins. At a dietary level of 1% rosin, the rats showed a slight decrease in body weight gain and both species showed increased liver sizes. Microscopic examination of the liver and other tissues did not reveal any abnormalities that could be attributed to the test material. At dietary levels of 0.2% or less, the rats and dogs did not have any abnormalities that could be related to the resin (rosin) acids. Tumor incidence was equal to, or less than, that in control animals.

**OTHER:**

The following resin acid components of rosin were all negative in the Ames IN VITRO bioassay: Abietic, dehydroabietic, levopimaric, pimaric, isopimaric, and sandaracopimaric. Abietic acid was also negative in the DNA assay with E. COLI.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility equipped with leachate collection is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.

Avoid breathing dust or vapor.

Wash thoroughly after handling, and before eating, drinking or smoking.

**A. MOLTEN product - PERSONAL PROTECTIVE EQUIPMENT**

Face shield, safety glasses and hard hat

Long-sleeve protective shirt, long pants and work shoes

Long cuff lined gloves

Lined rain suit with protective hood or shoulder shroud or full aluminized or thermal suit with hood

Protective clothing should be made of six-ounce (6 oz) or greater fabric; polyester should be avoided.

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

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**B. SOLID product - PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses

Impervious gloves

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**A. MOLTEN product - HANDLING AND STORAGE PRECAUTIONS:**

If allowed to solidify to solid or flake form, this product can exhibit the characteristics of solid or flake rosin, and may form flammable dust-air mixtures. See HANDLING AND STORAGE PRECAUTIONS for solid product below. Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

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**B. SOLID product - HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater), the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. **ATTENTION! A GROUNDING CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!**

Flaked forms are prone to gradual oxidation. Control inventory. Use oldest material first.

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**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	HERCULES* GUM ROSIN	8050-09-7	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulations 40 CFR 261.33 paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261 Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, Del, 19894  
 Phone #: (302) 594-5000 (24 hrs)

PEXOIL\* B and PEXOIL\* H  
 Light end fractions,  
 MOLTEN LIQUID or LIQUID

MSDS No.: 860 2119 0200-02

Supersedes MSDS No.: 860 2119 0200-01

Date: 05/28/93

-----  
 I. PRODUCT IDENTIFICATION  
 -----

A. PEXOIL\* B and PEXOIL\* H Light end fractions, MOLTEN LIQUID

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
 PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Amber, viscous liquid at 120-160 C (248-320 F);  
 rosin odor

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 B. PEXOIL\* B and PEXOIL\* H Light end fractions, LIQUID

APPEARANCE AND ODOR: Dark brown liquid; pine odor

CASRN: Mixture

HMIS RATINGS: (1)

Health hazard:	0	Minimal
Flammability hazard:	0	Minimal
Reactivity hazard:	0	Minimal

CHEMICAL & COMMON NAME: Rosin oils or light end fractions from processing of  
 rosin-derived resins

\* Registered Trademark of Hercules Incorporated

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 (1) Explanation of acronyms:

- HMIS: Hazardous Materials Identification System rating for product as supplied.
- CASRN: Chemical Abstracts Service Registry Number
- AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.
- OSHA: Occupational Safety and Health Administration.
- TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.
- TWA: Time Weighted Average
- STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)
- C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)
- SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)
- N/A: Not applicable

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**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

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As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a health hazard.

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup> (as formaldehyde), for rosin core solder pyrolysis products should be observed.

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: N/A	SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE AT 20 C: Negligible	SPECIFIC GRAVITY: Lighter than water
VAPOR DENSITY: N/A	pH: N/A
VOLATILE (WT.),%: Negligible @ 20 C	EVAPORATION RATE: Slower than butyl acetate
FREEZING POINT: Not determined	

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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**A. MOLTEN LIQUID product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

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FLASH POINT: 163 C (325 F) TCC

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

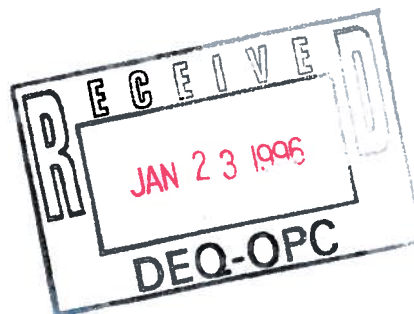
EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

Continued...





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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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A. MOLTEN LIQUID product

**DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.**

SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

**EYES:** Burns can cause irreversible eye injury and blindness. Smoke or fumes from rosin products may cause eye irritation with redness, tearing and discomfort.

**SKIN:** Serious burns will result from contact with molten product. Repeated or prolonged contact may cause an allergic skin reaction (sensitization) in susceptible individuals. See MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.

**INHALATION:** Breathing smoke or fumes from molten rosin products may produce breathing discomfort, coughing and sore throat.

**INGESTION:** None known

EMERGENCY & FIRST AID PROCEDURES:

**EYES:** Cool burns with plenty of low-pressure water. Get medical attention immediately.

**SKIN:** Immediately cool burn area with cold water and cold packs for at least 15 minutes. Do NOT put ice directly on the skin. Do NOT attempt to remove solidified resin from the skin as severe tissue damage may result. Get medical attention.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

- NOTE TO PHYSICIAN: Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen and soften the material.

Continued...

V. HEALTH HAZARD DATA

...Continued

B. LIQUID product

SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

- EYES: Contact may cause mild transient eye irritation.
- SKIN: Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (see below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).
- INHALATION: None known. None expected.
- INGESTION: None known.

EMERGENCY & FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician.

INGESTION: If swallowed, do NOT induce vomiting. Call a physician.

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

PRIMARY ROUTES OF ENTRY: Eyes, skin

CANCER INFORMATION:

None of the components of this product are listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

REPORTED HUMAN EFFECTS:

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**REPORTED ANIMAL EFFECTS:**

Based on tests of a similar resin, this product has a low order of acute peroral and percutaneous toxicity and minimal skin irritancy potential.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Add inert absorbent, sweep up, and place the material in metal drums for disposal. Large Spills: Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.

Wash thoroughly after handling, and before eating, drinking or smoking.

Remove contaminated clothing promptly and clean thoroughly before reuse.

Avoid breathing vapor.

**A. MOLTEN LIQUID product - PERSONAL PROTECTIVE EQUIPMENT:**

Face shield, safety glasses and hard hat

Long-sleeve protective shirt, long pants and work shoes

Long-cuff lined gloves

Lined rain suit with protective hood or shoulder shroud or full aluminized or thermal suit with hood

Protective clothing should be made of six-ounce (6 oz) or greater fabric; polyester should be avoided.

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

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Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**B. LIQUID product - PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves

Safety glasses

Appropriate protective clothing

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

---

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**A. MOLTEN LIQUID product - HANDLING AND STORAGE PRECAUTIONS:**

Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

See HANDLING AND STORAGE PRECAUTIONS for liquid product below.

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**B. LIQUID product - HANDLING AND STORAGE PRECAUTIONS:**

Store in a cool, dry, well-ventilated area.

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**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.

Completely isolate and thoroughly clean all equipment, piping, or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	PEXOIL* B and PEXOIL* H Light end fractions, Molten liquid or liquid	Mixture	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3	N/A

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

## VIII. ENVIRONMENTAL REGULATORY DATA

..Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

HERCULES\* BELTOR  
Synthetic resin

MSDS No.: 860 2171 0004-01

Date: 01/05/90

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I. PRODUCT IDENTIFICATION

---

WARNING | STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE  
VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL  
HAZARDS).

HERCULES\* BELTOR Synthetic resin

HMIS RATINGS: (1)

CAS Number: (8052-10-6)

Health hazard:	0	Minimal
Flammability hazard:	1	Slight
Reactivity hazard:	0	Minimal

APPEARANCE AND ODOR: Brown to red solid; typical rosin odor.

\* Registered Trademark of Hercules Incorporated.

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FOOTNOTES

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(1) Explanation of acronyms:  
HMIS: Hazardous Materials Identification System rating for product as supplied.  
OSHA: Occupational Safety and Health Administration.  
TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.  
TWA: Time Weighted Average  
N/A: Not applicable

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Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.



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**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

---

The ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH" for 1989-90.

If this product is used in a manner that could generate particulates (dust), Hercules recommends that the dust be treated as a NUISANCE PARTICULATE (Particulates Not Otherwise Classified) as defined by the American Conference of Governmental Industrial Hygienists (ACGIH) or (Particulates not otherwise Regulated) as defined by OSHA.

RECOMMENDED AIRBORNE LEVELS  
OSHA TWA      TLV-TWA 1989-1990

Particulates not	15mg/m <sup>3</sup> total	10mg/m <sup>3</sup>
Otherwise classified/regulated	5mg/m <sup>3</sup> respirable fraction	

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: N/A

SOLUBILITY IN WATER: Negligible

VAPOR PRESSURE AT 20 C: Not determined. SPECIFIC GRAVITY: 1.14

VAPOR DENSITY: N/A

pH: N/A

VOLATILE (VOL.),%: Negligible at 20 C      EVAPORATION RATE: Slower than butyl acetate

SOFTENING POINT: 90 C (194 F)

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

WARNING | STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

FLASH POINT: 210 C (410 F)

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: Not determined.

Continued...

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, or carbon dioxide

SPECIAL FIREFIGHTING PROCEDURES: None

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS:

Stable. Store below 32 C (90 F), in order to preserve product integrity.

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: Dust may cause irritation by mechanical abrasion.

SKIN: Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).

INHALATION: None known. None expected.

INGESTION: None known.

EMERGENCY & FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water. **MOLTEN RESINS:** If molten material comes in contact with the skin, cool under a running stream of water. Do NOT attempt to remove the resin from the skin. Removal could result in severe tissue damage. Get medical attention.

NOTE TO PHYSICIAN: Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This material contains rosin/a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this resin after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to this resin or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers. Repeated exposure to fumes of thermal decomposition products of BELTOR heated to high temperatures may produce an asthmatic reaction (respiratory sensitization) in sensitive individuals.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

None known. See above: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**

**REPORTED ANIMAL EFFECTS:**

This material has not been tested. However, similar rosin resins had an acute oral LD50 greater than 5000 mg/kg in rats. In 90-day feeding studies with rats at 1% in the diet, these resins caused an increased liver weight, although other organ weights and histopathology revealed no significant effects and were comparable to the controls. When fed to rats and dogs at a 1% dietary level for two years, food consumption and growth rate were slightly reduced for rats but no difference was observed for dogs. There were no histologic findings in any organs or tissues examined, including the liver, that could be attributed to the test material. At the 0.05% dietary level no significant difference from the control animals were detected with either rats or dogs.

Continued...

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of waste material in a permitted facility in accordance to local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.

Avoid breathing dust.

Wash thoroughly after handling, and before eating, drinking or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves

Safety glasses

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Keep away from sparks and flame.

Avoid accumulating dust. Avoid suspending dust in air.

Flaked forms are prone to gradual oxidation. Control inventory.

Use oldest material first.

Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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**HANDLING AND STORAGE PRECAUTIONS:...**Continued

For small packages, the following warning applies:

WARNING| STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES. Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater), the following warning applies:

WARNING| STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES. Avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. ATTENTION| A GROUND CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION|

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate sources of ignition.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	HERCULES* BELTOR	8052-10-6	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)  
N/A: Product does NOT contain an EHS.

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)  
N/A: Product does NOT contain an EHS.

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

This product does NOT contain toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.



HERCULES INCORPORATED  
KINGSTON PLAZA  
WILMINGTON, DE 19894

MELHI\* NLM SYNTHETIC RESIN

PHONE #: (302) 594-5000 (24 HRS)

MSDS NO.: 860 2165 1300-02

PERSEDES MSDS #: 860 2165 1300-01

DATE: 03/16/90

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PRODUCT IDENTIFICATION  
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WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES. (FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

MELHI\* NLM SYNTHETIC RESIN

HMS RATINGS: (1)

HEALTH HAZARD:	0	MINIMAL
FLAMMABILITY HAZARD:	1	SLIGHT
REACTIVITY HAZARD:	0	MINIMAL

APPEARANCE AND ODOR: DARK BROWN SOLID OR FLAKE; TYPICAL ROSIN ODDOR

REGISTERED TRADEMARK OF HERCULES INCORPORATED.

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HAZARDOUS INGREDIENTS & EXPOSURE LIMITS  
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NOTE: THE INGREDIENTS IN THIS PRODUCT ARE NOT LISTED IN 29 CFR 1910, PART Z, NOR DO THEY APPEAR IN "THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES IN THE WORK ENVIRONMENT ADOPTED BY ACGIH" FOR 1989-90.

THESE MATERIALS ARE USED IN A MANNER THAT COULD GENERATE PARTICULATES (DUST), HERCULES RECOMMENDS THAT THE RESIN DUST BE TREATED AS A NUISANCE PARTICULATE ACCORDING TO THE AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH).

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NOTES  
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EXPLANATION OF ACRONYMS:

MSDS: HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATING FOR PRODUCT AS SUPPLIED.  
N/A: NOT APPLICABLE

HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT MATTER IN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE BY HERCULES INCORPORATED AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL AND STATE LAWS.

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1. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS  
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BOILING POINT: N/A SOLUBILITY IN WATER: NEGLIGIBLE  
VAPOR PRESSURE @ 20 C: NEGLIGIBLE SPECIFIC GRAVITY: 1.06  
VAPOR DENSITY: N/A PH: N/A  
VOLATILE (VOL.): NEGLIGIBLE AT 20 C EVAPORATION RATE: SLOWER THAN BUTYL ACETATE  
FREEZING POINT: 98-106 C (208-254 F)

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2. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA  
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WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

FLASH POINT: ABOVE 150 C (300 F)

LEAKAGE LIMITS: NOT DETERMINED.

IGNITION TEMPERATURE: NOT DETERMINED.

EXTINGUISHING MEDIA: WATER SPRAY, DRY CHEMICAL, FOAM, OR CARBON DIOXIDE

SPECIAL FIREFIGHTING PROCEDURES:  
USE SELF-CONTAINED BREATHING APPARATUS.  
COOL CONTAINERS WITH WATER IF EXPOSED TO FIRE.

USUAL FIRE & EXPLOSION HAZARDS:  
MAY FORM FLAMMABLE DUST - AIR MIXTURES.

STABILITY CONSIDERATIONS: STABLE

COMPATIBILITY WITH: NONE

HAZARDOUS DECOMPOSITION PRODUCTS: NONE

HAZARDOUS PRODUCTS OF COMBUSTION:  
CARBON MONOXIDE, CARBON DIOXIDE AND SMOKE. DEPENDING ON CONDITIONS, SOME ALIPHATIC ALDEHYDES AND CARBOXYLIC ACIDS ALSO MAY BE FORMED.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

  
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T.

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HEALTH HAZARD DATA  
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## SIGNS &amp; SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

- EYES: DUST MAY CAUSE IRRITATION BY MECHANICAL ABRASION. SMOKE OR FUMES OF DECOMPOSITION PRODUCTS OF ROSIN PRODUCTS HEATED TO HIGH TEMPERATURES MAY CAUSE EYE IRRITATION, WITH REDNESS, TEARING AND DISCOMFORT.
- SKIN: PROLONGED AND REPEATED CONTACT MAY CAUSE A SKIN SENSITIZATION REACTION IN SUSCEPTIBLE INDIVIDUALS (SEE BELOW: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).
- INHALATION: BREATHING SMOKE OR FUMES OF DECOMPOSITION PRODUCTS OF ROSIN PRODUCTS HEATED TO HIGH TEMPERATURES MAY PRODUCE BREATHING DISCOMFORT, COUGHING AND SORE THROAT.
- INGESTION: NONE KNOWN.

## EMERGENCY &amp; FIRST AID PROCEDURES:

EYES: IN CASE OF CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF LOW-PRESSURE WATER FOR AT LEAST 15 MINUTES. REMOVE ANY CONTACT LENSES TO ENSURE THOROUGH FLUSHING. CALL A PHYSICIAN.

SKIN: WASH WITH SOAP AND RUNNING WATER. MOLTEN RESINS: IF MOLTEN MATERIAL COMES IN CONTACT WITH THE SKIN, COOL UNDER A RUNNING STREAM OF WATER. DO NOT ATTEMPT TO REMOVE THE RESIN FROM THE SKIN. REMOVAL COULD RESULT IN SEVERE TISSUE DAMAGE. GET MEDICAL ATTENTION.

NOTE TO PHYSICIAN: MATERIAL SHOULD NOT BE FORCIBLY PULLED FROM THE SKIN. MINERAL OIL MAY BE USED TO LOOSEN THE MATERIAL.

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MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE: THIS PRODUCT CONTAINS ROSIN OR A ROSIN DERIVATIVE. ROSIN AND SOME OF ITS DERIVATIVES HAVE BEEN REPORTED TO CAUSE AN ALLERGIC SKIN REACTION (SENSITIZATION) IN SUSCEPTIBLE INDIVIDUALS AFTER REPEATED OR PROLONGED SKIN CONTACT. HERCULES INCORPORATED IS UNAWARE OF ANY ALLERGIC SKIN REACTIONS CAUSED BY INDUSTRIAL EXPOSURE TO THIS PRODUCT OR SIMILAR MATERIALS. A THOROUGH SEARCH OF HERCULES MEDICAL RECORDS HAS DISCLOSED NO CASE OF SKIN SENSITIZATION TO ROSIN OR ITS DERIVATIVES FROM INDUSTRIAL EXPOSURE IN OUR WORKERS. NONE HAVE BEEN REPORTED BY OUR CUSTOMERS.

REPEATED EXPOSURE TO SMOKE OR FUMES OF DECOMPOSITION PRODUCTS OF ROSIN OR ROSIN DERIVATIVES HEATED TO HIGH TEMPERATURES MAY PRODUCE AN ASTHMATIC REACTION (RESPIRATORY SENSITIZATION) IN SENSITIVE INDIVIDUALS.

PRIMARY ROUTES OF ENTRY: EYES, SKIN

CONTINUED...

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HEALTH HAZARD DATA  
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## NCER INFORMATION:

THE COMPONENTS OF THIS PRODUCT ARE NOT LISTED AS CARCINOGENS BY THE NATIONAL TOXICOLOGY PROGRAM (NTP). THEY HAVE NOT BEEN REGULATED AS CARCINOGENS BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND HAVE NOT BEEN EVALUATED BY THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC).

PRODUCT HAS NOT BEEN TESTED AS SUCH. THE FOLLOWING OBSERVATIONS RELATE TO COMPONENTS.

## REPORTED HUMAN EFFECTS:

HUMAN PATCH TEST: SINGLE APPLICATION FOR FIVE DAYS FOLLOWED AFTER THREE WEEKS BY TWO DAY CHALLENGE APPLICATION, 200 SUBJECTS, IMPREGNATED DISKS; TEST NEGATIVE FOR IRRITATION AND SENSITIZATION.

## REPORTED ANIMAL EFFECTS:

ACUTE: PERORAL RAT LD50 = 10.2 G/KG; PERORAL MOUSE LD50 = 4.1 G/KG; PERORAL GUINEA PIG LD50 = 6.2 G/KG; PERCUTANEOUS RABBIT APPROX LD50 GREATER THAN 2.5 G/KG.

CHRONIC: RAT FEEDING STUDY, NINETY DAYS- AT 5% IN THE DIET, FOOD REJECTION AND STARVATION; MILD HEPATIC FATTY CHANGES ATTRIBUTED TO 11% CORN OIL IN DIET.

CHRONIC: RAT FEEDING STUDY, TWO YEARS- REDUCED WEIGHT GAIN AND INCREASED RELATIVE LIVER WEIGHT IN 0.1% FEMALES, INCREASE IN ABSOLUTE AND RELATIVE HEART WEIGHT, BOTH SEXES AT 0.1%.

DOG FEEDING STUDY, TWO YEARS- NO ADVERSE FINDINGS.

THERMOLYSIS: VAPOR HEATED TO GREATER THAN 177 C, 6 H INHALATION, RATS; NOMINAL CONCENTRATION OF 0.585 MG/L PRODUCED NO ADVERSE EFFECTS.

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SPILL PROCEDURES & WASTE DISPOSAL  
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## STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

IF MATERIAL IS NOT CONTAMINATED, SCOOP INTO CLEAN CONTAINERS FOR USE. IF CONTAMINATED, SCOOP INTO CONTAINERS FOR DISPOSAL.

## BEST DISPOSAL METHOD:

INCINERATION OF COMBUSTIBLE WASTE MATERIAL IN A PERMITTED FACILITY IN ACCORDANCE TO LOCAL, STATE, AND FEDERAL REGULATIONS IS THE RECOMMENDED DISPOSAL METHOD. LANDFILLING IN A LICENSED FACILITY EQUIPPED WITH LEACHATE COLLECTION IS A SUITABLE ALTERNATIVE.

REFER TO SECTION VIII FOR SPECIFIC FEDERAL ENVIRONMENTAL AND REGULATORY DATA REGARDING USE OR DISPOSAL OF THIS PRODUCT.

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1. APPLICABLE CONTROL MEASURES

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PROPRIATE HYGIENIC PRACTICES:

DO NOT ALLOW EYE OR SKIN CONTACT.

AVOID BREATHING DUST.

WASH THOROUGHLY AFTER HANDLING, AND BEFORE EATING, DRINKING OR SMOKING.

PERSONAL PROTECTIVE EQUIPMENT:

IMPERVIOUS GLOVES

SAFETY GLASSES

APPROPRIATE RESPIRATORY PROTECTION IS REQUIRED WHEN EXPOSURE TO AN AIRBORNE CONTAMINANT IS LIKELY TO EXCEED ACCEPTABLE LIMITS. RESPIRATORS SHOULD BE SELECTED AND USED IN ACCORDANCE WITH OSHA, SUBPART I (29 CFR 1910.134) AND MANUFACTURER'S RECOMMENDATIONS.

PERSONNEL EXPOSED TO HOT MOLTEN MATERIAL SHOULD WEAR PROTECTIVE CLOTHING THAT PROVIDES PROTECTION FROM THERMAL BURNS. FULL FACE SHIELD, LINED RAIN SUIT (OR OTHER HEAT RESISTANT MATERIAL), AND LINED IMPERVIOUS GLOVES ARE RECOMMENDED.

RISK PRACTICES:

EYEWASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE EASILY ACCESSIBLE.

HANDLING AND STORAGE PRECAUTIONS:

KEEP AWAY FROM SPARKS AND OPEN FLAME.

ON SMALL PACKAGES, THE FOLLOWING WARNING APPLIES:

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES. AVOID IGNITION SOURCES SUCH AS SPARKS AND FLAME. GROUND ALL EQUIPMENT. IN ADDITION, WHEN EMPTYING BAGS WHERE FLAMMABLE VAPORS MAY BE PRESENT, BLANKET VESSEL WITH INERT GAS, GROUND OPERATOR, AND POUR MATERIAL SLOWLY INTO CONDUCTIVE, GROUNDED CHUTE.

FOR LARGE BAGS (1,000 LBS. OR GREATER), THE FOLLOWING WARNING APPLIES:

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES. AVOID IGNITION SOURCES SUCH AS SPARKS AND FLAME. GROUND ALL EQUIPMENT AND THE BAG. IN ADDITION, WHEN EMPTYING WHERE FLAMMABLE VAPORS MAY BE PRESENT, BLANKET VESSEL WITH AN INERT GAS. ATTENTION! A GROUND CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!

ENGINEERING CONTROLS:

ADEQUATE VENTILATION SHOULD BE PROVIDED TO KEEP DUST CONCENTRATIONS BELOW ACCEPTABLE EXPOSURE LIMITS. DISCHARGE FROM THE VENTILATION SYSTEM SHOULD COMPLY WITH APPLICABLE AIR POLLUTION CONTROL REGULATIONS.

DETECTIVE MEASURES DURING REPAIR AND MAINTENANCE

ELIMINATE SOURCES OF IGNITION.

COMPLETELY ISOLATE AND THOROUGHLY CLEAN ALL EQUIPMENT, PIPING OR VESSELS BEFORE BEGINNING MAINTENANCE OR REPAIRS.

KEEP AREA CLEAN. PRODUCT WILL BURN.

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 1. ENVIRONMENTAL & REGULATORY DATA  
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THE FOLLOWING ENVIRONMENTAL AND REGULATORY DATA ARE PROVIDED TO ASSIST USERS  
 IN THIS PRODUCT IN DEFINING THEIR REGULATORY ENVIRONMENTAL COMPLIANCE  
 REQUIREMENTS.

PRODUCT COMPOSITION

PRODUCT (P) OR COMPONENT NO.	TRADE NAME OR CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	MELHI* NLM	N/A	100

SARA TITLE III (SEE FOOTNOTES)

COMPONENT NO.	SEC. 304 EHS RQ (LBS)	SEC. 302 EHS TPQ (LBS)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 DUST	NO

RCRA (40 CFR 302.4 HAZARDOUS SUBSTANCE & REPORTABLE QUANTITIES)

THIS PRODUCT DOES NOT CONTAIN ANY HAZARDOUS SUBSTANCES LISTED IN  
 40 CFR 302.4.

RCRA INFORMATION

THIS PRODUCT IS NOT LISTED IN FEDERAL HAZARDOUS WASTE REGULATION  
 40 CFR 261.33, PARAGRAPH (E) OR (F) - I.E., CHEMICAL PRODUCTS THAT ARE  
 CONSIDERED HAZARDOUS IF THEY BECOME WASTES. IT DOES NOT EXHIBIT ANY OF  
 THE HAZARDOUS CHARACTERISTICS LISTED IN 40 CFR 261, SUBPART C. STATE OR  
 LOCAL HAZARDOUS WASTE REGULATIONS MAY APPLY IF THEY ARE DIFFERENT FROM THE  
 FEDERAL REGULATION.

OTHER

NONE

CONTINUED...

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ENVIRONMENTAL REGULATORY DATA  
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CONTINUED

## TNOTES:

SEC. 302 - THRESHOLD PLANNING QUANTITY, EXTREMELY HAZARDOUS SUBSTANCE (EHS) (40 CFR 355 EMERGENCY PLANNING AND NOTIFICATION REGULATIONS)

N/A: PRODUCT DOES NOT CONTAIN AN EHS.

SEC. 304 - REPORTABLE QUANTITY FOR RELEASES OF AN EHS (40 CFR 355, APPENDIX A)

N/A: PRODUCT DOES NOT CONTAIN AN EHS.

SEC 311/312 - 40 CFR 370 HAZARDOUS CHEMICAL REPORTING REQUIREMENTS "HAZARD CATEGORIES"

HC-1 IMMEDIATE (ACUTE) HEALTH HAZARD

HC-2 DELAYED (CHRONIC) HEALTH HAZARD

HC-3 FIRE HAZARD

HC-4 SUDDEN RELEASE OF PRESSURE HAZARD

HC-5 REACTIVE HAZARD

NHH NOT A HEALTH HAZARD

NPH NOT A PHYSICAL HAZARD

313 - 40 CFR 372 TOXIC CHEMICAL RELEASE REPORTING REQUIREMENTS

THIS PRODUCT DOES NOT CONTAIN TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372 TOXIC CHEMICAL REPORTING REQUIREMENTS.

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. NO. 2855S





# MATERIAL SAFETY DATA SHEET

HERCULES (Approved by U.S. Department of Labor as "Essentially Similar" to Form OSHA-20)

MSDS - 037  
May 10, 1973  
Supersedes: PC  
Page 1 of 2

## I. PRODUCT IDENTIFICATION

CHEMICAL NAME	Pine oil	REGULAR TELEPHONE NO.	302-656-9811
SYNONYMS:	Not applicable	EMERGENCY TELEPHONE NO.	302-654-8900
FORMULA:	Not applicable	CHEMICAL FAMILY:	Not applicable
TRADE NAME AND SYNONYMS:	Yarmor® F	MOLECULAR WEIGHT:	Not applicable

## II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (UNITS)
Not applicable		

## III. PHYSICAL DATA

BOILING POINT, 760 mm Hg	206°C (403°F)	FREEZING POINT:	-10°C (14°F)
SPECIFIC GRAVITY (H <sub>2</sub> O = 1)	0.93	VAPOR PRESSURE @ 20°C:	Less than 1 mm Hg
VAPOR DENSITY (AIR = 1)	5.3	SOLUBILITY IN WATER, % BY WT. @ 20°C:	Slight
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (BUTYL ACETATE = 1)	Less than 1, slower
APPEARANCE AND ODOR	Straw-colored liquid; pine odor		

## IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD)	76°C (169°F), COC	AUTOIGNITION TEMPERATURE	Not available	
FLAMMABLE LIMITS IN AIR, % BY VOLUME	LOWER	Not available	UPPER	Not available
EXTINGUISHING MEDIA	Water fog, foam, dry chemical, carbon dioxide			
SPECIAL FIRE-FIGHTING PROCEDURES	Cool containers with water if exposed to fire.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	Not applicable			

Liability is expressly disclaimed for any loss or

ORGANICS DEPARTMENT

V. HEALTH HAZARD DATA

Threshold Limit Value: Not established - See Section II

Effects of Overexposure: Causes burns of eyes and skin.

Emergency & First Aid Procedures:

EYES: In case of contact, immediately flush with plenty of water for at least 15 minutes. Call a physician.  
SKIN: Wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

VI. REACTIVITY DATA

Stable. Conditions to Avoid: None

Incompatibility (Materials to Avoid): None

Hazardous Decomposition Products: Exposure to heat may cause liberation of acetic acid vapors. Burning liberates CO, CO<sub>2</sub>, NH<sub>3</sub>, and smoke.

Hazardous Polymerization Will Not Occur.

VII. SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled: Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

Waste Disposal Method: Dispose of in accordance with local, state, and Federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: None required in normal use.

Ventilation Local Exhaust: -- Special: --  
Mechanical: Recommended Other: --  
(General)

Protective Gloves: Solvent resistant Eye Protection: Chemical goggles  
Other Protective Equipment: Face shield, eyewash and safety shower

IX. SPECIAL PRECAUTIONS

Precautionary Labeling:

**DANGER! CAUSES BURNS OF EYES AND SKIN**

Do not get in eyes, on skin, or on clothing.

Avoid breathing vapors or mist.

Wear goggles, face shield, and rubber gloves when handling.

Keep containers closed.

Use with adequate ventilation.

Wash thoroughly after handling.

FIRST AID:

EYES - In case of contact, immediately flush with plenty of water for at least 15 minutes. Call a physician.

SKIN - Wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

Other Handling and Storage Conditions: None

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

ROSIN NITRILE PROCESS INTERMEDIATE  
 (Crude and distilled)

MSDS No.: 999 0420 3007-01

Date: 11/30/90

-----  
 I. PRODUCT IDENTIFICATION  
 -----

DANGER! MAY CAUSE EYE BURNS AND SKIN IRRITATION.

ROSIN NITRILE PROCESS INTERMEDIATE  
 (Crude and distilled)

HMS RATINGS: (1)

Health hazard: 3 Serious  
 Flammability hazard: 0 Minimal  
 Reactivity hazard: 0 Minimal

APPEARANCE AND ODOR: Amber semi-solid; ammonia odor

-----  
 II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS  
 -----

CHEMICAL & COMMON NAMES:	%	RECOMMENDED AIRBORNE LEVELS (1)	
		OSHA TWA	TLV-TWA
Rosin nitrile	60-90	Not established.	

(1) Explanation of acronyms:

HMS: Hazardous Materials Identification System rating for product as supplied.

AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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### III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS

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BOILING POINT: Not determined. SOLUBILITY IN WATER: Slight  
VAPOR PRESSURE @ 20 C: Not determined. SPECIFIC GRAVITY: Not determined.  
VAPOR DENSITY: Heavier than air pH: N/A  
VOLATILE (VOL.), %: 90=Crude EVAPORATION RATE: Slower than butyl  
60=Distilled acetate  
MELTING POINT: Not determined.  
SOFTENING POINT: 18.9 C=Crude  
15.2 C=Distilled

---

### IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA

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FLASH POINT: Not determined.  
FLAMMABLE LIMITS: Not determined.  
AUTOIGNITION TEMPERATURE: Not determined.  
EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon  
SPECIAL FIREFIGHTING PROCEDURES: None  
UNUSUAL FIRE & EXPLOSION HAZARDS: None  
STABILITY CONSIDERATIONS:  
Stable. Nitriles can be reacted at high temperatures and in the presence of catalysts and other reactants to form amines, amides, carboxylic acids and esters, aldehydes, ketones, imines, and other compounds.  
INCOMPATIBILITY WITH: None  
HAZARDOUS DECOMPOSITION PRODUCTS: None  
HAZARDOUS PRODUCTS OF COMBUSTION:  
Carbon monoxide, carbon dioxide, ammonia and hydrogen cyanide. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.  
HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**DANGER! MAY CAUSE EYE BURNS AND SKIN IRRITATION.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** May cause eye burns which could result in loss of vision. Smoke or fumes from decomposition of rosin products heated to high temperatures may cause redness, tearing and discomfort.
- SKIN:** May cause severe skin irritation. Prolonged contact may cause burns. See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**
- INHALATION:** This material has a relatively low vapor pressure. Workplace vapor concentrations are not expected to reach levels that could cause injury. Breathing smoke or fumes from decomposition of rosin products heated to high temperatures may produce breathing discomfort, coughing and sore throat.
- INGESTION:** May cause severe injury to the mouth and gastrointestinal tract; swallowing may also cause nausea, vomiting, dizziness, headache.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse. Discard contaminated leather articles.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid. Induce vomiting. Call a physician. NEVER give liquids to or attempt to induce vomiting in an unconscious person.

**INHALATION:** Remove to fresh air. Call a physician if irritation persists.

---

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

Repeated exposure to smoke or fumes of decomposition products of rosin or rosin derivatives heated to high temperatures may produce an asthmatic (respiratory sensitization) reaction in sensitive individuals.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

PRIMARY ROUTES OF ENTRY: Eyes, skin

**CANCER INFORMATION:**

Not listed as a carcinogen by NTP (National Toxicology Program); not regulated as a carcinogen by OSHA (Occupational Safety & Health Administration); not evaluated by IARC (International Agency for Research on Cancer).

**REPORTED HUMAN EFFECTS:**

See above- MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE. If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup>, (as formaldehyde) for rosin core solder pyrolysis products should be observed.

**REPORTED ANIMAL EFFECTS:**

Oral LD50, rats greater than 3.2 g/kg.  
Animal studies showed that related materials cause severe eye injury.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility equipped with leachate collection is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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VII. APPLICABLE CONTROL MEASURES

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APPROPRIATE HYGIENIC PRACTICES:

- Avoid contact with eyes, skin, and clothing.
- Avoid breathing dust, smoke and fumes.
- Wash thoroughly after handling, and before eating, drinking, or smoking.

PERSONAL PROTECTIVE EQUIPMENT:

- Impervious gloves
- Safety glasses
- Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

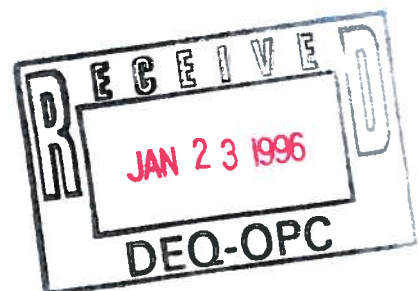
WORK PRACTICES:

- Eyewash fountains and safety showers should be easily accessible.

HANDLING AND STORAGE PRECAUTIONS: Slight ammonia odor (when crude)

ENGINEERING CONTROLS:

- Provide adequate ventilation.
- 





-----  
 VIII. ENVIRONMENTAL & REGULATORY DATA  
 -----

The following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	ROSIN NITRILE PROCESS INTERMEDIATE (Crude and distilled)	N/A	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

This product contains Rosin nitrile that is listed as a "Toxic Pollutant" under Section 307 of the Clean Water Act, and specific discharge limitations on wastewaters containing it may apply. Refer to the Effluent Guidelines for your industry (40 CFR 401 through 469).

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
-----

...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

-----  
HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

cc Safety  
10-12-93



# ACTIVATED METALS & CHEMICALS, INC.

P.O. BOX 4130 • SEVIERVILLE, TENNESSEE 37864  
615-453-7177 • FAX 615-428-3446

## MATERIAL SAFETY DATA SHEET

### SECTION I - MATERIAL IDENTIFICATION

Product Name: Nickel-Aluminum-Cobalt Alloy

Chemical Name: Metallic Alloy containing nickel and cobalt

Physical Form: Grit or powder. Grayish black coloration; no noticeable odor.

### SECTION II - MATERIAL COMPOSITION

<u>Components</u>	<u>Percentage</u>	<u>CAS Numbers</u>	<u>TLV's</u>
Nickel	5.0% maximum	7440-02-0	1.0 mg/m <sup>3</sup>
Aluminum	50.0% maximum	7429-90-5	10.0 mg/m <sup>3</sup>
Cobalt	45.0% maximum		0.05 mg/m <sup>3</sup>

(As airborne dusts or mists)

#### HAZARDOUS COMPONENTS:

Nickel, metal, dust, compounds or fumes are listed under 29 CFR 1910, Subpart Z, OSHA Toxic and Hazardous Substances as an air contaminant. Nickel metal, fumes or dust may cause eye, lung, and skin irritations.

The NTP (National Toxicological Program) anticipates nickel to be a human carcinogen. The IARC (International Agency for Research on Cancer) lists nickel as a probable human carcinogen.

Cobalt dust and fumes are listed under 29CFR1910, Subpart Z, as an air contaminant; dust or fumes may cause eye, lung, and skin irritations.

SECTION III - PHYSICAL DATA

Boiling Points: > 2600 C  
Solubility in Water: Insoluble  
Evaporation Rate: N.A.  
Specific Gravity: > 1.0

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SECTION IV - HEALTH HAZARD INFORMATION

Skin: Some individuals may be "nickel-cobalt sensitized" and have allergic reactions upon contact.

Eye: The finely divided powder is abrasive and will cause irritation, tearing, redness, and blurred vision.

Inhalation: Inhalation of dusts will cause irritation of the respiratory tract.

Primary Route of Entry: Inhalation of dusts.

Chronic Effects: Chronic respiratory diseases will be aggravated by exposure to dusting conditions.

---

SECTION V - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Wear a NIOSH-approved respirator for dust and mist in dusting situations.

Eye Protection: Wear goggles and face shield to avoid eye contact. If dust contacts eyes, immediately flush with copious amounts of water and contact physician.

Skin Contact: Wear protective gloves, especially individuals sensitive to metals. If skin contact occurs, immediately wash effected area with warm soapy water.

Provide local ventilation to meet permissible exposure limits.

---

SECTION VI - FIRE AND EXPLOSION DATA

Flash Point: N/A

Extinguishing Media: This material is considered non-flammable. If a fire occurs in the area where this material is used, use sand or dry chemicals, avoid water.

Unusual Fire and Explosion Hazards: None known at this time.

---

SECTION VII - REACTIVITY DATA

Stability: This material is stable.

Polymerization: Does not occur.

Incompatibilities: Strong acids and bases can cause decomposition of this material.

---

SECTION VIII - SPILL AND LEAK PROCEDURES

Steps to be taken in the event of a spill: Sweep or shove spilled material into original or suitable container.

Waste Disposal Methods: Incineration for recovery of the metals is the recommended and desired method. The material may be landfilled in accordance with all applicable local, state, and federal regulations.

---

SECTION IX - OTHER INFORMATION

Proper handling can insure minimal exposure to individuals and the environment. Please review with all personnel the proper techniques of protection before using this material. Safety is the responsibility of the immediate user.

---

Material Safety Data Sheet  
Nickel-Aluminum-Cobalt Alloy  
Page - 4

This information is provided in good faith and is believed to be correct as of August, 1990. Activated Metals and Chemicals, Inc., makes no representation as to the complete accuracy of this information. It is expected the companies receiving this information will use good judgment in applications for this product to prevent any harm to individuals, property or the environment.

ACTIVATED METALS AND CHEMICALS, INC., U.S.A.

August, 1990

MATERIAL SAFETY DATA SHEET

ACCEPTED BY O.S.H.A. AS ESSENTIALLY SIMILAR TO O.S.H.A. FORM 20

AND CHEMICAL CO. ENVIRONMENTAL & OCCUPATIONAL SAFETY DEPT., BOX 2219, COLUMBUS, OH 43224-4019 EMERGENCY TELEPHONE: 606-324-1133 (LOCATED AT ASHLAND, KENTUCKY)

\*\*\*\*\*

SHI AND PRODUCT NAME: LIME HYDRATED

MOLECULES INCORPORATED  
P.O. DRAWER 1937  
HATTIESBURG MISS 39401

OS 50 OS6 4133770-  
DATA SHEET NO: 0000935-001  
LATEST REVISION DATE: 02/78-73046  
PRODUCT: 3514800  
INVOICE: 521532  
INVOICE DATE: 06/25/80  
TO: SAME

ATTN: PURCHASING/SAFETY DEPT.

\*\*\*\*\* SECTION I-PRODUCT IDENTIFICATION \*\*\*\*\*

REFERENCE IDENTIFICATION: ALCAL I  
HAZARD CLASSIFICATION: (17) GRN-B

\*\*\*\*\* SECTION II-HAZARDOUS COMPONENTS \*\*\*\*\*

INGREDIENT	PERCENT	TLV
HYDRATE	>60	5 MG/CUM

\*\*\*\*\* SECTION III-PHYSICAL DATA \*\*\*\*\*

PROPERTY	REFINEMENT	MEASUREMENT
INITIAL BOILING POINT	FOR PRODUCT	5162.00 DEG F ( 2850.00 DEG C @ 760.00 MMHG
APOR PRESSURE	NOT APPLICABLE	
APOR DENSITY	NOT APPLICABLE	
SPECIFIC GRAVITY		2.300 @ 68.00 DEG F ( 20.00 DEG C
PERCENT VOLATILES	NOT APPLICABLE	
VAPORATION RATE	NOT APPLICABLE	



\*\*\*\*\* SECTION IV-FIRE AND EXPLOSION DATA \*\*\*\*\*

FLAMMABLE (CLOSED CUP) NOT APPLICABLE

LOWER EXPLOSIVE LIMIT NOT APPLICABLE

EXTINGUISHING MEDIA: CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: NOT APPLICABLE

SPECIAL FIREFIGHTING PROCEDURES: SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS: NOT APPLICABLE

\*\*\*\*\* SECTION V-HEALTH HAZARD DATA \*\*\*\*\*

THRESHOLD LIMIT VALUE: 5 MG/CM

EFFECTS OF OVEREXPOSURE: FDF PRODUCT

EYES - CAUSES BURNS.

SKIN - CAUSES BURNS.

BREATHING - DUST CAN CAUSE IRRITATION OF NASAL AND RESPIRATORY PASSAGES.

SWALLOWING - RESULTS IN SEVERE DAMAGE TO MUCOUS MEMBRANES.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDRY CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY. GET MEDICAL ATTENTION.

IF SWALLOWED: GIVE TWO GLASSES OF WATER; INDUCE VOMITING IMMEDIATELY BY STICKING FINGER DOWN THROAT. CALL A PHYSICIAN. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

\*\*\*\*\* SECTION VI-REACTIVITY DATA \*\*\*\*\*

HAZARDOUS POLYMERIZATION: CANNOT OCCUR  
STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH: STRONG MINERAL ACIDS., STRONG ORGANIC ACIDS

\*\*\*\*\* SECTION VII - SPILL OR LEAK PROCEDURES \*\*\*\*\*

TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:  
-----

**SMALL SPILL:** COVER WITH EXCESS DRY SODA ASH MIX AND SWEEP ONTO PAPER OR COLLECT IN BEAKER.

**LARGE SPILL:** ELIMINATE ALL IGNITION SOURCES (FLARES, FLAMES, INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. MIX WITH DRY SODA ASH. SCUOP INTO A DRY BUCKET.

**WASTE DISPOSAL METHOD:**  
-----

**SMALL SPILL:** DISSOLVE IN LARGE AMOUNT OF WATER AND NEUTRALIZE WITH CaHCl. FLUSH DOWN DRAIN WITH EXCESS WATER.

**LARGE SPILL:** POUR INTO LARGE TANK OF WATER AND NEUTRALIZE. FLUSH TO DRAIN WITH LARGE EXCESS OF WATER.

\*\*\*\*\* SECTION VIII - PROTECTIVE EQUIPMENT TO BE USED \*\*\*\*\*

**RESPIRATORY PROTECTION:** IF NEEDED USE A NIOSH/MSHA JOINTLY APPROVED JUST RESPIRATOR. (ASK YOUR SAFETY EQUIPMENT SUPPLIER)

**VENTILATION:** PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

**PROTECTIVE GLOVES:** WEAR RESISTANT GLOVES SUCH AS: NEOPRENE, POLYVINYL CHLORIDE

**EYE PROTECTION:** CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

**OTHER PROTECTIVE EQUIPMENT:** TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

\*\*\*\*\* SECTION IX - SPECIAL PRECAUTIONS OR OTHER COMMENTS \*\*\*\*\*

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THIS DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH ASHLAND OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

# ZINC OXIDE

## MATERIAL SAFETY DATA SHEET 3506

### A. PRODUCT/COMPANY IDENTIFICATION

TR. NAME (COMMON NAME OR SYNONYM) Zinc Oxide (French Process)		PRODUCT CODE# AZO, AZODOX, AZOFLO	
CHEMICAL NAME Zinc Oxide		FORMULA ZnO	MOLECULAR WEIGHT 81.38
MANUFACTURER'S NAME: MIDWEST ZINC - HILLSBORO, INC. P.O. BOX 538 HILLSBORO, IL 62049		ISSUED DATE 3/9/94	REVISED DATE
TELEPHONE (24 HOUR EMERGENCY OR INFORMATION): (217)532-3931			

### B. COMPOSITION/INFORMATION ON INGREDIENTS

MATERIAL OR COMPONENT	C.A.S. #	WT. %	PERMISSIBLE AIR CONC.(mg/cu.m.)	
			OSHA	ACGIH
zinc oxide	1314-13-2	99.7-100	5.0 Resp. Dust 10.0 Total Dust	10.0 dust
lead	7439-92-1	< 0.003		
cadmium	7440-43-9	< 0.002		

### C. HAZARDS IDENTIFICATION

ROUTES OF ENTRY INGESTION <input checked="" type="checkbox"/> INHALATION <input checked="" type="checkbox"/> SKIN <input type="checkbox"/>	CARCINOGENICITY Not listed as a carcinogen by IARC, NTP, OSHA.
ACUTE OVEREXPOSURE (SYMPTOMS AND EFFECTS) Metal fume fever with symptoms of fever, chills, metallic taste, chest tightness or nausea may result from inhalation of zinc oxide fume or dust. Zinc oxide is relatively non-toxic by mouth, but may cause fever, nausea, stomach cramps or diarrhea in large doses. Dermatitis (papulopustular eczema) with intense itching may result from excessive skin contact.	
CHRONIC OVEREXPOSURE (SYMPTOMS AND EFFECTS) None reported.	
SPECIAL CONDITIONS POSSIBLY AGGRAVATED None reported.	

### D. FIRST AID MEASURES

Inhalation: Remove from exposure; place individual under care of a physician. Ingestion: Induce vomiting in conscious individual and call a physician. Skin or Eyes: Flush with plenty of water. If symptoms develop, consult a physician.
--

### E. FIRE FIGHTING MEASURES

FLASH POINT Applicable	AUTO IGNITION TEMPERATURE Not Applicable	FLAMMABLE LIMITS IN AIR (% BY VOL) Not Applicable
SPECIAL FIRE AND EXPLOSION HAZARDS Applicable	FIRE EXTINGUISHING AGENTS RECOMMENDED No specific agents recommended	FIRE EXTINGUISHING AGENTS TO AVOID No specific agents
SPECIAL FIRE FIGHTING PRECAUTIONS NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing if involved in fire.		

## RELEASE MEASURES

### SPILLS OR LEAKS

Any method which keeps dust to a minimum is acceptable. Vacuuming is preferred for dust. Use approved respiratory protection if possibility of dust or fume exists. Do not use compressed air for cleaning.

## HANDLING AND STORAGE

### NORMAL HANDLING

Use of approved respirators is required for applications where adequate ventilation cannot be provided. Activities which generate dust or fume should be avoided. When melted, the temperature should be kept as low as possible.

### STORAGE

General storage procedures acceptable.

## EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS

Local exhaust ventilation is recommended for dust and/or fume generating operations where airborne exposures may exceed permissible air concentrations.

### PERSONAL HYGIENE

Avoid inhalation or ingestion. Practice good housekeeping and personal hygiene procedures. A shower is recommended if significant dust exposure occurs.

### SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

NPCA HMIS 1H-0F-0R-PPE(E)  
NFPA Classification: 1H, 0F, 0R

### LABEL SIGNAL WORD:

CAUTION

### RESPIRATORY PROTECTION

Where airborne exposures may exceed OSHA/ACGIH permissible concentrations, the minimum respiratory protection recommended is a negative pressure air purifying respirator with cartridges that are NIOSH/MSHA approved against dust, mists and mists having a TWA not less than 0.05 mg/cu.m.

### EYES AND FACE

Safety glasses recommended where the possibility of getting dust or particles in eyes exists.

### OTHER CLOTHING AND EQUIPMENT

Protective clothing is recommended for jobs with heavy dust exposure to prevent skin irritation. Contaminated clothing to be removed before leaving plant premises.

## PHYSICAL/CHEMICAL PROPERTIES

### APPEARANCE AND ODOR

Solid

### APPEARANCE AND ODOR

White powder, odorless

### MELTING POINT (DEGREES C)

Sublimes at 1975

### BOILING POINT (DEGREES C)

Not Available

### SPECIFIC GRAVITY (H<sub>2</sub>O = 1)

5.6

### VAPOR DENSITY (AIR = 1)

Not Applicable

### SOLUBILITY IN WATER (% BY WT.)

soluble

### pH

Not Applicable

### VAPOR PRESSURE (mm Hg)

Not Applicable

### EVAPORATION RATE

Not Applicable

## STABILITY AND REACTIVITY

### STABILITY

Stable

### CONDITIONS TO AVOID

Not Applicable

### COMPATIBILITY (MATERIALS TO AVOID)

Zinc oxide and magnesium can react explosively when heated. Zinc oxide and chlorinated rubber were mixed and exploded in one instance.

### HAZARDOUS DECOMPOSITION PRODUCTS

None

### HAZARDOUS POLYMERIZATION

Will not occur

### CONDITIONS TO AVOID

Not Applicable

## TOXICOLOGICAL INFORMATION

### LD50(SPECIES, ROUTE)

Not available.

### LC50(SPECIES)

Not available.

### MUTAGENICITY

Not available.

## ECOLOGICAL

### TOXICITY

Not available.

### ENVIRONMENTAL FATE

Not available.

# DISPOSAL CONSIDERATIONS

DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE, AND LOCAL DISPOSAL OR DISCHARGE LAWS)  
Hazardous under 40 CFR 261, Subparts B and C, material must be treated or disposed in a facility meeting the requirements of 40 CFR 264 or 265. If non-hazardous, material should be disposed in a facility meeting the requirements of 40 CFR 257.

STATUS OF UNUSED MATERIAL  
If stored in unaltered form, material should be tested to determine if it must be classified as a hazardous waste for disposal purposes. Under specific circumstances, application can be made to the EPA Administrator to have a particular site designated non-hazardous.

40 CFR  
261

# TRANSPORT

REGULATION AND ID (OR PIN) NUMBER  
This material is not regulated by the DOT.

# REGULATORY INFORMATION

HAZARD CLASSIFICATION, SARA REGULATION AND OTHER INFORMATION  
HMIS does not classify this material  
CA Status.....: On TSCA Inventory  
Regulated under SARA Title III:  
Section 302.....: None  
Section 311/312.....: Immediate  
Section 313 Chemicals.....: Zinc compounds  
RCRA Reportable Quantity.....: None

WARNING: The State of California has listed lead as a chemical which can cause birth defects of other reproductive organs and has listed cadmium as a chemical known to cause cancer.

# REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES  
EPA regulations for airborne contaminants 29 CFR 1910.1000 and 1018; ACGIH Threshold Limit Values for Chemical Substances

ADDITIONAL INFORMATION REFERENCES  
American Conference of Governmental Hygienists, 6th Ed., ACGIH  
Journal of Industrial Hygiene and Toxicology, Vol. 2A, 3rd Rev. Ed., 1981  
National Fire Protection Association, Guide on Hazardous Materials, 10th Ed., 1991  
Handbook of Toxic and Hazardous Chemicals; Sittig, Marshall; 1981  
MEDLINE Plus Database; Micromedex, Inc., Vol. 17, 1993  
NATOTOX Database; Spectrum Research, Inc., Version 2.0, 1992

GENERAL  
Handbook of Chemistry and Physics, 57th Ed., 1976-77, Weast, R.C., Editor, CRC Inc.

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ACETIC ACID, GLACIAL

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J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

=====  
SECTION I - PRODUCT IDENTIFICATION  
=====

PRODUCT NAME: ACETIC ACID, GLACIAL  
COMMON SYNONYMS: ETHANOIC ACID; METHANE CARBOXYLIC ACID; ETHYLIC ACID  
CHEMICAL FAMILY: ORGANIC ACIDS  
FORMULA: CH<sub>3</sub>COOH  
FORMULA WT.: 60.05  
CAS NO.: 64-19-7  
NIOSH/RTECS NO.: AF1225000  
PRODUCT USE: LABORATORY REAGENT  
PRODUCT CODES: 4803,9524,6903,9511,9520,9522,9508,9507,9506,9515,9501,9500  
9505,5355,9503,9513

=====  
PRECAUTIONARY LABELING  
=====

BAKER SAF-T-DATA\* SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	2	MODERATE
REACTIVITY	-	2	MODERATE
CONTACT	-	3	SEVERE (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING

DANGER

COMBUSTIBLE. CAUSES SEVERE BURNS. HARMFUL IF SWALLOWED OR INHALED.  
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE  
VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER  
SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. IN CASE OF SPILL,  
NEUTRALIZE WITH SODA ASH OR LIME AND PLACE IN DRY CONTAINER.

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===== PRECAUTIONARY LABELING (CONTINUED) =====

INTERNATIONAL LABELING

FLAMMABLE. CAUSES SEVERE BURNS.  
KEEP OUT OF REACH OF CHILDREN. DO NOT BREATHE VAPOUR. IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.

SAF-T-DATA\* STORAGE COLOR CODE: RED (FLAMMABLE)

===== SECTION II - COMPONENTS =====

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
ACETIC ACID	64-19-7	90-100	10 PPM	10 PPM

===== SECTION III - PHYSICAL DATA =====

BOILING POINT: 118 C (244 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 11 (20 C)
MELTING POINT: 17 C (62 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 2.1
SPECIFIC GRAVITY: 1.05 (H2O=1)	EVAPORATION RATE: 0.97 (BUTYL ACETATE = 1)
SOLUBILITY(H2O): COMPLETE (100%)	% VOLATILES BY VOLUME: 100 (21 C)
PH: 2.4 (1.0M SOLUTION)	
ODOR THRESHOLD (P.P.M.): N/A	PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A	
APPEARANCE & ODOR: COLORLESS LIQUID. VINEGAR-LIKE ODOR.	

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=====  
SECTION IV - FIRE AND EXPLOSION HAZARD DATA  
=====

FLASH POINT (CLOSED CUP): 39 C (103 F) NFPA 704M RATING: 2-2-1

AUTOIGNITION TEMPERATURE: 426 C (800 F)

FLAMMABLE LIMITS: UPPER - 19.9 % LOWER - 4.0 %

FIRE EXTINGUISHING MEDIA

USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR.

TOXIC GASES PRODUCED

ACETIC ACID, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

=====  
SECTION V - HEALTH HAZARD DATA  
=====

THRESHOLD LIMIT VALUE (TLV/TWA): 25 MG/M3 (10 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 37 MG/M3 (15 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 25 MG/M3 (10 PPM)

TOXICITY OF COMPONENTS

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=====  
SECTION V - HEALTH HAZARD DATA (CONTINUED)  
=====

ORAL RAT LD50 FOR ACETIC ACID 3310 MG/KG  
INTRAVENOUS MOUSE LD50 FOR ACETIC ACID 525 MG/KG  
SKIN RABBIT LD50 FOR ACETIC ACID 1060 MG/KG  
INHALATION MOUSE LC50 FOR ACETIC ACID 5620 PPM  
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY  
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS  
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM,  
PULMONARY EDEMA, LUNG INFLAMMATION, HEADACHE, COUGHING,  
DIFFICULT BREATHING, DIZZINESS, CHEST PAINS, TEETH  
DAMAGE, RESPIRATORY FAILURE

SKIN CONTACT: SEVERE BURNS, MAY CAUSE DERMATITIS

EYE CONTACT: SEVERE BURNS, PERMANENT EYE DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: BURNS TO MOUTH AND THROAT, NAUSEA, VOMITING,  
GASTROINTESTINAL IRRITATION, DIARRHEA, SHOCK, MAY BE  
FATAL

CHRONIC EFFECTS: LUNG DAMAGE, TEETH DAMAGE

TARGET ORGANS  
RESPIRATORY SYSTEM, EYES, SKIN, TEETH, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE  
RESPIRATORY SYSTEM DISEASE, SKIN DISORDERS

PRIMARY ROUTES OF ENTRY  
INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT

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=====  
SECTION V - HEALTH HAZARD DATA (CONTINUED)  
=====

EMERGENCY AND FIRST AID PROCEDURES

- INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
- INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
- SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.
- EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

NOTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO  
 EXTREMELY HAZARDOUS SUBSTANCE: NO  
 CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS ACETIC ACID (RC = 5000 LBS).  
 SARA 313 TOXIC CHEMICALS: NO  
 TSCA INVENTORY: YES

=====  
SECTION VI - REACTIVITY DATA  
=====

- STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
- CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION
- INCOMPATIBLES: STRONG OXIDIZING AGENTS, MOST COMMON METALS (EXCEPT ALUMINUM), CHROMIC ACID, NITRIC ACID, SULFURIC ACID, HYDROGEN PEROXIDE, ALKALIES, CARBONATES, STRONG BASES, AMINES, PHOSPHORUS TRICHLORIDE, PHOSPHORUS PENTACHLORIDE
- DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

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J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

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=====  
SECTION VII - SPILL & DISPOSAL PROCEDURES  
=====

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING, OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. REMOVE FROM SPILL AREA. FLUSH AREA WITH WATER. DO NOT ALLOW SPILL TO ENTER DRAINS OR SEWER SYSTEM.

J. T. BAKER NEUTRASORB(R) OR TEAM(R) 'LOW NA+' ACID NEUTRALIZERS ARE FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: 0001, D002 (IGNITABLE, CORROSIVE WASTE)

CHRONIC TOXICITY

FATHEAD MINNOW 96HR-LC50 > 100MG/L; WATER FLEA 96HR-LC50 = 100 MG/L; MOSQUITO FISH 48HR-LC50 = 251 MG/L; GOLDEN ORFE MINNOW 48HR-LC50 = 410 MG/L.

=====  
SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT  
=====

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 500 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID/ORGANIC CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

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SECTION IX - STORAGE AND HANDLING PRECAUTIONS

=====

SAF-T-DATA\* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED,  
FLAMMABLE LIQUID STORAGE AREA OR CABINET. STORE ABOVE 17 C.

=====

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

=====

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: ACETIC ACID, GLACIAL  
HAZARD CLASS: 8  
UN/NA: UN2789 REPORTABLE QUANTITY: 5000 LBS. PACKAGING GROUP: II  
LABELS: CORROSIVE  
REGULATORY REFERENCES: 49CFR 172.101; 173.245; 173.245A

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: ACETIC ACID, GLACIAL  
HAZARD CLASS: 8, 3.3 I.M.O. PAGE: 8100  
UN: UN2789 MARINE POLLUTANTS: NO PACKAGING GROUP: II  
LABELS: CORROSIVE, FLAMMABLE LIQUID  
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: ACETIC ACID, GLACIAL  
HAZARD CLASS: 8 PACKAGING GROUP: II  
UN: UN2789  
LABELS: CORROSIVE, FLAMMABLE LIQUID  
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE

THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN  
TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE  
DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION  
OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR  
SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR  
WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE  
INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION,  
INVESTIGATION, AND VERIFICATION. ANY USE OF THE  
INFORMATION MUST BE DETERMINED BY THE USER TO BE IN  
ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL  
LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR  
172.3 AND EMPLOYEE TRAINING 49CFR 173.1.

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=====  
SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)  
=====

U.S. CUSTOMS HARMONIZATION NUMBER: 29152100005  
=====

N/A = NOT APPLICABLE OR NOT AVAILABLE  
N/E = NOT ESTABLISHED  
---

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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===  
APPROVED BY QUALITY ASSURANCE DEPARTMENT.

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"ISSUED BY VWR 10/23/93"



PAGE: 1  
DATE PREPARED: MAY 3, 1993  
MSDS NO.: 90230000

**ISOPROPYL ALCOHOL, ANHYDROUS**

**SECTION 1 PRODUCT IDENTIFICATION & EMERGENCY INFORMATION**

PRODUCT NAME: Isopropyl Alcohol, Anhydrous

CHEMICAL NAME:  
2-Propanol

CAS 67-63-0

CHEMICAL FAMILY:  
Aliphatic Alcohol

PRODUCT DESCRIPTION:  
Clear colorless liquid.

EMERGENCY TELEPHONE NUMBERS: EXXON CHEMICAL AMERICAS 800-726-2015  
CHEMTREC 800-424-9300

**SECTION 2 HAZARDOUS INGREDIENT INFORMATION**

This product is hazardous as defined in 29 CFR 1910.1200.

OSHA HAZARD  
Flammable  
PEL; TLV  
Eye irritant

For additional information see Section 3.

**SECTION 3 HEALTH INFORMATION & PROTECTION**

**NATURE OF HAZARD**

**EYE CONTACT:**

Irritating, and will injure eye tissue if not removed promptly.

**SKIN CONTACT:**

Frequent or prolonged contact may irritate and cause dermatitis.  
Low order of toxicity.

**INHALATION:**

High vapor concentrations are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects.  
Negligible hazard at ambient temperature (-18 to 38 Deg C; 0 to 100 Deg F)

**INGESTION:**

Minimal toxicity.  
Small amounts of the liquid aspirated into the respiratory system during ingestion, or from vomiting, may cause bronchiopneumonia or pulmonary edema.

**FIRST AID**

**EYE CONTACT:**

Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.

**SKIN CONTACT:**

Immediately flush with large amounts of water; use soap if available.  
Remove contaminated clothing, including shoes, after flushing has begun.



**ISOPROPYL ALCOHOL, ANHYDROUS**PAGE: 2  
DATE PREPARED: MAY 3, 1993  
MSDS NO.: 90230000**INHALATION:**

Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.

**INGESTION:**

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

**ACUTE TOXICITY DATA IS AVAILABLE UPON REQUEST.**

**WORKPLACE EXPOSURE LIMITS****OSHA REGULATION 29CFR1910.1000 REQUIRES THE FOLLOWING PERMISSIBLE EXPOSURE LIMITS:**

A TWA of 400 ppm (980 mg/m<sup>3</sup>) and a STEL of 500 ppm (1225 mg/m<sup>3</sup>) for Isopropyl Alcohol.

**THE ACGIH RECOMMENDS THE FOLLOWING THRESHOLD LIMIT VALUES:**

a TWA of 400 ppm (983 mg/m<sup>3</sup>), and a STEL of 500 ppm (1230 mg/m<sup>3</sup>) for Isopropyl Alcohol.

**PRECAUTIONS****PERSONAL PROTECTION:**

For open systems where contact is likely, wear long sleeves, chemical resistant gloves, and chemical goggles.

Where contact may occur, wear safety glasses with side shields.

Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA approved respirators may be necessary to prevent overexposure by inhalation.

**VENTILATION:**

The use of mechanical dilution ventilation is recommended whenever this product is used in a confined space, is heated above ambient temperatures, or is agitated.

Use explosion-proof ventilation equipment.

**CHRONIC EFFECTS:**

In developmental toxicity studies conducted by the Chemical Manufacturers Association, unexpected acute toxicity was found when Isopropanol was administered to pregnant rabbits by gavage. There were no unexpected toxic effects in pregnant rats exposed in the same study. In rats there were some relatively mild developmental effects at maternally toxic levels. There was no evidence of developmental toxicity in the rats at levels which did not also produce maternal toxicity. There were no indications of developmental toxicity in the rabbits at any exposure level. Findings from a multigeneration reproduction study indicate that infant and immature rats are more sensitive than their parents to the acute oral toxicity induced by high (1000 mg/kg/day) doses of Isopropanol. The effect levels for rats and rabbits were at several times the maximum exposure that would occur at the TLV. This information has been reported to the U.S. EPA under the provisions of Section 8(e) of TSCA.

**CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST**

**ISOPROPYL ALCOHOL, ANHYDROUS**PAGE: 3  
DATE PREPARED: MAY 3, 1993  
MSDS NO.: 90230000**SECTION 4 FIRE & EXPLOSION HAZARD****FLASHPOINT:** 54 Deg F. **METHOD:** TCC  
**FLAMMABLE LIMITS:** LEL: 2.0 UEL: 12.7 @ 77 Deg F.  
**AUTOIGNITION TEMPERATURE:** > 662 Deg F.**GENERAL HAZARD:**

Flammable Liquid, can release vapors that form flammable mixtures at temperatures at or above the flashpoint.  
"Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE, AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.

**FIRE FIGHTING:**

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors.  
Either allow fire to burn under controlled conditions or extinguish with alcohol type foam and dry chemical. Try to cover liquid spills with foam.

**HAZARDOUS COMBUSTION PRODUCTS:**

No unusual

**SECTION 5 SPILL CONTROL PROCEDURE****LAND SPILL:**

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 7) notify the National Response Center.  
Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust.  
Recover by pumping (use an explosion proof or hand pump) or with a suitable absorbent.  
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

**WATER SPILL:**

Eliminate sources of ignition. Warn occupants and shipping in surrounding and downwind areas of fire and explosion hazard and request all to stay clear.  
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

**ISOPROPYL ALCOHOL, ANHYDROUS**PAGE: 4  
DATE PREPARED: MAY 3, 1993  
MSDS NO.: 90230000**SECTION 6 NOTES****HAZARD RATING SYSTEMS:**

This information is for people trained in:  
National Paint & Coatings Association's (NPCA)  
Hazardous Materials Identification System (HMIS)  
National Fire Protection Association (NFPA 704)  
Identification of the Fire Hazards of Materials

	NPCA-HMIS	NFPA 704	KEY
HEALTH	2	1	4 = Severe
FLAMMABILITY	3	3	3 = Serious
REACTIVITY	0	0	2 = Moderate
			1 = Slight
			0 = Minimal

**SECTION 7 REGULATORY INFORMATION****DEPARTMENT OF TRANSPORTATION (DOT):****DOT PROPER SHIPPING NAME:**

ISOPROPANOL, Flammable Liquid UN1219

**DOT HAZARD CLASS:** Flammable liquid**DOT IDENTIFICATION NUMBER:** UN 1219

NAME: Isopropanol (Isopropyl Alcohol)

**FLASHPOINT:** 54 Deg F. METHOD: TCC**TSCA:**

This product is listed on the TSCA Inventory at CAS Registry Number 67-63-0

**CERCLA:**

If this product is accidentally spilled, it is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). We recommend you contact local authorities to determine if there may be other local reporting requirements.

**SARA TITLE III:**

Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories: Immediate health, Delayed Health, Fire.

This information may be subject to the provisions of the Community Right-to-Know Reporting Requirements (40 CFR 370) if threshold quantity criteria are met.

**SECTION 8 TYPICAL PHYSICAL & CHEMICAL PROPERTIES****SPECIFIC GRAVITY:**

0.79 at 68

**SOLUBILITY IN WATER, WT. % AT °F:**

100.00 at 68

**SP. GRAV. OF VAPOR, at 1 atm (Air=1):**

Greater than 1.00

**VAPOR PRESSURE, mmHg at °F:**

96 at 100

230 at 131

**VISCOSITY OF LIQUID, CST AT °F:**

3 at 68

**FREEZING/MELTING POINT, °F:**

-128

**ISOPROPYL ALCOHOL, ANHYDROUS**PAGE: 5  
DATE PREPARED: MAY 3, 1993  
MSDS NO.: 90230000EVAPORATION RATE, n-Bu Acetate=1:  
2.3BOILING POINT, °F:  
180 to 181**SECTION 9 REACTIVITY DATA****STABILITY:**

Stable

**HAZARDOUS POLYMERIZATION:**

Will not occur

**CONDITIONS TO AVOID INSTABILITY:**

Not Applicable

**MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:**

Caustics, amines, alkanolamines, aldehydes, strong oxidizing agents, and chlorinated compounds.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

None

**SECTION 10 STORAGE AND HANDLING****ELECTROSTATIC ACCUMULATION HAZARD:**

No, but use proper grounding procedure

**LOADING/UNLOADING TEMPERATURE, °F:**

Ambient

**STORAGE TEMPERATURE, °F:**

Ambient

**VISC. AT LOADING/UNLOADING TEMP., cST:**

3

**STORAGE/TRANSPORT PRESSURE, mmHg:**

Atmospheric

**REVISION SUMMARY:**Since SEPTEMBER 15, 1992 this MSDS has been revised in Section(s):  
5**REFERENCE NUMBER:**

HDHA-C-00021

**DATE PREPARED:**

May 3, 1993

**SUPERSEDES ISSUE DATE:**

September 15, 1992

FOR ADDITIONAL PRODUCT INFORMATION, CONTACT YOUR TECHNICAL SALES REPRESENTATIVE  
FOR ADDITIONAL HEALTH/SAFETY INFORMATION, CALL 713-870-6884

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# MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,  
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

## SECTION I

MANUFACTURER'S NAME W.R. Grace & Co., Davison Chemical Division		EMERGENCY TELEPHONE NO. ---
ADDRESS (Number, Street, City, State, and ZIP Code) 3rd St. & Railroad Ave., P. O. Box 436, South Pittsburg, Tennessee 37380		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS Raney Cobalt Catalyst #27
CHEMICAL FAMILY Metal	FORMULA 90% Co & 10% Al & Al <sub>2</sub> O <sub>3</sub>	

## SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		N.A.	BASE METAL	90	1 mg/m <sup>3</sup>
CATALYST		N.A.	Co		
VEHICLE		N.A.	ALLOYS		N.A.
SOLVENTS		N.A.	METALLIC COATINGS		N.A.
ADDITIVES		N.A.	FILLER METAL PLUS COATING OR CORE FLUX		N.A.
OTHERS		N.A.	OTHERS		
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES					TLV (Units)
Not Applicable					

## SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N.A.	SPECIFIC GRAVITY (H <sub>2</sub> O=1) Wet Bulk Dens.	10 lbs/gal
VAPOR PRESSURE (mm Hg.)	N.A.	PERCENT, VOLATILE BY VOLUME (%)	0
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____-1)	N.A.
SOLUBILITY IN WATER	Insol.		
APPEARANCE AND ODOR	Black powder, 40 micron typical particle size		

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	N.A.	FLAMMABLE LIMITS	Let	Uel
EXTINGUISHING MEDIA	Water			
SPECIAL FIRE FIGHTING PROCEDURES Material is shipped in water slurry. If allowed to dry, it will smolder and generate heat. Use water, CO <sub>2</sub> foam, or common bleach solution (sodium hypochlorite) to cool down and quench smoldering material.				
UNUSUAL FIRE AND EXPLOSION HAZARDS				

reactivated

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hr.)

HERCULES\* RESIN 731D  
Disproportionated rosin,  
MOLTEN or SOLID

MSDS No.: 874 7301 0100-03

Supersedes MSDS No.: 874 7301 0100-02

Date: 04/02/93

I. PRODUCT IDENTIFICATION

A. HERCULES\* RESIN 731D Disproportionated rosin, MOLTEN

DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.  
PRODUCT MAY BURN IF IGNITED.

APPEARANCE AND ODOR: Pale amber, viscous liquid at 150-210 C (302-410 F);  
rosin odor

B. HERCULES\* RESIN 731D Disproportionated rosin, SOLID

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE  
VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL  
HAZARDS).

APPEARANCE AND ODOR: Amber-colored solid or flake; typical rosin odor

CASRN: 8050-09-7

HMIS RATINGS:(1)

Health hazard: 0 Minimal  
Flammability hazard: 1 Slight  
Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Disproportionated rosin

\* Registered Trademark of Hercules Incorporated

(1)Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable



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**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

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As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a health hazard.

If this product is used in a manner that could generate particulates (dust), Hercules recommends that the dust be treated as a NUISANCE PARTICULATE (Particulates Not Otherwise Classified) as defined by the American Conference of Governmental Industrial Hygienists (ACGIH) or (Particulates not otherwise Regulated) as defined by OSHA.

**RECOMMENDED AIRBORNE LEVELS  
1992-1993**

	OSHA TWA	TLV-TWA
Particulates not Otherwise classified/regulated	15 mg/m3 total 5 mg/m3 respirable fraction	10 mg/m3

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m3 (as formaldehyde), for rosin core solder pyrolysis products should be observed.

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: N/A

SOLUBILITY IN WATER: Negligible

VAPOR PRESSURE AT 20 C: Not determined

SPECIFIC GRAVITY: 1.06

VAPOR DENSITY: N/A

pH: N/A

VOLATILE (WT.),%: Not determined

EVAPORATION RATE: Slower than butyl acetate

SOFTENING POINT: 80 C (176 F)

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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**A. MOLTEN product**

CAUTION! PRODUCT MAY BURN IF IGNITED.

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**B. SOLID product**

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

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FLASH POINT: 209 C (408 F) COC

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

**SPECIAL FIREFIGHTING PROCEDURES:**

Use self-contained breathing apparatus.

Apply water to MOLTEN RESIN fires from a safe, protected location to avoid body contact with hot resin.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form flammable dust-air mixtures.

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide, smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Section 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

MONSANTO PRODUCT NAME

ADIPIC ACID, RESIN GRADE

(K) 10/...

MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MO 63167  
EMERGENCY PHONE NO.  
(CALL COLLECT)  
314-694-1000

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**PRODUCT IDENTIFICATION**

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**Synonyms:** Hexanedioic acid  
1,4-butanedicarboxylic acid

**Chemical Formula:**  $\text{HOOC}(\text{CH}_2)_4\text{COOH}$

**CAS No.:** 124-04-9

**TSCA Inventory:** This product appears on the inventory of Chemical Substances published by the U.S. Environmental Protection Agency (EPA) under the authority of the Toxic Substances Control Act (TSCA)

**DOT Proper Shipping Name:** ORM-E, Solid, N.O.S. (adipic acid) (for bulk shipments)

**DOT Hazard Class/I.D. No.:** ORM-E/NA9188

**DOT Label:** Not Applicable

**U.S. Surface Freight Classification:** Adipic Acid

**Reportable Quantity (RQ) Under DOT (49 CFR) and CERCLA Regulations:** Adipic Acid, 5000 pounds

**SARA Hazard Notification**

Hazard Categories under criteria of  
SARA Title III rules (40 CFR Part 370): Immediate

Section 313 Hazardous Chemical(s): Not Applicable

Hazardous Chemical(s) under OSHA Hazard Communication Standard:

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

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**WARNING STATEMENTS**

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**CAUTION!**  
MAY CAUSE EYE IRRITATION  
COMBUSTIBLE DUST - EXPLOSION POTENTIAL

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**PRECAUTIONARY MEASURES**

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Keep away from heat, sparks and flame.  
Avoid creating a dust cloud in handling, transfer and clean up.  
Avoid contact with eyes.  
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

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**EMERGENCY AND FIRST AID PROCEDURES**

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**FIRST AID:** IF IN EYES, immediately flush with plenty of water. Remove material from skin and clothing. Get medical attention if irritation persists.

**IN CASE OF:**  
**SPILL or LEAK,** vacuum or sweep up and place into containers for disposal.

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**OCCUPATIONAL CONTROL PROCEDURES**

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**Eye Protection:** Where there is significant potential for eye contact, wear chemical goggles and have eye flushing equipment available.

**Skin Protection:** Although adipic acid does not present a significant skin concern, minimize skin contamination by following good industrial practice. Wearing of protective gloves is recommended. Wash hands and contaminated skin after handling.

**Respiratory Protection:** Avoid breathing dust, vapor and/or mist. Use NIOSH/MSHA approved respiratory protection equipment (full facepiece recommended) when airborne exposure is excessive (see below). Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR 1910.134.

**Ventilation:** Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust systems.

**Airborne Exposure Limits:**

**Product:** Adipic Acid

Although OSHA and ACGIH have not established specific exposure limits for this material, they have established limits for nuisance dusts:

OSHA PEL/8-hour Time-weighted average: Total 15 mg/m<sup>3</sup>; respirable 5 mg/m<sup>3</sup>  
ACGIH TLV/8-hour Time-weighted average: Total 10 mg/m<sup>3</sup>

These limits are stated only to indicate the least stringent airborne dust exposure levels applicable to nuisance dusts. Adipic acid may cause mild eye and respiratory tract irritation at exposure concentrations below these limits.

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**FIRE PROTECTION INFORMATION**

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**Flash Point:** 385°F

**Method:** Cleveland Open Cup

**Melting Point:** 305°F

**Ignition Temperature:** 450°F

**Extinguishing Media:** Water spray or any Class A extinguishing agent.

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## FIRE PROTECTION INFORMATION (continued)

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**Special Firefighting Procedures:** Firefighters and others who may be exposed to products of combustion (see "Hazardous Decomposition Products" below) should wear full protective clothing including self-contained breathing apparatus. Fire fighting equipment should be thoroughly decontaminated after use.

**Unusual Fire and Explosion Hazards:** Adipic acid is a combustible dust. When mixed in sufficient quantities in air, explosive concentrations can occur.

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## REACTIVITY DATA

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**Materials to Avoid:** None known.

**Hazardous Decomposition Products:** Cyclopentanone may form. No other uniquely hazardous decomposition products are expected. If the product is burned, as with any organic material, carbon monoxide, carbon dioxide, smoke, and soot can be produced.

**Hazardous Polymerization:** Does not occur.

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## HEALTH EFFECTS SUMMARY

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The following information summarizes human experience and results of scientific investigations reviewed by health professionals for hazard evaluation of adipic acid and development of Precautionary Measures and Occupational Control Procedures recommended in this document.

### Effects of Exposure

Inhalation and skin contact are expected to be the primary routes of occupational exposure to adipic acid. Occupational exposure to this material has not been reported to cause significant adverse health effects. However, based on available information, exposure to adipic acid may produce mild eye and/or respiratory tract irritation.

### Toxicological Data

Data from Monsanto studies and from the available scientific literature indicate the following:

Single dose (acute) studies indicate:

Oral - Practically Nontoxic (Rat LD50 - 5,050 mg/kg)  
Dermal - Practically Nontoxic (Rabbit LD50 - >7,940 mg/kg)  
Eye Irritation - Moderately Irritating (Rabbit, 18.2/110.0)  
Skin Irritation - Nonirritating (Rabbit, 4-hr. exposure, 0.0/8.0)

No adverse effects were reported in rats exposed to adipic acid by repeated inhalation. Rats given adipic acid in their diets for two years showed no increase in tumors. No birth defects were reported in mice, rats or hamsters given adipic acid orally during pregnancy. No adverse genetic changes were reported in standard tests using bacterial, animal and human cells, and animals.

### Additional Information

Adipic acid is GRAS (Generally Recognized As Safe). The United States Food and Drug Administration regulates it for use as a direct food additive and an indirect additive in packaging material that has direct food contact under several sections of part 21 CFR (Code of Federal Regulations).







UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.  
Industrial Chemicals Division

## MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 01/28/91

Union Carbide urges each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material of the information in this MSDS and any other information regarding hazards or safety; (2) furnish this same information to each of its customers for the product; and (3) request its customers to notify their employees, customers, and other users of the product of this information.

### I. IDENTIFICATION

PRODUCT NAME: DIETHYLENETRIAMINE, COMMERCIAL GRADE

CHEMICAL NAME: Ethyleneamine Mixture

CHEMICAL FAMILY: Ethyleneamines

FORMULA: Not Applicable

MOLECULAR WEIGHT: Not Applicable

SYNONYMS: DETA C; DETA - Comm. C-DETA, C-DTA

CAS # and Not Applicable

CAS NAME: Not Applicable (mixture)

### II. PHYSICAL DATA (Determined on typical material)

BOILING POINT, 760 mm Hg: 207 C (404 F)

FREEZING POINT: Sets to glass below - 61C (-78F)

SPECIFIC GRAVITY(H<sub>2</sub>O = 1):  
0.955 at 20/20 C

VAPOR PRESSURE AT 20°C:  
0.07 mm Hg

VAPOR DENSITY (air = 1):  
3.5-3.6

SOLUBILITY IN WATER by wt:  
100%

EVAPORATION RATE  
(Butyl Acetate = 1): 0.009

APPEARANCE AND ODOR: Water-white liquid; mild amine odor.

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UNION CARBIDE is a Trademark of Union Carbide Corporation  
EMERGENCY PHONE NUMBER: 1-800-UCC-HELP (Number available at all times) or 304-744-3487

UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.  
Industrial Chemicals Division  
39 Old Ridgebury Road, Danbury, CT. 06817-0001



**III. INGREDIENTS**

<u>MATERIAL</u>	<u>%</u>	<u>TLV (Units)</u>	<u>HAZARD</u>
Diethylenetriamine (CAS# 111-40-0)	89-93	1ppm TWA, ACGIH and OSHA	See Section V
Aminoethylpiperazine (CAS# 140-31-8)	7-11	None established	See Section V

**IV. FIRE AND EXPLOSION HAZARD DATA**

**FLASH POINT**  
(test method(s)): 210 F. Pensky-Martens closed cup ASTM D93  
215 F. Cleveland open cup ASTM D92

**FLAMMABLE LIMITS IN AIR,**  
% by volume: LOWER: Not determined  
UPPER: Not determined

**EXTINGUISHING MEDIA:** Apply alcohol-type or all-purpose-type foams by manufacturers' recommended techniques for large fires. Use CO2 or dry chemical media for small fires.

**SPECIAL FIRE FIGHTING PROCEDURES:** Do not direct a solid stream of water or foam into hot, burning pools; this may cause splattering and increase fire intensity. Use protective clothing, eye protection and self-contained breathing apparatus.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Oxides of nitrogen will be evolved.

**V. HEALTH HAZARD DATA**

**EXPOSURE LIMIT(S):** See Section III.

**EFFECTS OF SINGLE OVEREXPOSURE:**

**SWALLOWING:** Moderately toxic. May cause burns of mouth and throat, abdominal pain, nausea, vomiting, diarrhea, dizziness, weakness, thirst, collapse and possible coma. The nature and severity of these signs and symptoms will be dependent on the amount swallowed. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury.

**SKIN ABSORPTION:** Prolonged or widespread exposure may result in the absorption of potentially harmful amounts of material.

**INHALATION:** Vapors are irritating and may cause excessive tear formation, burning sensation of the nose and throat, coughing, wheezing, shortness of breath, nausea and vomiting. Extremely high vapor concentrations may cause lung damage. Some individuals may develop asthma. (See "Other Effects of Overexposure".)

**SKIN CONTACT:** Causes severe local redness, swelling and chemical burns.

**EYE CONTACT:** Causes severe conjunctival irritation, corneal injury and iritis. Corneal injury may be marked, extensive, and if not promptly treated, may possibly lead to permanent impairment of vision. Vapor may cause temporary disturbances of vision. (See "Notes to Physician.")

**EFFECTS OF REPEATED OVEREXPOSURE:**

Repeated exposure to high concentrations of vapor may cause injury to liver,

kidney, and respiratory tract.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:**

Because of its irritating properties, this material may aggravate an existing dermatitis. Breathing of vapor and/or mists may aggravate asthma and inflammatory or fibrotic pulmonary disease.

**SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:**

This material contains N-aminoethylpiperazine which has exhibited evidence of weak mutagenic activity in standard in vitro test systems. Materials of closely related chemical structure do not exhibit carcinogenic potential in life-time mouse skin painting studies. The relevance of mutagenic activity of this material to potential health hazards in man is not known at the present time.

**OTHER EFFECTS OF OVEREXPOSURE:**

- Inhalation of ethyleneamines may cause sensitization of the respiratory tract, and the development of an asthmatic reaction on further exposure.
- There may be some susceptible\* individuals who develop long-term hyperreactive airways, asthma and other respiratory injury following exposure to extremely low concentrations of ethyleneamines, even below the irritation threshold. Other respiratory irritants may produce a reaction in individuals whose airways have become hyperreactive. \*Since there are no definitive screening methods available to identify susceptible individuals, we suggest that people with asthma, or other long-standing respiratory conditions (for example, chronic bronchitis, emphysema, etc.) should be protected from any potential exposure to ethyleneamines.
- Skin contact may cause sensitization and an allergic skin reaction.
- Cross-sensitization may also occur by skin contact with this material and other amines.

**EMERGENCY AND FIRST AID PROCEDURES:**

**SWALLOWING:**

If patient is fully conscious, give two glasses of water or milk at once. Do not induce vomiting. Obtain medical attention without delay.

**SKIN:**

Immediately flush skin with plenty of water while removing contaminated clothing and shoes. Obtain medical attention. Wash clothing before wearing again. Discard shoes.

**INHALATION:**

Remove to fresh air. Give artificial respiration if not breathing. Oxygen may be given by qualified personnel if breathing is difficult. Obtain medical attention.

**EYES:**

Immediately flush eyes thoroughly with water and continue washing for at least 15 minutes. Obtain medical attention, preferably from an ophthalmologist, urgently.

**NOTES TO PHYSICIAN:**

There is no specific antidote. Treatment should be directed at the control of symptoms and the clinical condition of the patient. Due to the corrosive nature of the material, swallowing may lead to severe ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. Due to the severely corrosive nature of the material, any aspiration during vomiting could result in severe lung injury. Therefore, emesis should not be induced mechanically or pharmacologically. However, the acute peroral systemic toxicity of the material indicates that evacuation of the stomach contents should be undertaken at the earliest possible time by means carrying the least likelihood for aspiration (e.g. the use of gastric lavage with endotracheal intubation). Exposure to the vapor may cause minor edema of the corneal epithelium. This condition, referred to as "glauropsia," "blue haze," or "blue-gray haze," produces a blurring of vision against a general bluish haze and the appearance of halos around bright objects. The effect disappears spontaneously within a few hours of the end of an exposure, and leaves no sequelae. Although not detrimental to the eye per se, glauropsia predisposes an affected individual to physical accidents, and reduces the ability to undertake skilled tasks such as driving a motorized vehicle.

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**VI. REACTIVITY DATA**

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STABILITY: Stable

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CONDITIONS TO AVOID: Some decomposition can occur upon vigorous heating; e.g., application of high-pressure steam or flame.

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INCOMPATIBILITY (materials to avoid):  
Avoid contamination with acids, epoxides, oxidizing agents, aldehydes, ketones, acrylates and organic halides.

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HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:  
Burning can produce carbon monoxide, carbon dioxide and oxides of nitrogen. Vigorous heating above ambient temperatures can produce ethylenediamine, other volatile amines and ammonia.

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HAZARDOUS POLYMERIZATION: Will Not Occur

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CONDITIONS TO AVOID: None

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**VII. SPILL OR LEAK PROCEDURES**

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STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:  
Wear suitable protective equipment; avoid contact with liquid and vapors! Small spills could be flushed with large amounts of water. Larger spills should be collected for disposal. Avoid discharge to sewers or waterways. This product is resistant to biodegradation in a biological wastewater treatment plant. A large spill could be toxic to the biomass in a treatment plant or could be toxic to fish. Therefore, avoid discharge to sewers or to natural waters.

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WASTE DISPOSAL METHOD: Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

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**VIII. SPECIAL PROTECTION INFORMATION**

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RESPIRATORY PROTECTION (specify type):  
Positive pressure supplied air respirator equipped with a full facepiece should be used during any operation where there is potential for release of this product to workplace air.

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VENTILATION: This product should be confined within closed equipment, in which case general (mechanical) room ventilation should be satisfactory. Special local ventilation is needed at points where vapors can be expected to escape to workplace air.

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PROTECTIVE GLOVES: Butyl or Neoprene

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EYE PROTECTION: Monogoggles

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OTHER PROTECTIVE EQUIPMENT:  
Eye bath, safety shower, and chemical apron

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**IX. SPECIAL PRECAUTIONS**

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PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

DANGER! Causes eye and skin burns.
Harmful and corrosive if swallowed.
Harmful if inhaled or absorbed through skin.
May cause asthma with possible long-term lung damage.
May cause allergic skin reaction.
Cross-sensitization to other amines may occur.
Combustible.
Aspiration may cause lung damage.
May cause liver, kidney and respiratory system damage.
Do not get in eyes, on skin on clothing.
Do not swallow.
Avoid breathing vapor.
Keep away from heat and flame.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS:

WARNING: Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions.

Any use of this product in elevated-temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions. Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapors."

X. REGULATORY INFORMATION

STATUS ON SUBSTANCE LISTS:

The concentrations shown are maximum or ceiling levels (weight %) to be used for calculations for regulations. Trade Secrets are indicated by "TS".

FEDERAL EPA

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in 40 CFR 302.4.

Components present in this product at a level which could require reporting under the statute are:
\*\*\* None \*\*\*

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III

requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312).

Components present in this product at a level which could require reporting under the statute are:
\*\*\* NONE \*\*\*

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III

requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material.

Components present in this product at a level which could require reporting under the statute are:
\*\*\* None \*\*\*

STATE RIGHT-TO-KNOW

---

found to cause cancer, birth defects or other reproductive harm.

---

MASSACHUSETTS Right-To-Know, Substance List (MSL) Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products.

Components present in this product at a level which could require reporting under the statute are:

HAZARDOUS SUBSTANCES ( => 1%)

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Diethylenetriamine	111-40-0	93.0
N-Aminoethylpiperazine	140-31-B	11.0

---

PENNSYLVANIA Right-To-Know, Hazardous Substance List Hazardous Substances and Special Hazardous Substances on the List must be identified when present in products.

Components present in this product at a level which could require reporting under the statute are:

HAZARDOUS SUBSTANCES ( => 1%)

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Diethylenetriamine	111-40-0	93.0
N-Aminoethylpiperazine	140-31-8	11.0

---

**Toxic Substances Control Act(TSCA) STATUS:**

The ingredients of this product are on the TSCA inventory.

---

**CALIFORNIA SCAQMD RULE 443.1 VOC'S:**

Not presently available

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**OTHER REGULATORY INFORMATION:**

\*\*\* None Known \*\*\*

**NOTE -----**

The opinions expressed are those of qualified experts within Union Carbide. We believe that the information contained is current as of the date of the Material Safety Data Sheet. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Union Carbide, it is the user's obligation to determine the conditions of safe use of the product.

**REVISED SECTIONS:**

Revisions in this MSDS occurred in the following sections:

Section V: HEALTH HAZARD DATA

Section IX: PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

PC: 26237

F NUMBER: N0140D

MATERIAL SAFETY DATA SHEET

5/4/93  
PAGE: 01 of 07

A  
HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

HERCULES\* AMINE D  
Hydroabietylamine

MSDS No.: 856 2181 0100-02

Supersedes MSDS No.: 856 2181 0100-01

Date: 04/30/93

-----  
1. PRODUCT IDENTIFICATION  
-----

DANGER! CAUSES SKIN AND EYE BURNS, POSSIBLE BLINDNESS.

HERCULES\* AMINE D Hydroabietylamine

HMIS RATINGS: (1)

CASRN: 61790-47-4

Health hazard: 3 Serious  
Flammability hazard: 1 Slight  
Reactivity hazard: 1 Slight

CHEMICAL & COMMON NAME: Rosin amine

APPEARANCE AND ODOR: Pale amber, viscous liquid; faint ammonia odor

\* Registered trademark of Hercules Incorporated  
-----

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

---

**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

---

CHEMICAL & COMMON NAMES:	CASRN	WT %	RECOMMENDED AIR-BORNE LEVELS(1)	
			OSHA PEL	TLV-TWA
Rosin amine	61790-47-4	100	Not established	Not established

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup> (as formaldehyde), for rosin core solder pyrolysis products should be observed.

---

**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: 344 C (651 F) decomposes	SOLUBILITY IN WATER (WT., % AT 100 C): < 0.5
VAPOR PRESSURE AT 20 C: < 1 mm Hg	SPECIFIC GRAVITY: 1.00
VAPOR DENSITY: Not determined	pH: N/A
VOLATILE (WT.,%): None	EVAPORATION RATE: Slower than butyl acetate
FREEZING POINT: Viscosity increases	

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

FLASH POINT: 207 C (404 F), Setflash Closed, Cup

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: 221 C (430 F)

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide or halon

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS PRODUCTS OF COMBUSTION:  
Carbon monoxide, carbon dioxide, nitrogen oxides, ammonia and hydrogen cyanide. Depending on conditions, aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

---

**DANGER! CAUSES SKIN AND EYE BURNS, POSSIBLE BLINDNESS.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Droplet contamination can cause redness, swelling, pain, tearing. Splash may cause corneal injury or permanent blindness.
- SKIN:** Redness, itching, pain, swelling and rash. Can cause severe, slow-healing burns and permanent scarring. (See below: Medical conditions generally recognized as being aggravated by exposure.)
- INGESTION:** Diarrhea, intestinal discomfort, nausea, vomiting.
- INHALATION:** (Mist) Irritation of the nose, throat and respiratory tract.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** Immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. If signs of irritation appear, see a physician. Wash clothing before reuse. Discard contaminated leather articles.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid to dilute this product. Call a physician. NEVER give liquids to an unconscious person.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**NOTE TO PHYSICIAN:** Use only soap and water to remove from skin. Use of solvents may increase skin injury.

---

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, Skin

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**CANCER INFORMATION:**

Not listed as a carcinogen by NTP (National Toxicology Program); not regulated as a carcinogen by OSHA (Occupational Safety & Health Administration); not evaluated by IARC (International Agency for Research on Cancer).

**REPORTED HUMAN EFFECTS:**

Contact with the neat product for two hours caused skin irritation in human subjects. Contact for short periods (15 minutes or less) did not produce irritation. Contact with 1 to 2% aqueous solution for several hours did not produce irritation.

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

**REPORTED ANIMAL EFFECTS:**

Oral LD50, rats - 2500 mg/kg.

Oral LD50, guinea pigs - 700 mg/kg.

Corrosive to eyes and skin. Skin injury had delayed onset.

**OTHER:**

Negative in Ames test.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Salvage material in metal containers. Wash contaminated surfaces with vinegar or dilute acetic acid. Follow with thorough water wash.

**WASTE DISPOSAL METHOD:**

Incineration in accordance with local, state, and federal regulations is the preferred method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing vapor.

Wash thoroughly after handling, and before eating, drinking, or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Chemical goggles  
Face shield

Appropriate protective clothing

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Store in a cool, dry, well-ventilated area.

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	HERCULES* AMINE D Hydroabietylamine	61790-47-4	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

-----

HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

MATERIAL SAFETY DATA SHEET

MSDS: OR 026C  
DATE: 9/21/83  
PAGE: 1 of 2

HERCULES INCORPORATED  
WILMINGTON, DELAWARE, 19894  
PHONE NUMBERS: Regular - 302-594-5000

After Normal Business Hours and Only for Emergencies involving Safety and Health - 302-995-3000

I. PRODUCT IDENTIFICATION

Chemical Name & Synonyms: Dehydroabietylamine acetate paste

Chemical Family: Amine salt

CAS No:--

Formula: C<sub>22</sub>H<sub>29</sub>O<sub>2</sub>N,

Molecular Weight: Chief component, 345

Trade Name: AMINE-D™ ACETATE 70%

II. HAZARDOUS INGREDIENTS

Material	%	TLV-TWA VALUES ADOPTED BY ACGIH 1983-84
Dehydroabietylamine acetate	70	Not established

III. PHYSICAL DATA

Boiling Point: 100°C (212°F)(water)

Freezing Point:

Viscosity increases

Vapor Pressure: Not determined

Specific Gravity: 1.03

Vapor Density: 2.0

Percent Volatile: 30

(Air=1)

(By Volume)

Solubility in Water @ 20°C: up to 50%

Evaporation Rate:

Slower; less than 1

pH: 6.9

(Butyl Acetate=1)

Appearance and Odor: Tan, pasty solid; vinegar-like odor.

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: 191°C (375°F) COC

Autoignition Temperature: Not established

Flammable Limits In Air, % by Volume: NA

Extinguishing Media: Water spray, dry chemical, foam, or carbon dioxide.

Special Fire-Fighting Procedures: Cool containers with water if exposed to fire.

Unusual Fire and Explosion Hazards: See SECTION VI REACTIVITY DATA.

Notes: NA = Not Applicable.

The information contained herein is furnished without warranty of any kind. Product users should make independent judgments of suitability of this information to ensure proper use and protect the health and safety of employees.

#### 4. REACTIVITY DATA:

**STABILITY:** (CONDITIONS TO AVOID) Introduction of water to storage vessel. If a two stage mixture results a slow exothermic reaction may be initiated. An exotherm begins at 325°C (617°F).

**INCOMPATIBILITY:** (SPECIFIC MATERIALS TO AVOID) Acid, base, oxidizing materials as bleach and chlorine.

**HAZARDOUS DECOMPOSITION PRODUCTS:** hydrogen chloride

**HAZARDOUS POLYMERIZATION:** Will occur with certain catalysts as strong acids or bases and compounds containing Al, Cu, Zn, Pb.

#### 5. ENVIRONMENTAL AND DISPOSAL INFORMATION

**ACTION TO TAKE FOR SPILLS/LEAKS:** Dilute with water. Use personal protective equipment as recommended during clean up. Use only sand to absorb spills. **Warning: DO NOT USE CLAY BASED ABSORBANTS SUCH AS SPEEDI-DRI, MILLSORB ETC AS A VERY EXOTHERMIC, EXPLOSIVE REACTION WILL OCCUR.** Use SODA ASH ( $\text{Na}_2\text{CO}_3$ ) in conjunction with water which will react with the epichlorohydrin to yield glycerine.

**Disposal Method:** Consult with local, state and federal officials.

#### 6. HEALTH HAZARD DATA:

**EYE:** Will cause irritation and possible delayed corneal damage.

**SKIN CONTACT:** Will cause irritation, burns and allergic skin reactions.

**SKIN ABSORPTION:** The  $\text{LD}_{50}$  for skin absorption in rabbits is 515 mg/Kg. Single and repeated exposure can result in absorption in harmful amounts.

**INGESTION:** The oral  $\text{LD}_{50}$  = 282 mg/Kg for male rats, (175 mg/Kg for female rats.) Moderate to high oral

toxicity. Swallowing large amounts may death.

**INHALATION:**  $\text{LC}_{50}$  = 2165 ppm in female rats, 3617 ppm in male rats for 1 hr. Excessive vapor concentrations are easily attained and may cause unconsciousness and death. Effects may be delayed. Excessive exposure may cause irritation to upper respiratory tract.

**SYSTEMIC AND OTHER EFFECTS:** May cause lung, liver and/or kidney effects. (kidney effects being most likely).

**CARCINOGENIC STATUS:** Epichlorohydrin has been shown to cause cancer in laboratory animals. Epichlorohydrin is listed as a potential carcinogen by IARC and NTP.

**BIRTH DEFECTS:** Unlikely to cause birth defects.

**REPRODUCTIVE EFFECTS:** Studies have shown interference with fertility in males.

**MUTAGENICITY:** (Effects in genetic material): Epichlorohydrin has been shown to have mutagenic activity in bacteria and animals. The correlation to humans is known.

#### 7. FIRST AID:

**EYES:** Immediately irrigate with water for 15 minutes. Promptly contact physician.

**SKIN:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician if irritation persists. Wash clothing before reuse. Destroy contaminated shoes. Seek medical attention immediately.

**INGESTION:** If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

**INHALATION:** Remove to fresh air. Give Oxygen or artificial respiration if necessary. Seek medical attention.



**NOTE TO PHYSICIAN:**

No specific antidote. Epichlorohydrin may cause delayed skin burns and these may be second degree burns with little or no warning. If burn is present treat as any thermal burn. Liver and Kidney should be monitored after a significant exposure. Lung functions should be followed after a significant single or intermittent inhalation exposure.

**8. HANDLING PRECAUTIONS:**

**EXPOSURE GUIDELINES:**

ACGIH TLV and OSHA PEL are 2 ppm, skin.

**EYE PROTECTION:**

Use chemical goggles. Eye wash fountain should be located in immediate work area.

**VENTILATION:**

Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

**RESPIRATORY PROTECTION:**

Use an approved air purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded use an approved positive pressure breathing apparatus.

**SKIN PROTECTION:**

Use neoprene or other protective clothing impervious to this material. Contaminated leather items should be removed and destroyed.

**9. ADDITIONAL INFORMATION:**

**SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:**

Do not get in eyes, on skin or clothing. Do not breathe vapors. Storage tanks should be blanketed with nitrogen, and the oxygen content should be maintained below nine percent- (9%)

**10. NFPA HAZARD RATING:**

4 = EXTREME	HEALTH
3 = HIGH	FIRE
2 = MODERATE	REACTIVITY
1 = SLIGHT	SPECIFIC
0 = INSIGNIFICANT	

5  
1  
-

**11. REGULATORY INFORMATION**

**STATUS ON SUBSTANCE LISTS:**

The concentrations shown in this document are maximum or ceiling levels (expressed in weight %, unless otherwise specified) to be used for regulations. Trade Secrets are indicated by "TS".

**FEDERAL EPA:**

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, and LIABILITY ACT of 1980 (CERCLA):

requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQ's) in 40 CFR 302.4 .

Components present in this product at level which could require reporting under the statute are:

<u>Chemical</u>	<u>CAS#</u>	<u>wt %</u>	<u>RQ</u>
<i>epichlorohydrin</i>	106-89-8	>99%	100#

SUPERFUND AMENDMENTS and REAUTHORIZATION ACT of 1986 (SARA) TITLE III:

Sections 301-304 require emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (Rqs) in 40 CFR 355.

Components present in this product at a level which could require reporting under this statute are:

<u>Chemical</u>	<u>CAS#</u>	<u>WT %</u>	<u>TPQ</u>
<i>epichlorohydrin</i>	<i>106-89-8</i>	<i>&gt; 99%</i>	<i>1,000#</i>

Sections 311-312 require products to be reviewed and applicable EPA Hazard Definitions be identified and made known.

**EPA HAZARD CLASSIFICATIONS:**

<b>Acute Hazard</b>	<b>Chronic Hazard</b>	<b>Fire Hazard</b>	<b>Pressure Hazard</b>	<b>Reactive Hazard</b>
<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>no</i>	<i>no</i>

Section 313 requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material.

Components present in this product at level which could require reporting under the statute are:

<u>Chemical</u>	<u>CAS#</u>	<u>wt %</u>
<i>Epichlorohydrin</i>	<i>106-89-8</i>	<i>&gt; 99%</i>

If you are unsure if you must report more information, call the EPA Emergency Planning and Right-To-Know Hot Line : 800-535-0202 or 202-479-2449

**OTHER REGULATORY INFORMATION:**

California Proposition 65: As defined in 22 California Code of Regulations, Division 2, Chapter 3, Article 7 : During normal use and processing of epichlorohydrin the exposure levels may exceed those of significant risk as defined in this communication standard. This product is known to the state of California to cause cancer.

**TOXIC SUBSTANCES CONTROL ACT (TSCA):**

The components of this product are contained on the chemical substance inventory list.



# MATERIAL SAFETY DATA SHEET

MSDS NUMBER ▶

5,080-21

PAGE 1

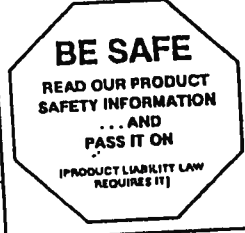
97367 (4-85)

24 HOUR EMERGENCY ASSISTANCE

GENERAL MSDS ASSISTANCE

SHELL: 713-473-9461 CHEMTREC: 800-424-9300

SHELL: 713-241-4819



ACUTE HEALTH +  
4

FIRE  
3

REACTIVITY  
2

HAZARD RATING ▶

LEAST - 0 SLIGHT - 1 MODERATE - 2  
HIGH - 3 EXTREME - 4

\*For acute and chronic health effects refer to the discussion in Section III

## SECTION I

NAME

PRODUCT ▶ EPICHLOROHYDRIN

CHEMICAL NAME ▶ 1-CHLORO-2,3-EPOXY PROPANE

CHEMICAL FAMILY ▶ HALOGENATED ALKYL EPOXIDE

SHELL CODE ▶ 32410 32411

## SECTION II-A

PRODUCT/INGREDIENT

CAS NUMBER

PERCENT

NO.

COMPOSITION

106-89-8

100

P EPICHLOROHYDRIN

## SECTION II-B

ACUTE TOXICITY DATA

ACUTE INHALATION LC50

NO. ACUTE ORAL LD50

ACUTE DERMAL LD50

500 PPM(4H) (RAT)

P 90 MG/KG (RAT)  
P 236 MG/KG (MOUSE)

754 MG/KG (RABBIT)

## SECTION III

HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

### EYE CONTACT

BASED ON PRODUCT TESTING PRODUCT IS CORROSIVE TO THE EYES AND MAY CAUSE SEVERE DAMAGE INCLUDING BLINDNESS. BOTH LIQUID AND VAPORS ARE IRRITATING TO THE EYES.

### SKIN CONTACT

BASED ON PRODUCT TESTING, PRODUCT IS CORROSIVE TO THE SKIN. VAPORS ARE ALSO IRRITATING TO THE SKIN. BASED ON PRODUCT TESTING, PRODUCT MAY CAUSE SKIN SENSITIZATION. BASED ON PRODUCT TESTING, PRODUCT IS TOXIC AND IS HARMFUL IF ABSORBED THROUGH THE SKIN; MAY PRODUCE KIDNEY AND LIVER DAMAGE.

### INHALATION

BASED ON PRODUCT TESTING PRODUCT MAY CAUSE SEVERE IRRITATION TO THE NOSE, THROAT AND RESPIRATORY TRACT. MAY CAUSE LUNG SENSITIZATION AND RESPIRATORY DEPRESSION. BASED ON PRODUCT TESTING PRODUCT IS TOXIC AND IS HARMFUL IF INHALED; MAY PRODUCE LIVER, KIDNEY, AND LUNG DAMAGE AND CNS DEPRESSION.

### INGESTION

BASED ON PRODUCT TESTING PRODUCT IS TOXIC AND IS HARMFUL IF SWALLOWED; MAY PRODUCE LIVER AND KIDNEY DAMAGE AND CNS DEPRESSION.

**SIGNS AND SYMPTOMS**

IRRITATION AS NOTED ABOVE. KIDNEY DAMAGE MAY BE EVIDENCED BY CHANGES IN URINE OUTPUT, URINE APPEARANCE OR EDEMA (SWELLING FROM FLUID RETENTION). LIVER DAMAGE MAY BE EVIDENCED BY LOSS OF APPETITE, JAUNICE (YELLOWISH SKIN COLOR) AND SOMETIMES PAIN IN THE UPPER ABDOMEN ON THE RIGHT SIDE. LUNG DAMAGE (SCARRING, BRONCHITIS, EMPHYSEMA) MAY BE EVIDENCED BY SHORTNESS OF BREATH, ESPECIALLY ON EXERTION, AND MAY BE ACCOMPANIED BY CHRONIC COUGH. SKIN SENSITIZATION (ALLERGY) MAY BE EVIDENCED BY RASHES, ESPECIALLY HIVES. LUNG SENSITIZATION (E.G., ALLERGY, ASTHMA) MAY BE EVIDENCED BY WHEEZING WITH SHORTNESS OF BREATH AND COUGH. EARLY TO MODERATE CNS (CENTRAL NERVOUS SYSTEM) DEPRESSION MAY BE EVIDENCED BY GIDDINESS, HEADACHE, DIZZINESS AND NAUSEA; IN EXTREME CASES, UNCONSCIOUSNESS AND DEATH MAY OCCUR.

**AGGRAVATED MEDICAL CONDITIONS**

PREEXISTING EYE, SKIN, RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT. IMPAIRED LIVER, KIDNEY, AND LUNG FUNCTIONS FROM PREEXISTING DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT. PREEXISTING SKIN OR LUNG ALLERGIES MAY INCREASE THE CHANCE OF DEVELOPING INCREASED ALLERGY SYMPTOMS FROM EXPOSURE TO THIS PRODUCT.

**OTHER HEALTH EFFECTS**

EPICHLOROHYDRIN HAS BEEN SHOWN TO BE CARCINOGENIC IN ANIMAL INHALATION, INTUBATION, AND DRINKING WATER EXPOSURE STUDIES. IT HAS BEEN CLASSIFIED AS AN ANTICIPATED HUMAN CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM (NTP). IT HAS BEEN CLASSIFIED BY THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) AS A PROBABLE HUMAN CARCINOGEN (IARC GROUP 2A) BASED ON THE FOLLOWING CONCLUSIONS: HUMAN EVIDENCE - INADEQUATE; ANIMAL EVIDENCE - SUFFICIENT. ECH HAS BEEN REPORTED TO PRODUCE INFERTILITY IN MALE RATS, BUT NO REPRODUCTIVE EFFECTS WERE OBSERVED IN THE FEMALE.

SEE SEC VI FOR SUPPLEMENTAL HEALTH INFORMATION.

**SECTION IV OCCUPATIONAL EXPOSURE LIMITS**

NO.	OSHA PEL/TWA	OSHA PEL/CEILING	ACGIH TLV/TWA	ACGIH TLV/STEL	OTHER
1	2 PPM (SKIN)		2 PPM (SKIN)		
*SHELL INTERNAL STANDARD - 1 PPM(SKIN) TWA, 3 PPM(SKIN) STEL.					

**SECTION V EMERGENCY AND FIRST AID PROCEDURES**

**EYE CONTACT**  
IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN. CONTINUE CONTINUOUSLY WITH WATER WHILE ON WAY TO GET MEDICAL ATTENTION.

**SKIN CONTACT**  
IMMEDIATELY REMOVE CONTAMINATED CLOTHING OR SHOES, WIPE EXCESS FROM SKIN AND FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. USE SOAP IF AVAILABLE OR FOLLOW BY WASHING WITH SDAP AND WATER. DO NOT REUSE CLOTHING UNTIL THOROUGHLY CLEANED. GET MEDICAL ATTENTION. CONTAMINATED LEATHER ARTICLES, INCLUDING SHOES, CANNOT BE DECONTAMINATED AND SHOULD BE DESTROYED TO PREVENT REUSE.

**INHALATION**  
MOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION.

**INGESTION**  
NOT GIVE LIQUIDS IF VICTIM IS UNCONSCIOUS OR VERY DROWSY. OTHERWISE, GIVE NO MORE THAN 2 GLASSES OF WATER AND INDUCE VOMITING BY GIVING 30CC (2 TABLESPOONS) SYRUP OF IPECAC. IF IPECAC IS NOT AVAILABLE, GIVE 2 GLASSES OF WATER AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF VICTIM'S THROAT. KEEP VICTIM'S HEAD BELOW HIPS WHILE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.\*

**REFERENCE TO PHYSICIAN**  
SYMPTOMS SUCH AS LOSS OF GAG REFLEX, CONVULSIONS OR UNCONSCIOUSNESS OCCUR BEFORE EMESIS, GASTRIC LAVAGE SHOULD BE CONSIDERED FOLLOWING INTUBATION WITH A CUFFED ENDOTRACHEAL TUBE.

**SECTION VI SUPPLEMENTAL HEALTH INFORMATION**

ALTHOUGH THE SIGNIFICANCE IS UNKNOWN, CHROMOSOMAL CHANGES HAVE BEEN OBSERVED IN HUMAN LYMPHOCYTES. EPICHLOROHYDRIN HAS ALSO BEEN FOUND TO BE MUTAGENIC IN IN VITRO ASSAYS AND WITH BACTERIA AND MAMMARY GLAND HUMAN CELLS.

SECTION VII

PHYSICAL DATA

BOILING POINT: 239  
(DEG F)

MELTING POINT: -71  
(DEG F)

EVAPORATION RATE (N-BUTYL ACETATE = 1): 1.35

SPECIFIC GRAVITY: 1.18  
(H2O=1)

SOLUBILITY: 6.690 (W)  
(IN WATER) 68 DEG F

VAPOR PRESSURE: 13.8 @70 DEG F  
(MM HG)

VAPOR DENSITY: 3.2  
(AIR=1)

APPEARANCE AND ODOR:  
COLORLESS, MOBILE LIQUID, IRRITATING CHLOROFORM-LIKE ODOR

SECTION VIII

FIRE AND EXPLOSION HAZARDS

FLASH POINT AND METHOD:  
87 DEG F TCC

FLAMMABLE LIMITS /% VOLUME IN AIR  
LOWER: 3.8 UPPER: 21.0

EXTINGUISHING MEDIA  
USE WATER FOG, FOAM, DRY CHEMICAL OR CO2.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS  
WARNING. FLAMMABLE. CLEAR FIRE AREA OF UNPROTECTED PERSONNEL. DO NOT ENTER CONFINED FIRE SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE PRESSURE NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER.

UNUSUAL FIRE AND EXPLOSION HAZARDS  
HANDLE AS A FLAMMABLE LIQUID. MAY POLYMERIZE AND BURST CONTAINERS WHEN HEATED. CONTAINERS EXPOSED TO INTENSE HEAT FROM FIRES SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP WHICH COULD RESULT IN CONTAINER RUPTURE. CONTAINER AREAS EXPOSED TO DIRECT FLAME CONTACT SHOULD BE COOLED WITH LARGE QUANTITIES OF WATER AS NEEDED TO PREVENT WEAKENING OF CONTAINER STRUCTURE. COMBUSTION MAY PRODUCE TOXIC CARBON MONOXIDE AND HYDROGEN CHLORIDE (CORROSIVE). EXPOSURE TO THESE GASES CAN CAUSE SEVERE LUNG DAMAGE AND MAY CAUSE DEATH.

SECTION IX

REACTIVITY

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL OCCUR

CONDITIONS AND MATERIALS TO AVOID:  
REACTS VIOLENTLY WITH ACIDS, BASES, AMMONIA, AMINES AND OXIDIZING AGENTS. AVOID LEWIS AND BRONSTED ACID-AND BASES SUCH AS BORON FLURIDE AND TRANSITION METAL HALIDES (I.E. IRON, ALUMINUM, AND ZINC HALIDES) WHICH MAY PRODUCE UNCONTROLABLE POLYMERIZATION. METALS TO BE AVOIDED INCLUDE ALUMINUM, COPPER, MAGNESIUM, ZINC, LEAD AND THEIR ALLDYS. AVOID HEAT SPARKS, FLAMES AND TEMPERATURES ABOVE 600 DEG F.

HAZARDOUS DECOMPOSITION PRODUCTS  
CARBON MONOXIDE, HYDROGEN CHLORIDE (CORROSIVE AND POISONOUS) AND UNIDENTIFIED ORGANIC COMPDUNDS MA BE FORMED DURING COMBUSTION. HYDROGEN CHLORIDE CAN ALSO BE PRODUCED BY THERMAL DECOMPOSITION.



SECTION X

EMPLOYEE PROTECTION

LABORATORY PROTECTION

AVOID BREATHING VAPOR. IF EXPOSURE MAY OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS (SEC. IV) USE A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134 USE EITHER A FULL-FACE, ATMOSPHERE-SUPPLYING RESPIRATOR OR AIR PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

PROTECTIVE CLOTHING

DO NOT GET IN EYES. WEAR CHEM. GOGGLES IF THERE IS POTENTIAL CONTACT WITH EYES. AVOID CONTACT WITH SKIN AND CLOTHING. WEAR CHEMICAL-RESISTANT GLOVES AND PROTECTIVE CLOTHING. TEST DATA FROM PUB. LIT. AND/OR GLOVE AND CLOTHING MFGS. INDICATE BEST PROTECTION IS PROVIDED BY BUTYL RUBBER.

ADDITIONAL PROTECTIVE MEASURES

USE EXPLOSION-PROOF VENTILATION AS REQUIRED TO CONTROL VAPOR CONCENTRATIONS. EYE WASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE AVAILABLE FOR EMERGENCY USE.

SECTION XI

ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES

WARNING. FLAMMABLE. ELIMINATE ALL IGNITION SOURCES. HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING. \*\*\* LARGE SPILLS \*\*\* EVACUATE THE HAZARD AREA OF UNPROTECTED PERSONNEL. WEAR APPROPRIATE RESPIRATOR AND PROTECTIVE CLOTHING. SHUT OFF SOURCE OF LEAK ONLY IF SAFE TO DO SO. DIKE AND CONTAIN. IF VAPOR CLOUD FORMS, WATER FOG OR CHEMICAL FOAM MAY BE USED TO SUPPRESS; CONTAIN RUN-OFF. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS SAND OR OTHER CHEMICALLY NEUTRAL MATERIAL; DO NOT USE CLAY; PLACE IN NON-LEAKING CONTAINERS FOR PROPER DISPOSAL. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE; DISPOSE OF FLUSH SOLUTIONS AS ABOVE. \*\*\* SMALL SPILLS \*\*\* TAKE UP WITH SAND OR OTHER CHEMICALLY NEUTRAL MATERIAL AND PLACE IN NON-LEAKING CONTAINERS; SEAL TIGHTLY FOR PROPER DISPOSAL.

SECTION XII

SPECIAL PRECAUTIONS

WARNING! CORROSIVE TO THE EYES AND SKIN. EACH IS A REACTIVE MATERIAL AND A SKIN SENSITIZER. IT MAY BE A RESPIRATORY SENSITIZER. CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, CAN CONTAIN HAZARDOUS PRODUCT RESIDUES. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING, PERSONAL GROOMING, OR USING TOILET FACILITIES. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. ATTACKS SOME KINDS OF PLASTIC, RUBBER, AND COATINGS. PENETRATES LEATHER EASILY. CONTAMINATED LEATHER ARTICLES, INCLUDING SHOES, CANNOT BE DECONTAMINATED AND SHOULD BE DESTROYED TO PREVENT REUSE.

WARNING! FLAMMABLE LIQUID. KEEP LIQUID AND VAPOR AWAY FROM HEAT, SPARKS AND FLAME. SURFACES THAT ARE SUFFICIENTLY HOT MAY IGNITE EVEN LIQUID PRODUCT IN THE ABSENCE OF SPARKS OR FLAME. EXTINGUISH WITH WATERS, CIGARETTES AND TURN OFF OTHER SOURCES OF IGNITION PRIOR TO USE AND UNTIL ALL VAPORS ARE GONE. VAPORS MAY ACCUMULATE AND TRAVEL TO IGNITION SOURCES DISTANT FROM THE HANDLING SITE; DISCHARGE-FIRE CAN RESULT. KEEP CONTAINERS CLOSED WHEN NOT IN USE. USE ONLY WITH ADEQUATE VENTILATION. CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, CAN CONTAIN EXPLOSIVE VAPORS.

DO NOT CUT, DRILL, GRIND, WELD OR PERFORM SIMILAR OPERATIONS ON OR NEAR CONTAINERS. DO NOT PRESSURIZE DRUM CONTAINERS TO EMPTY THEM. STATIC ELECTRICITY MAY ACCUMULATE AND CREATE A FIRE HAZARD. GROUND FIXED EQUIPMENT. BOND AND GROUND TRANSFER CONTAINERS AND EQUIPMENT.

WARNING! EACH AND WATER FORM CORROSIVE 2-PHASE SYSTEMS WHICH SHOULD BE AVOIDED IN STORAGE; SUCH SITUATIONS ARE CORROSIVE TO METAL AND COULD LEAD TO UNCONTROLLABLE POLYMERIZATION. STORAGE VESSELS SHOULD BE MAINTAINED SO AS TO EXCLUDE AIR SUCH AS BY USE OF AN INERT GAS BLANKET TO PREVENT FORMATION OF FLAMMABLE OR EXPLOSIVE MIXTURES.

SECTION XIII

TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:

SECTION 6.1 (POISON), SUBSIDIARY RISK CLASS 3 (FLAMMABLE LIQUID), II, RQ.

DOT INFORMATION IN THIS SECTION IS BASED UPON AN EVALUATION OF THE PRODUCT AGAINST THE REQUIREMENTS OF 49 CFR 172 & 173 AS REVISED BY HM-181.

TELEPHONE NUMBER: 1-800-424-9093  
SHIPPER SHIPPING NAME: EPICHLOROHYDRIN

OTHER REQUIREMENTS:  
UN 2023, GUIDE 30.

-----  
SECTION XIV OTHER REGULATORY CONTROLS  
-----

EPICHLOROHYDRIN IS LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES. THE PRODUCT CONTAINS A TRACE IMPURITY, CIS-1,3-DICHLOROPROPENE (CAS NO. 10061-01-5) WHICH IS NOT LISTED ON THE TSCA INVENTORY. BECAUSE THIS IMPURITY HAS NO COMMERCIAL PURPOSE IN EPICHLOROHYDRIN, IT IS EXEMPT FROM TSCA INVENTORY REQUIREMENTS IN THIS CASE.

IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE ATTACHED ENVIRONMENTAL DATA SHEET (EDS) SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

-----  
SECTION XV 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.

STATE LISTED COMPONENT	PERCENT	STATE CODE
EPICHLOROHYDRIN (CAS NO: 106-89-8 )	100	CA, FL, IL, MA, ME, MN, NJ, PA, RI, CA65
CIS-1,3-DICHLOROPROPANE (CAS NO: 10061-01-5 )	0.04	MA
TRANS-1,3-DICHLOROPROPANE (CAS NO: 10061-02-6 )	0.03	MA
TRICHLOROPROPANE (CAS NO: 96-18-4 )	>0.01	CA65

CA = CALIFORNIA HAZ. SUBST. LIST; CA65 = CALIFORNIA SAFE DRINKING WATER AND TOXICS ENFORCEMENT ACT LIST; CT = CONNECTICUT TOX. SUBST. LIST; FL = FLORIDA SUBST. LIST; IL = ILLINDIS TOX. SUBST. LIST; LA = LOUISIANA HAZ. SUBST. LIST; MA = MASSACHUSETTS SUBST. LIST; ME = MAINE HAZ SUBST. LIST; MN = MINNESOTA HAZ. SUBST. LIST; NJ = NEW JERSEY HAZ. SUBST. LIST; PA = PENNSYLVANIA HAZ. SUBST. LIST; RI = RHODE ISLAND HAZ. SUBST. LIST.

THIS PRODUCT CONTAINS A CHEMICAL OR CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

-----  
SECTION XVI SPECIAL NOTES  
-----

THIS MSDS REVISION HAS CHANGES IN SECTION XIV.



PRODUCT NAME: EPICHLOROHYDRIN

MSDS 5,080-21  
PAGE 6

-----  
INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT.  
HOWEVER, SHELL MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE  
RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE  
USE OF THE PRODUCT DESCRIBED HEREIN.  
-----

DATE PREPARED: APRIL 22, 1993  
-----

BE SAFE

READ OUR PRODUCT  
SAFETY INFORMATION ... AND PASS IT ON  
(PRODUCT LIABILITY LAW  
REQUIRES IT)

-----  
J. C. WILLETT  
-----

SHELL OIL COMPANY  
PRODUCT SAFETY AND COMPLIANCE  
P. O. BOX 4320  
HOUSTON, TX 77210

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER.....:

EM SCIENCE  
A DIVISION OF EM INDUSTRIES  
P.O. BOX 70  
J DEMOCRAT RD.  
GIBBSTOWN, N.J. 08027

PREPARATION DATE.: 11/26/91  
DATE MSDS PRINTED.: APR 29, 1992

INFORMATION PHONE NUMBER.: 609-354-9200  
HOURS: MON. TO FRI. 8:30-5  
CHEMTREC EMERGENCY NUMBER: 800-424-9300  
HOURS: 24 HRS A DAY

CATALOG NUMBER(S):

SX1244 SX1244I SX1242 SX1244PC SX1244Y SX1244T SX1244TP 714  
748 732

CHEMICAL NAME.....: SULFURIC ACID  
TRADE NAME.....: OIL OF VITRIOL  
CHEMICAL FAMILY...: MINERAL ACID  
FORMULA.....: H2SO4 IN WATER

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MOLECULAR WEIGHT.: 98.08

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS #	APPR %
SULFURIC ACID	7664-93-9	100%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE.....:  
CLEAR, COLORLESS VISCOUS LIQUID;  
SHARP OOR

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

SYMPTOMS OF EXPOSURE:  
MEDICAL COND. AGGRAVATED BY EXPOSURE:  
ROUTES OF ENTRY.....:  
INHALATION, INGESTION OR SKIN CONTACT.

4. FIRST AID MEASURES

5. FIRE FIGHTING MEASURES

FLASH POINT (F).....:NONCOMBUSTIBLE  
FLAMMABLE LIMITS LEL (%):N/A  
FLAMMABLE LIMITS UEL (%):N/A  
EXTINGUISHING MEDIA.....:  
FIRE FIGHTING PROCEDURES.:  
FIRE & EXPLOSION HAZARDS.:

6. ACCIDENTAL RELEASE MEASURES

SPILL RESPONSE:

EVACUATE THE AREA OF ALL UNNECESSARY PERSONNEL.  
WEAR SUITABLE PROTECTIVE EQUIPMENT LISTED UNDER EXPOSURE /  
PERSONAL PROTECTION.  
ELIMINATE ANY IGNITION SOURCES UNTIL THE AREA IS DETERMINED TO BE  
FREE FROM EXPLOSION OR FIRE HAZARDS.  
CONTAIN THE RELEASE AND ELIMINATE ITS SOURCE, IF THIS CAN BE DONE  
WITHOUT RISK.  
TAKE UP AND CONTAINERIZE FOR PROPER DISPOSAL AS DESCRIBED UNDER  
DISPOSAL.  
COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS ON REPORTING  
RELEASES. REFER TO REGULATORY INFORMATION FOR REPORTABLE  
QUANTITY AND OTHER REGULATORY DATA.  
EM SCIENCE RECOMMENDS SPILL-X NEUTRALIZERS AND ABSORBENT AGENTS  
FOR VARIOUS TYPES OF SPILLS.  
ADDITIONAL INFORMATION ON THE SPILL-X PRODUCTS CAN BE PROVIDED  
THROUGH THE EM SCIENCE TECHNICAL SERVICE DEPARTMENT  
(909) 354-9200.  
THE FOLLOWING EM SCIENCE SPILL-X NEUTRALIZER AND ABSORBENT IS  
RECOMMENDED FOR THIS PRODUCT:

7. HANDLING AND STORAGE

HANDLING & STORAGE:

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:

VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION

WORK / HYGENIC PRACTICES:

-----  
EXPOSURE GUIDELINES

OSHA - PEL:

COMPONENT	TWA		STEL		CL		SKIN
	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	
SULFURIC ACID		1					

-----  
ACGIH - TLV:

COMPONENT	TWA		STEL		CL		SKIN
	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	
SULFURIC ACID		1		3			

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (C 760 MMHG): 290+C  
MELTING POINT (C): -10C  
SPECIFIC GRAVITY (H2O = 1): 1.844 60/60F  
VAPOR PRESSURE (MM HG): 1 146C  
PERCENT VOLATILE BY VOL (%): N/A  
VAPOR DENSITY (AIR = 1): N/A  
EVAPORATION RATE (BUAC = 1): 1  
SOLUBILITY IN WATER (%): MISCIBLE  
APPEARANCE: CLEAR, COLORLESS VISCOUS LIQUID;  
SHARP ODOR

10. STABILITY AND REACTIVITY

STABILITY: YES  
HAZARDOUS POLYMERIZATION:  
DOES NOT OCCUR

HAZARDOUS DECOMPOSITION:  
SO<sub>2</sub>, HYDROGEN (IN PRESENCE OF METALS)

CONDITIONS TO AVOID:  
MATERIALS TO AVOID:  
(X) WATER  
( ) ACIDS

- (X) BASES
- ( ) CORROSIVES
- (X) OXIDIZERS
- (X) OTHER :

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:  
TOXICOLOGICAL FINDINGS:

12. DISPOSAL CONSIDERATIONS

EPA WASTE NUMBERS: D002

TREATMENT:

SPECIFIED TECHNOLOGY - NEUTRALIZE TO PH 6-9. CONTACT YOUR LOCAL PERMITTED WASTE DISPOSAL SITE (TSD) FOR PERMISSIBLE TREATMENT SITES.

ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME...:

SULFURIC ACID

DOT TECHNICAL NAME.....:

ID NUMBER.....: UN1830

14. REGULATORY INFORMATION

TSCA INVENTORY.....:

THE CAS NUMBER OF THIS PRODUCT IS LISTED ON THE TSCA INVENTORY.

COMPONENT	SARA EHS (302)	SARA EHS TPQ (LBS)	CERCLA RQ (LBS)
SULFURIC ACID	Y	1000	1000

SULFURIC ACID

Y

1.0

## 15. OTHER INFORMATION

## COMMENTS:

NONE

## NFPA HAZARD RATINGS:

HEALTH : 3

FLAMMABILITY : 0

REACTIVITY : 2

SPECIAL HAZARDS: W

## REVISION HISTORY:

08/01/81 08/01/84 04/17/86 12/06/86 06/19/87 10/27/87 01/26/88  
09/26/88 03/01/91 05/31/91

- = REVISED SECTION

N/A = NOT AVAILABLE

N/E = NONE ESTABLISHED

THE STATEMENTS CONTAINED HEREIN ARE OFFERED FOR INFORMATIONAL PURPOSES ONLY AND ARE BASED UPON TECHNICAL DATA THAT EM SCIENCE BELIEVES TO BE ACCURATE. IT IS INTENDED FOR USE ONLY BY PERSONS HAVING THE NECESSARY TECHNICAL SKILL AND AT THEIR OWN DISCRETION AND RISK. SINCE CONDITIONS AND MANNER OF USE ARE OUTSIDE OUR CONTROL, WE MAKE NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

PORTIONS COPYRIGHT ARIEL RESEARCH CORPORATION, 1991. RESTRICTED USE CONDITIONS APPLY. SELECTED REGULATORY INFORMATION IN THIS MSDS HAS BEEN DERIVED FROM ARIEL RESEARCH CORPORATION'S INTERNATIONAL CHEMICAL REGULATORY MONITORING SYSTEM (ICRMS). USE OF THIS DATA IS PROVIDED SUBJECT TO THE TERMS OF THE LICENSE AGREEMENT BETWEEN EM INDUSTRIES AND ARIEL RESEARCH CORPORATION. FURTHER DISTRIBUTION IS PROHIBITED WITHOUT AUTHORIZATION.

MSDS - SX1242

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"ISSUED 05/30/92"

ATTENTION: PLANT MANAGER OR SAFETY DIRECTOR

THIS IS TO NOTIFY YOU THAT THE PRODUCT OR PRODUCTS LISTED ABOVE, PROCEEDED BY SARA, CONTAIN CHEMICALS IN QUANTITIES THAT EXCEED THE DEMINIMUM CONCENTRATION SPECIFIED UNDER SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986 AND 40 CFR PART 372. THIS PRODUCT OR PRODUCTS IS THEREFORE SUBJECT TO THE SECTION 313 REQUIREMENTS FOR REPORTING TOTAL ANNUAL RELEASES OF THE NAMED CHEMICALS BY CERTAIN MANUFACTURING FACILITIES. PLEASE RETAIN THIS INFORMATION TO ASSIST YOU IN MEETING THESE REPORTING REQUIREMENTS.



1179 1/85

# MATERIAL SAFETY DATA SHEET

6460-10-03-84-540

DATE

2  
Safely  
June 19, 1985

SUBSIDIARY OF MERCK &amp; CO., INC.

PRODUCT NAME

C-1 ANTIFOAM

## SECTION I

MANUFACTURER'S NAME

Calgon Corporation

EMERGENCY  
TELEPHONE NO.

(412) 777-8000

ADDRESS

P. O. Box 1346, Pittsburgh, Pennsylvania 15230

CHEMICAL NAME  
AND SYNONYMS

Alkoxylated Alcohol Solution

FORMULA

Polyalkylene Oxide Solution

## SECTION II HAZARDOUS INGREDIENTS

PRINCIPAL HAZARDOUS COMPONENT (S)	CAS #	% BY WEIGHT	ORAL LD <sub>50</sub>	DERMAL LD <sub>50</sub>	TLV (Units)		
					ACGIH	OSHA	OTHER
Chemical Name			*				
Common Name							
Chemical Name							
Common Name							
Chemical Name							
Common Name							
Chemical Name							
Common Name							

\* See Section V - Health Hazard Data for Toxicity Data on the product

## SECTION III PHYSICAL DATA

BOILING POINT (° F)	> 212	SPECIFIC GRAVITY (H <sub>2</sub> O=1)	1.04
VAPOR PRESSURE (mmHg.)	Similar to Water	PERCENT VOLATILE BY VOLUME (%)	~ 65
VAPOR DENSITY (AIR=1)	Similar to Water	pH	1% Solution 6.0
SOLUBILITY IN WATER	Complete	OTHER	

APPEARANCE AND ODOR

Clear water-white viscous liquid with mild odor

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND

## SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)

Not Flammable

Flammable Media

Product is not flammable.

Special Fire Fighting Procedures

Exercise caution when fighting any chemical fire. A self-contained breathing apparatus is essential.

Unusual Fire and Explosion Hazards

None

## SECTION V HEALTH HAZARD DATA

### EFFECT OF OVEREXPOSURE

#### A. ACUTE

##### 1. INGESTION

The product would not be considered hazardous through ingestion. The acute oral LD<sub>50</sub> (rats) was found to be 38.4 ml/kg for the active ingredient in the product.

##### 2. INHALATION

Due to the low vapor pressure and inhalation hazard, the product would not be present under normal temperatures. However, inhalation testing on mists of compounds similar to the active ingredient in the product showed delayed lung damage and death at 84 mg/m<sup>3</sup> and 450 mg/m<sup>3</sup> (rat - 4 hour).

##### 3. DERMAL EXPOSURE

###### a. TOXIC

The product is practically non toxic through dermal absorption. The acute oral LD<sub>50</sub> (rabbits) is > 20 ml/kg for the active ingredient in the product.

###### b. IRRITATION

The active ingredient in the product when applied to rabbit skin produced only slight capillary injection in 24 hours.

###### c. SENSITIZATION

Application of the active ingredient in the product on 50 human subjects produced slight evidence of sensitization in only one subject.

**4. EYE IRRITATION**

Only slight irritation was observed when the product was instilled in rabbit eyes.

**B. SUBCHRONIC, CHRONIC, OTHER**

No applicable information was found concerning adverse health effects resulting from subchronic and chronic exposure to the product.

---

**FIRST AID**

**A. EYE**

Good First Aid should be followed in all cases of exposure.  
In case of eye contact, flush with plenty of water for at least 15 minutes.  
If irritation develops, call a physician.

**B. SKIN**

Not Applicable

**C. INGESTION**

Not Applicable

**D. INHALATION**

Not Applicable

## SECTION VI REACTIVITY DATA

STABILITY (Materials to Avoid)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">STABLE</td> <td style="width: 50%;">CONDITIONS TO AVOID</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> </tr> </table>	STABLE	CONDITIONS TO AVOID	X	X	
STABLE	CONDITIONS TO AVOID					
X	X					

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition may produce carbon monoxide and carbon dioxide

## SECTION VII SPILL OR LEAK PROCEDURES

REPORTABLE QUANTITIES (RQ) IN LBS OF EPA HAZARDOUS SUBSTANCES IN PRODUCT

1.           N/A
2.
3.

NOTIFY EPA OF PRODUCT SPILLS EQUAL TO OR EXCEEDING

          N/A           LBS.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Dispose of in accordance with local, state and federal regulations. Dike area to contain as much spilled material as possible. Remove any remaining material by absorbing on vermiculite or other suitable absorbing material and place in a sealed container for disposal.

WASTE DISPOSAL METHOD

Dispose of in a landfill or incinerate in accordance with local, state and federal regulations.

## SECTION VIII HANDLING/STORAGE

PROTECTIVE GLOVES

Not Required

EYE PROTECTION

Not Required

OTHER PROTECTIVE CLOTHING

Not Required

RESPIRATORY PROTECTION

Not Required

VENTILATION

Normal

LOCAL EXHAUST

Not Required

OTHER

Not Required

MECHANICAL (General)

Not Required

STORAGE & HANDLING

Wash thoroughly after handling.

Keep container closed.

Exercise caution in the storage and handling of all chemical substances.

PRECAUTIONS

None

12-27-94  
MATERIAL SAFETY  
DATA SHEET



ASHLAND CHEMICAL, INC.  
Subsidiary Of Ashland Oil, Inc  
P.O. BOX 2219  
COLUMBUS, OHIO 43216  
(614) 889-3333

24-HOUR  
Emergency  
Telephone  
1 (800) 274-5263 or  
1 (800) ASHLAND

001444

POTASSIUM SORBATE NF/FCC GRAN

Page: 1

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

Product Name: POTASSIUM SORBATE NF/FCC GRAN  
CAS NUMBER: 24634-61-5

05 50 Q86 4133770-

Data Sheet No: 0017524-003.003  
Prepared: 11/16/94  
Supersedes: 08/17/94  
Print Date: 12/17/94

HERCULES INCORPORATED  
P O DRAWER 1937  
HATTIESBURG MS 39401

PRODUCT: 3885100  
INVOICE: 032628  
INVOICE DATE: 12/13/94  
TO: HERCULES INCORPORATED  
WEST 7TH STREET  
HATTIESBURG MS 39401

ATTN: PLANT MGR./SAFETY DIR.

SECTION I - PRODUCT IDENTIFICATION

General or Generic ID: SALTS

SECTION II - COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS AND CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III SECTION 313 ARE IDENTIFIED IN THIS SECTION. SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	Percent	PEL	TLV	Note
POTASSIUM 2,4-HEXADIENOATE CAS #: 24634-61-5	100	.		( 1)

Notes:

( 1) PEL/TLV NOT ESTABLISHED FOR THIS MATERIAL

SECTION III - PHYSICAL DATA

Boiling Point	NOT APPLICABLE
Vapor Pressure	NOT APPLICABLE
Specific Vapor Density	NOT APPLICABLE
Specific Gravity	1.360 @ 77.00 Deg F ( 25.00 Deg C)
Percent Volatiles	NOT APPLICABLE
Evaporation Rate	NOT APPLICABLE

SECTION IV - FIRE AND EXPLOSION INFORMATION

FLASH POINT NOT APPLICABLE

EXPLOSIVE LIMIT NOT APPLICABLE

EXTINGUISHING MEDIA: WATER FOG

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WHEN FIGHTING FIRES.

SPECIAL FIRE & EXPLOSION HAZARDS: MATERIAL DECOMPOSES AT GREATER THAN 750 DEGREES F. |

DUST MAY BE AN EXPLOSION HAZARD.

NFPA CODES: HEALTH- 0 FLAMMABILITY- 1 REACTIVITY- 0

SECTION V - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL: NOT ESTABLISHED.

EFFECTS OF ACUTE OVEREXPOSURE:

EYES - EXPOSURE CAUSES EYE IRRITATION. SYMPTOMS MAY INCLUDE STINGING, TEARING, REDNESS, AND SWELLING.  
SKIN - EXPOSURE MAY CAUSE MILD SKIN IRRITATION. SYMPTOMS MAY INCLUDE REDNESS AND BURNING.  
BREATHING - EXPOSURE TO DUST IS POSSIBLE.

SYMPTOMS MAY INCLUDE:

-IRRITATION (NOSE, THROAT, RESPIRATORY TRACT)- PRE-EXISTING LUNG DISORDERS, E.G. ASTHMA-LIKE CONDITIONS, MAY BE AGGRAVATED BY EXPOSURE TO THIS MATERIAL.

SWALLOWING - SINGLE DOSE ORAL TOXICITY IS LOW. SWALLOWING SMALL AMOUNTS DURING NORMAL HANDLING IS NOT LIKELY TO CAUSE HARMFUL EFFECTS; SWALLOWING LARGE AMOUNTS MAY BE HARMFUL.

SYMPTOMS MAY INCLUDE:

-GASTROINTESTINAL IRRITATION (NAUSEA, VOMITING, DIARRHEA)-

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDRY CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL

CONTINUED ON PAGE: 2





POTASSIUM SORBATE NF/FCC GRAN

Page: 2

**SECTION V-HEALTH HAZARD DATA (Continued)**

ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION, SKIN CONTACT

**SECTION VI-REACTIVITY DATA**

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: NOT APPLICABLE

**SECTION VII-SPILL OR LEAK PROCEDURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: SWEEP UP MATERIAL FOR DISPOSAL OR RECOVERY.

LARGE SPILL: SHOVEL MATERIAL INTO CONTAINERS. THOROUGHLY SWEEP AREA OF SPILL TO CLEAN UP ANY RESIDUAL MATERIAL.

WASTE DISPOSAL METHOD:

SMALL SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

LARGE SPILL: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

**SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED**

RESPIRATORY PROTECTION: IF OVEREXPOSURE HAS BEEN DETERMINED OR DOCUMENTED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW LEVEL OF OVEREXPOSURE (FROM KNOWN, SUSPECTED OR APPARENT ADVERSE EFFECTS).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS: NATURAL RUBBER

PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. CONSULT YOUR SAFETY REPRESENTATIVE.

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

**SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS**

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.



**DEFINITIONS**

This definition page is intended for use with Material Safety Data Sheets supplied by the Ashland Chemical Company. Recipients of these data sheets should consult the OSHA Safety and Health Standards (29 CFR 1910), particularly subpart G - Occupational Health and Environmental Control, and subpart I - Personal Protective Equipment, for general guidance on control of potential Occupational Health and Safety Hazards.

**SECTION I  
PRODUCT IDENTIFICATION**

**GENERAL OR GENERIC ID:** Chemical family or product description.

**DOT HAZARD CLASSIFICATION:** Product meets DOT criteria for hazards listed.

**SECTION II  
COMPONENTS**

Components are listed in this section if they present a physical or health hazard and are present at or above 1% in the mixture. If a component is identified as a CARCINOGEN by NTP, IARC, or OSHA as of the date on the MSDS, it will be listed and footnoted in this section when present at or above 0.1% in the product. Negative conclusions concerning carcinogenicity are not reported. Additional health information may be found in Section V. Components subject to the reporting requirements of Section 313 of SARA Title III are identified in the footnotes in this section, along with typical percentages. Other components may be listed if deemed appropriate.

Exposure recommendations are for components. OSHA Permissible Exposure Limits (PELS) and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) appear on the line with the component identification. Other recommendations appear as footnotes.

**SECTION III  
PHYSICAL DATA**

**BOILING POINT:** Of product if known. The lowest value of the components is listed for mixtures.

**VAPOR PRESSURE:** Of product if known. The highest value of the components is listed for mixtures.

**SPECIFIC VAPOR DENSITY:** Compared to AIR = 1. If the Specific Vapor Density of a product is not known, the value is expressed as lighter or greater than air.

**SPECIFIC GRAVITY:** Compared to WATER = 1. If Specific Gravity of product is not known, the value is expressed as less than or greater than water.

**pH:** If applicable.

**PERCENT VOLATILES:** Percentage of material with initial boiling point below 425 degrees Fahrenheit and vapor pressure above 0.1mm Hg at 68 F.

**EVAPORATION RATE:** Indicated as faster or slower than ETHYL ETHER, unless otherwise stated.

**SECTION IV  
FIRE AND EXPLOSION DATA**

**FLASH POINT:** Method identified.

**EXPLOSION LIMITS:** For product if known. The lowest value of the components is listed for mixtures.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Known or expected hazardous products resulting from heating, burning or other reactions.

**SECTION IV (cont.)**

**EXTINGUISHING MEDIA:** Following National Fire Protection Association criteria.

**FIREFIGHTING PROCEDURES:** Minimum equipment to protect firefighters from toxic products of vaporization, combustion or decomposition in fire situations. Other firefighting hazards may also be indicated.

**SPECIAL FIRE AND EXPLOSION HAZARDS:** States hazards not covered by other sections.

**NFPA CODES:** Hazard ratings assigned by the National Fire Protection Association.

**SECTION V  
HEALTH HAZARD DATA**

**PERMISSIBLE EXPOSURE LIMIT:** For product.

**THRESHOLD LIMIT VALUE:** For product.

**EFFECTS OF ACUTE OVEREXPOSURE:** Potential local and systemic effects due to single or short term overexposure to the eyes and skin or through inhalation or ingestion.

**EFFECTS OF CHRONIC OVEREXPOSURE:** Potential local and systemic effects due to repeated or long term overexposure to the eyes and skin or through inhalation or ingestion.

**FIRST AID:** Procedures to be followed when dealing with accidental overexposure.

**PRIMARY ROUTE OF ENTRY:** Based on properties and expected use.

**SECTION VI  
REACTIVITY DATA**

**HAZARDOUS POLYMERIZATION:** Conditions to avoid to prevent hazardous polymerization resulting in a large release of energy.

**STABILITY:** Conditions to avoid to prevent hazardous or violent decomposition.

**INCOMPATIBILITY:** Materials and conditions to avoid to prevent hazardous reactions.

**SECTION VII  
SPILL OR LEAK PROCEDURES**

Reasonable precautions to be taken and methods of containment, clean-up and disposal. Consult federal, state and local regulations for accepted procedures and any reporting or notification requirements.

**SECTION VIII  
PROTECTIVE EQUIPMENT TO BE USED**

Protective equipment which may be needed when handling the product.

**SECTION IX  
SPECIAL PRECAUTIONS OR OTHER COMMENTS**

Covers any relevant points not previously mentioned.

**ADDITIONAL COMMENTS**

Containers should be either reconditioned by CERTIFIED firms or properly disposed of by APPROVED firms. Disposal of containers should be in accordance with applicable laws and regulations. "EMPTY" drums should not be given to individuals. Serious accidents have resulted from the misuse of "EMPTIED" containers (drums, pails, etc.). Refer to Sections IV and IX.



HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

KYMENE\* 736  
 Wet strength resin

MSDS No.: 595 6152 0200-03

Supersedes MSDS No.: 595 6152 0200-02

Date: 11/12/93

12/6/93

I. PRODUCT IDENTIFICATION

WARNING! PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION.  
 MAY CAUSE EYE IRRITATION.  
 VAPOR AND MIST MAY BE IRRITATING TO MUCOUS MEMBRANES.  
 MAY CAUSE LIVER AND KIDNEY DAMAGE.

POSSIBLE CANCER HAZARD. PRODUCT CONTAINS LESS THAN 1%  
 1,3-DICHLOROPROPANOL (1,3-DCP).  
 1,3-DCP MAY CAUSE CANCER BASED ON ANIMAL AND OTHER LABORATORY  
 STUDIES.

Risk of cancer depends on duration and level of exposure.

KYMENE\* 736 Wet strength resin

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard: 2 Moderate (2)  
 Flammability hazard: 0 Minimal  
 Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Water solution of cationic amine polymer -  
 epichlorohydrin adduct

APPEARANCE AND ODOR: Amber-colored liquid; odorless

(2) Indicates that there may be chronic health effects present. See Section V  
 of MSDS.

\* Registered Trademark of Hercules Incorporated

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(1) Explanation of acronyms:

- HMIS: Hazardous Materials Identification System rating for product as supplied.
- CASRN: Chemical Abstracts Service Registry Number
- AIHA WEEL: American Industrial Hygienists Association - Workplace  
 Environmental Exposure Level.
- OSHA: Occupational Safety and Health Administration.
- TLV: Registered trademark of American Conference of Governmental Industrial  
 Hygienists for Threshold Limit Values.
- TWA: Time Weighted Average
- STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)
- C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)
- SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)
- N/A: Not applicable

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 II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS
 

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CHEMICAL & COMMON NAMES:	%	RECOMMENDED AIRBORNE LEVELS(1)	
		OSHA TWA	TLV-TWA 1989-90
KYMENE* 736	100		Not established
1,3-Dichloropropan-2-ol (1,3-DCP)	< 1		Not established (3)

(3) 1,3-DCP is the principal by-product from the manufacture of KYMENE\* 736. Although no TLV has been established, Hercules recommends that the workplace standard (TLV) of 2 ppm be applied.

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 III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS
 

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BOILING POINT: Not determined	SOLUBILITY IN WATER: Miscible
VAPOR PRESSURE @ 20 C: Similar to water	SPECIFIC GRAVITY: Not determined
VAPOR DENSITY: Negligible	pH: 2.5 - 3.0
% VOLATILE (VOL.): Not determined	EVAPORATION RATE: Similar to water
FREEZING POINT: - 0 C (32 F)	

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 IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA
 

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FLASH POINT: Noncombustible - Water solution

FLAMMABLE LIMITS: Not determined

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA:

None required. Product is dispersed in water and as such will not burn. However, water spray, dry chemical, foam, or carbon dioxide may be used on fires involving this product.

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE & EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

Continued...

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

This product is an aqueous solution that will not support combustion. If heated to decomposition, it may generate carbon monoxide, carbon dioxide, nitrogen oxides, or hydrogen chloride. Under some fire conditions, small amounts of ammonia and hydrogen cyanide may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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WARNING: PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION.  
MAY CAUSE EYE IRRITATION.  
VAPOR AND MIST MAY BE IRRITATING TO MUCOUS MEMBRANES.  
MAY CAUSE LIVER AND KIDNEY DAMAGE.

POSSIBLE CANCER HAZARD. PRODUCT CONTAINS LESS THAN 1%  
1,3-DICHLOROPROPANOL (1,3-DCP).  
1,3-DCP MAY CAUSE CANCER BASED ON ANIMAL AND OTHER LABORATORY  
STUDIES.  
Risk of cancer depends on duration and level of exposure.

SIGNS & SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: May cause stinging and transient redness.  
SKIN: Prolonged or repeated contact may cause skin irritation.  
See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING  
AGGRAVATED BY EXPOSURE.  
INHALATION: Inhaling vapor or mist may cause nasal and throat irritation  
and coughing.  
INGESTION: None known.

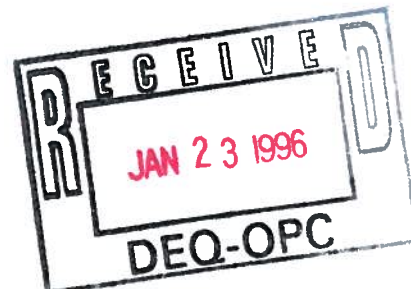
EMERGENCY & FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician if irritation persists.

Continued...



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**V. HEALTH HAZARD DATA**

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**EMERGENCY & FIRST AID PROCEDURES:...**Continued

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid to dilute this product. Induce vomiting. Call a physician if irritation persists. NEVER give liquids to an unconscious person. NEVER induce vomiting in an unconscious person.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**  
Prolonged or repeated contact may cause skin irritation.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin, inhalation.

**CANCER INFORMATION:**

**KYMENE\* 736:** The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are NOT regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have NOT been evaluated by the International Agency for Research on Cancer (IARC).

**1,3-DCP:** A recent unpublished chronic study of 1,3-DCP administered to rats in drinking water at 80 mg/liter for a period of 104 weeks found tumors of the liver, kidney, oral epithelial/tongue, and thyroid gland. At the dose level of 27 mg/liter no test material related effects were noted.

**REPORTED HUMAN EFFECTS:**

**KYMENE\* 736:** None known.

**1,3-DCP:** None known.

**REPORTED ANIMAL EFFECTS:**

**KYMENE\* 736:** Acute oral study: LD50 (rat) greater than 5000 mg/kg. This product has been tested in the Buehler Guinea Pig Sensitization Test. It is not a sensitizer in guinea pigs, under the conditions of this test.

**1,3-DCP:** Acute studies; Oral LD50 (rat) 110 mg/kg; Oral LD50 (mouse) 100 mg/kg; inhalation LC50 (4 hours, rat) 125 ppm, 2/6 deaths), 250 ppm (6/6 deaths); dermal LD50 (rabbits) 800 mg/kg; skin irritation (rabbit) mild; eye irritation (rabbit) severe. Liver and kidney damage was observed in acute oral and inhalation studies.

Continued...

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**V. HEALTH HAZARD DATA**

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**REPORTED ANIMAL EFFECTS:...Continued**

Subacute studies: In response to a TSCA test rule, a 13-week oral gavage study with 1,3-DCP was conducted with male and female rats at dose levels of 0.1, 1, 10, and 100 mg/kg body weight/day. The highest level produced decreases in body weight gain, feed consumption, and hematologic parameters, increases in clinical chemistry values and kidney and liver weight ratios. Histopathologic changes were noted in the stomach, kidney, liver, and nasal tissues in both male and female rats. Lesser effects were noted in the 10 mg dose groups; while 1 mg/day was considered a no-observed-adverse-effect level (NOAEL).

Male Wistar rats were exposed orally to 1,3-DCP by gavage at daily doses of 0, 15, or 60 mg/kg for 14 days. Differences between treated and control animals were observed in the appearance of small spermatocoele or sperm granulomas in the efferent ducts and/or epididymis. These effects were seen in only a small number of animals and were not dose related. In addition, no morphological changes were noted in kidneys, testes, or vas deferens. Studies conducted by the Upjohn Co. found 1,3-DCP to have no sterilant activity in male rats.

In an 8(e) submission to the EPA, a report of a two-year chronic feeding study in rats disclosed that tris (1,3-dichloropropan-2-ol) phosphate (CAS No. 13674-87-8) caused a statistically significant increase in malignant liver tumors (hepatocellular carcinomas) at 80 mg/kg/day, the highest dose studied. The significance of this study is that the product rapidly metabolized to 1,3-DCP and partial phosphate esters. Both partial esters were inactive in the Ames bacterial mutagen test in the presence of liver homogenate induction, whereas 1,3-DCP was mutagenic without activation (see below).

**OTHER:**

Genotoxicity: 1,3-DCP was active in the Ames salmonella bacteria test both in the presence and absence of a liver metabolizing fraction. It caused sister chromatid exchange and chromosome aberrations in Chinese hamster ovary cells in vitro and a mutation at the TK locus in the L5178Y line of mouse lymphoma cells in vitro. 1,3-DCP was active in all tests with and without activation by S-9 fraction from Aroclor\* induced rat liver.

\* Aroclor is a registered trademark of Monsanto Company for chlorinated biphenyl.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**ADDENDUM:**

Analyses of epichlorohydrin-polyamine and -polyamide resin solutions have consistently shown a very low (ppm) or nondetectable level of residual epichlorohydrin in the products as shipped. These products also contain various amounts of epichlorohydrin hydrolysis products (1,3-dichloropropan-2-ol and 3-chloropropane-1,2-diol) often at de minimus levels. However, the concentration of these substances in the headspace of storage tanks may sometimes exceed the suggested atmospheric limits (see next paragraph). These tanks should be vented in such a way that epichlorohydrin hydrolysis products do not contaminate the air of the workplace and should be entered only while using an approved tank entry procedure.

Hercules Incorporated recommends that the user of this product establish a monitoring program for airborne levels of epichlorohydrin hydrolysis products. It is recommended that 2 ppm be used as an 8-hour TWA for exposure to each of these products by inhalation if they are found in the tank headspace or in the workplace air. If the user requires information or assistance in establishing a monitoring program, contact Hercules Incorporated for further information.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal. Clean surrounding area with soda ash.

**WASTE DISPOSAL METHOD:**

Incineration should be in accordance with local, state, and federal regulations. Supplemental fuel may be required.

When the drum is empty, rinse it with plenty of water before discarding.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.

Avoid breathing mist or vapors.

Wash thoroughly after handling, and before eating, drinking or smoking.

Remove contaminated clothing promptly and clean thoroughly before reuse.

Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses

Impervious gloves

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Appropriate protective clothing

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Keep containers tightly closed.

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep mist and vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	KYMENE* 736 Wet strength resin	Mixture	100
1	1,3-Dichloropropan-2-ol	96-23-1	< 1

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, HC-2, NPH	N/A
1	N/A	N/A	HC-1, HC-2	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. Normal variations in this product may cause its pH to be equal to or less than 2.0. In those cases, the product exhibits the characteristic of CORROSIVITY (D002) as defined in hazardous waste regulation 40 CFR 261, Subpart C, and disposal of unused product must comply with the hazardous waste regulations. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

**SECTION V HEALTH HAZARD DATA**

**THRESHOLD LIMIT VALUE**  
**Fresh unused catalyst contains some compounds of platinum.**

**EFFECTS OF OVEREXPOSURE**  
**Platinum compounds can produce asthmatic or dermatitis symptoms in some persons. Respirators, gloves recommended in handling fresh catalyst. Remove any affected person from area and symptoms disappear. See INSax "Dangerous Properties of Industrial Materials" 3rd edition, p. 1032.**

**EMERGENCY AND FIRST AID PROCEDURES**

**SECTION VI REACTIVITY DATA**

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE		
INCOMPATIBILITY (Materials to avoid)		NONE	
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

**SECTION VII SPILL OR LEAK PROCEDURES**

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

**HIGH VALUE PRODUCT - COLLECT ALL SPILLED MATERIAL - BUT NO HAZARD**

**WASTE DISPOSAL METHOD**      **RETURN TO SUPPLIER FOR PLATINUM RECOVERY**

**SECTION VIII SPECIAL PROTECTION INFORMATION**

**RESPIRATORY PROTECTION (Specify type)**  
**FOR FRESH CATALYST USE RESPIRATOR WITH ACID RESISTANT CARTRIDGE.**

VENTILATION	LOCAL EXHAUST PROVIDE GOOD VENTILATION	SPECIAL
	MECHANICAL (General)	OTHER <b>SEE SECTION V</b>
PROTECTIVE GLOVES <b>USE IN HANDLING FRESH CATALYST</b>	EYE PROTECTION <b>SEE SECTION V ABOVE</b>	
OTHER PROTECTIVE EQUIPMENT		

**SECTION IX SPECIAL PRECAUTIONS**

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING**  
**NO STORAGE TRUCKS BUT KEEP CONTAINERS CLOSED TO AVOID MOISTURE PICKUP.**

**OTHER PRECAUTIONS**  
**SEE SECTION V ABOVE. PLATINUM COMPOUNDS CAN PRODUCE ALLERGIC SYMPTOMS IN A SMALL PERCENTAGE OF PERSONS.**



Hercules Incorporated  
Hercules Plaza  
Wilmington, DE 19894-0001  
(302) 594-5000 (24 hrs)

MSDS NO.: 595 6155 0500 REV.: 07  
ISSUE DATE: 06/30/94  
SUPERSEDES: 595 6155 0500 REV.: 06  
08/30/91

## SECTION 1: PRODUCT IDENTIFICATION

**PRODUCT NAME:** KYMENE® 557H wet-strength resin

**APPEARANCE:** aqueous solution

### HMIS RATINGS

**COLOR:** amber

**Health hazard:** 2 MODERATE

**ODOR:** odorless

**Flammability hazard:** 0 MINIMAL

**CASRN:** proprietary

**Reactivity hazard:** 0 MINIMAL

**CHEMICAL DESCRIPTION:** aqueous solution of a cationic amine polymer-epichlorohydrin adduct

## SECTION 2: HAZARDOUS COMPONENT INFORMATION

Hazardous Ingredients	CASRN	Wt. %
1,3-dichloropropan-2-ol	000096-23-1	0.5-5.0

## SECTION 3: HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** *WARNING!*

Prolonged or repeated contact may cause skin irritation and may cause sensitization in susceptible individuals.  
May cause eye irritation.  
Inhalation of vapor may be irritating to mucous membranes.  
Inhalation of mist may be irritating to mucous membranes.

### POTENTIAL HEALTH EFFECTS:

Possible cancer hazard. Product contains 1,3-dichloropropan-2-ol, a component that may cause cancer based on animal and other laboratory studies. Risk of cancer depends on duration and level of exposure. Overexposure may cause kidney or liver damage.

Refer to Section 5 for Hazardous Combustion Products, and Section 10 for Hazardous Decomposition/Hazardous Polymerization Products.

## SECTION 4: FIRST AID PROCEDURES

### EYES:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

### SKIN:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse.

**INHALATION:**

Remove to fresh air. Treat any irritation symptomatically. Get medical attention if cough or other symptoms develop.

**INGESTION:**

If conscious, drink large quantities of water. Induce vomiting. Get immediate medical attention. NEVER give anything by mouth to an unconscious person. NEVER induce vomiting in an unconscious person.

**SECTION 5: FIRE HAZARDS****FIRE FIGHTING PROCEDURES:**

This material is an aqueous dispersion and will not support combustion.  
Wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) and full protective gear when fighting fires involving this product.

**EXTINGUISHING MEDIA:**

Water spray, dry chemical, foam, carbon dioxide or halon may be used on fires involving this product.

**CONDITIONS TO AVOID:**

None known.

**HAZARDOUS COMBUSTION PRODUCTS:**

If heated to decomposition, the following substances may be formed: carbon monoxide, carbon dioxide, nitrogen oxides, hydrogen chloride, ammonia and hydrogen cyanide.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

Add absorbent, sweep up and discard. For large spills, dike to contain and pump into drums for use or disposal. Clean surrounding area with soda ash.

In case of accidental spill or release, refer to Section 8, Personal Protective Equipment and General Hygiene Practices.

**SECTION 7: HANDLING AND STORAGE****GENERAL MEASURES:**

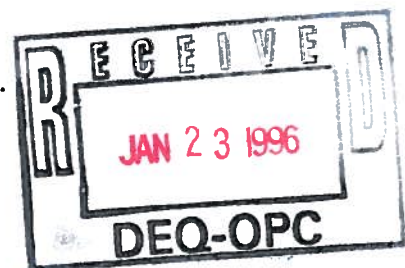
Keep container closed when not in use.

**MATERIALS OR CONDITIONS TO AVOID:**

Avoid freezing.

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION****GENERAL HYGIENIC PRACTICES:**

Avoid breathing vapor or mists.  
Avoid contact with eyes, skin, and clothing.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**RECOMMENDED EXPOSURE LIMITS:**

Hazardous Component	Wt. %	Limit	Basis
1,1-dichloropropan-2-ol	0.5-5.0	2 ppm	Hercules recommended 8 hr. TWA

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Safety glasses

Appropriate respiratory protection is required when exposure to airborne contaminants may exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

**WORK PRACTICES AND ENGINEERING CONTROLS:**

Eyewash fountains and safety showers should be easily accessible.

Enter confined space only after assuring that concentrations of hazardous ingredients are within the allowable limits or while using NIOSH-approved, supplied-air breathing apparatus.

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping, or vessels before beginning maintenance or repairs.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

pH:	4.6-4.9 (increases with age)	
Solids, %:	12.5	
Solubility in Water:	miscible with water	
Specific Gravity:	1.03	
Vapor Pressure:	similar to water	
Vapor Density:	lighter than air	
Evaporation Rate:	similar to water	
Boiling Point:	212 ° F	100 ° C
Freezing Point:	32 ° F	0 ° C

**SECTION 10: STABILITY AND REACTIVITY****GENERAL STABILITY CONSIDERATIONS:**

Stable under recommended handling and storage conditions.

**INCOMPATIBLE MATERIALS:**

None known

**HAZARDOUS DECOMPOSITION PRODUCTS:**

None anticipated under normal or recommended handling and storage conditions.

**HAZARDOUS POLYMERIZATION:**

Not anticipated under normal or recommended handling and storage conditions.

**SECTION 11: TOXICOLOGICAL INFORMATION****REPORTED HUMAN EFFECTS:**

**PRODUCT/SIMILAR PRODUCT** - This product may have sensitization potential at higher concentrations but does not produce an allergic response in more dilute concentrations. Repeated insult patch test of a 12% solution elicited a sensitization response in 2 of 52 subjects. A previous study using a 5% solution on 50 subjects produced neither irritation nor sensitization.

**REPORTED ANIMAL EFFECTS:**

**PRODUCT/SIMILAR PRODUCT** - Acute oral LD50 (rat): 6834 mg/kg; Acute inhalation (4 hrs, rat): > 11.2 mg/liter. Eye irritation (rabbit): unwashed, moderate conjunctivitis through seven days, normal at 14 days; washed, all eyes normal by two days. Dermal irritation (rabbit): moderate (Draize score, 3/8). Not a skin irritant by FHSA standards. Acute oral LD50 (mouse) on 5% solution: > 2500 mg/kg; eye irritation (rabbit): mild conjunctivitis, normal in 48 hrs.

**COMPONENT** - 1,3-dichloropropan-2-ol Acute studies: Oral LD50 (rat) 110 mg/kg. Oral LD50 (mouse) 100 mg/kg. Inhalation LC50 (4 hrs, rat) 125 ppm, (2/6 deaths); 250 ppm (6/6 deaths). Dermal LD50 (rabbits) 800 mg/kg. Skin irritation (rabbit) mild; eye irritation (rabbit) severe. Liver and kidney damage was observed in acute oral and inhalation studies. Subacute studies: 13-week oral gavage (rat). Dose level of 100 mg/kg/day produced decreases in body weight gain, feed consumption, and hematologic parameters, increases in clinical chemistry values, and kidney and liver weight ratios. Doses of 1 mg/day considered as no-observed-adverse-effect level (NOAEL).

**CARCINOGENICITY INFORMATION:**

**PRODUCT/SIMILAR PRODUCT** - Not listed as a carcinogen by NTP; Not regulated as a carcinogen by OSHA; and Not evaluated by IARC.

**COMPONENT** - 1,3-dichloropropan-2-ol: Chronic drinking water study in rats caused liver, kidney, oral and thyroid tumors at 80 mg/liter. No effect noted at 27 mg/liter.

**MUTAGENICITY/GENOTOXICITY INFORMATION:**

**PRODUCT/SIMILAR PRODUCT** - No mutagenicity studies have been carried out with this product.

**COMPONENT** - 1,3-dichloropropan-2-ol: Active in the Ames test. Caused sister chromatid exchange and chromosome aberrations in Chinese hamster ovary cells and mutation of mouse lymphoma cells.

**SECTION 12: ECOLOGICAL INFORMATION****ECOTOXICITY:**

**PRODUCT/SIMILAR PRODUCT** - Cationic polymers, in general, exhibit high toxicity to aquatic organisms when tested in purified laboratory water. However, when tested in water supplemented with organic acids at a level simulating natural water conditions, the results demonstrated a 100-fold decrease in toxicity.

**Aquatic:**

**COMPONENT** - polyamide resin: Acute aquatic 96-hour static LC50 values fall within the moderately toxic range of 1-10 mg/L. Fathead minnows and rainbow trout were the species tested. Salmon parr were also tested and the 96-hour static LC50 value was within the slightly toxic range of 10-100 mg/L.

**COMPONENT** - polyamide resin: Acute aquatic 48-hour static EC50 value falls within the moderately toxic range of 1-10 mg/L.

**Biodegradability:**

**COMPONENT** - polyamide resin: This product is not biodegradable.

**SECTION 13: DISPOSAL CONSIDERATIONS****WASTE DISPOSAL METHOD:**

Incineration in accordance with applicable regulations is the recommended disposal method. Supplemental fuel may be required. Wastewater containing this product can be considered for treatment in an acclimated biological treatment system.

**SECTION 14: TRANSPORTATION INFORMATION**

For information regarding transportation of this product, please contact Hercules Transportation at (302) 594-7356.

**SECTION 15: REGULATORY INFORMATION****CHEMICAL INVENTORIES:**

U. S. TSCA Status: Included on TSCA inventory.

**SARA TITLE III****Sections 302 and 304:**

This product is not an Extremely Hazardous Substance subject to reporting under 40CFR355.

**Sections 311 and 312:**

HC-1: Acute health hazard; HC-2: Chronic health hazard  
NPH: Not a physical hazard

**Section 313:**

This product does not contain any chemicals subject to reporting under Section 313 of Title III of the Superfund Amendments and Reauthorization Act and 40CFR372.

**CERCLA**

This product does not contain any chemicals subject to reporting as a CERCLA Hazardous Substance under 40CFR302.4.

**RCRA**

This product is not a hazardous waste as listed in 40CFR261.33. It does not exhibit any of the hazardous characteristics listed in 40CFR261, Subpart C.

**SECTION 16: OTHER INFORMATION****LIST OF ACRONYMS:**

ACGIH: American Conference of Governmental Industrial Hygienists  
AICS: Australian Inventory of Chemical Substances  
AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level  
ANSI: American National Standards Institute  
C: Ceiling  
CASRN: Chemical Abstracts Service Registry Number  
CERCLA: Comprehensive Emergency Response, Compensation and Liability Act  
DSL: Domestic Substances List (Canadian)  
EINECS: European Inventory of Existing Commercial Chemical Substances  
HMIS: Hazardous Materials Identification System  
IARC: International Agency for Research on Cancer  
MITI: Ministry of International Trade and Industry (Japanese)  
N/A: Not Applicable  
NDSL: Non-domestic Substances List (Canadian)  
NOR: Not Otherwise Regulated



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NTP: National Toxicology Program  
OSHA: Occupational Safety and Health Administration  
PEL: OSHA Permissible Exposure Limit  
RA: Resource Conservation and Recovery Act  
RQ: Reportable Quantity  
SARA: Superfund Amendment Reauthorization Act  
STEL: Short-Term Exposure Limit  
TLV: Threshold Limit Values (registered trademark of ACGIH)  
TPQ: Threshold Planning Quantity  
TSCA: Toxic Substances Control Act  
TWA: Time Weighted Average

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The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with our products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.



Hercules Incorporated  
Hercules Plaza  
Wilmington, DE 19894-0001  
(302) 694-6000 (24 hrs)

MSDS NO.: 595 6155 0600 REV.: 06  
ISSUE DATE: 09/23/94  
SUPERSEDES: 595 6155 0600 REV.: 05  
06/10/93

## SECTION 1: PRODUCT IDENTIFICATION

**PRODUCT NAME:** KYMENE® 557LX wet-strength resin

**APPEARANCE:** liquid

**COLOR:** light amber

**ODOR:** odorless

**CASRN:** proprietary

**CHEMICAL DESCRIPTION:** aqueous solution of a cationic amine polymer-epichlorohydrin adduct

**HMIS RATINGS**

<b>Health hazard:</b>	1 SLIGHT
<b>Flammability hazard:</b>	0 MINIMAL
<b>Reactivity hazard:</b>	0 MINIMAL

## SECTION 2: HAZARDOUS COMPONENT INFORMATION

This product is not a health hazard according to the OSHA Hazard Communication Standard 29CFR1910.1200. The hazards identified for this product are based on pH.

## SECTION 3: HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** *CAUTION!*

May cause eye irritation.  
May cause mild skin irritation.  
Inhalation of vapor may cause respiratory tract irritation.  
Inhalation of mist may cause respiratory tract irritation.

Refer to Section 5 for Hazardous Combustion Products, and Section 10 for Hazardous Decomposition/Hazardous Polymerization Products.

## SECTION 4: FIRST AID PROCEDURES

**EYES:** Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Get medical attention if cough or other symptoms develop.

**INGESTION:** If conscious, drink large quantities of water. Induce vomiting. Get immediate medical attention. NEVER give anything by mouth to an unconscious person. NEVER induce vomiting in an unconscious person.

**SECTION 5: FIRE HAZARDS****FIRE FIGHTING PROCEDURES:**

This material is an aqueous dispersion and will not support combustion. Wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) and full protective gear when fighting fires involving this product.

**EXTINGUISHING MEDIA:**

Water spray, dry chemical, foam, carbon dioxide or halon may be used on fires involving this product.

**CONDITIONS TO AVOID:**

None known.

**HAZARDOUS COMBUSTION PRODUCTS:**

If heated to decomposition, the following substances may be formed: carbon monoxide, carbon dioxide, smoke, nitrogen oxides, ammonia, hydrogen chloride, or hydrogen cyanide.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

Add absorbent, sweep up and discard. For large spills, dike to contain and pump into drums for use or disposal. Clean surrounding area with soda ash.

In case of accidental spill or release, refer to Section 8, Personal Protective Equipment and General Hygiene Practices.

**SECTION 7: HANDLING AND STORAGE****GENERAL MEASURES:**

There are no unusual hazards associated with handling of this product.

**MATERIALS OR CONDITIONS TO AVOID:**

None known

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION****GENERAL HYGIENIC PRACTICES:**

Avoid breathing vapor or mists.  
Avoid contact with eyes, skin, and clothing.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**RECOMMENDED EXPOSURE LIMITS:**

This product is not considered to present an inhalation health hazard under reasonably anticipated conditions of use.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Safety glasses

**WORK PRACTICES AND ENGINEERING CONTROLS:**

Eyewash fountains and safety showers should be easily accessible.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping, or vessels before beginning maintenance or repairs.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

pH:	2.8-3.2
Solids, %:	12.5
Solubility in Water:	miscible with water
Specific Gravity:	1.03
Vapor Pressure:	similar to water
Vapor Density:	lighter than air
Evaporation Rate:	similar to water
Boiling Point:	212 ° F      100 ° C
Freezing Point:	32 ° F      0 ° C

**SECTION 10: STABILITY AND REACTIVITY****GENERAL STABILITY CONSIDERATIONS:**

Stable under recommended handling and storage conditions.

**INCOMPATIBLE MATERIALS:**

None known

**HAZARDOUS DECOMPOSITION PRODUCTS:**

None anticipated under normal or recommended handling and storage conditions.

**HAZARDOUS POLYMERIZATION:**

Not anticipated under normal or recommended handling and storage conditions.

**SECTION 11: TOXICOLOGICAL INFORMATION****REPORTED HUMAN EFFECTS:**

**PRODUCT/SIMILAR PRODUCT** - No human toxicity studies have been carried out with this product.

**COMPONENT** - polyamide resin: This product may have sensitization potential at higher concentrations but does not produce an allergic response in more dilute concentrations. Repeated insult patch test of a 12% solution elicited a sensitization response in 2 of 52 subjects. A previous study using a 5% solution on 50 subjects produced neither irritation nor sensitization.

**REPORTED ANIMAL EFFECTS:**

**PRODUCT/SIMILAR PRODUCT** - No animal toxicity studies have been carried out with this product.

**COMPONENT** - polyamide resin: Acute oral LD50 (rat): 6834 mg/kg; Acute inhalation (4 hrs, rat): > 11.2 mg/liter. Eye irritation (rabbit): unwashed, moderate conjunctivitis through seven days, normal at 14 days; washed, all eyes normal by two days. Dermal irritation (rabbit): moderate (Draize score, 3/8). Not a skin irritant by FHSA standards. Acute oral LD50 (mouse) on 5% solution: > 2500 mg/kg; eye irritation (rabbit): mild conjunctivitis, normal in 48 hrs.

**MUTAGENICITY INFORMATION:**

**PRODUCT/SIMILAR PRODUCT** - Not listed as a carcinogen by NTP. Not regulated as a carcinogen by OSHA. Not evaluated by IARC.

**MUTAGENICITY/GENOTOXICITY INFORMATION:**

PRODUCT/SIMILAR PRODUCT - No mutagenicity studies have been carried out with this product.

**SECTION 12: ECOLOGICAL INFORMATION****ECOTOXICITY:**

PRODUCT/SIMILAR PRODUCT - Cationic polymers, in general, exhibit high toxicity to aquatic organisms when tested in purified laboratory water. However, when tested in water supplemented with organic acids at a level simulating natural water conditions, the results demonstrated a 100-fold decrease in toxicity.

**Aquatic:**

COMPONENT - polyamide resin: Acute aquatic 96-hour static LC50 values fall within the moderately toxic range of 1-10 mg/L. Fathead minnows and rainbow trout were the species tested. Salmon parr were also tested and the 96-hour static LC50 value was within the slightly toxic range of 10-100 mg/L.

COMPONENT - polyamide resin: Acute aquatic 48-hour static EC50 value, in the Daphnia, falls within the moderately toxic range of 1-10 mg/L.

**Biodegradability:**

Based upon data from this or similar materials, this product cannot be regarded as readily biodegradable; however, it may be slowly biodegradable.

**SECTION 13: DISPOSAL CONSIDERATIONS****WASTE DISPOSAL METHOD:**

Incineration in accordance with applicable regulations is the recommended disposal method. Supplemental fuel may be required. Wastewater containing this product can be considered for treatment in an acclimated biological treatment system.

**SECTION 14: TRANSPORTATION INFORMATION**

For information regarding transportation of this product, please contact Hercules Transportation at (302) 594-7356.

**SECTION 15: REGULATORY INFORMATION****CHEMICAL INVENTORIES:**

U. S. TSCA Status: Included on TSCA inventory.

**SARA TITLE III****Sections 302 and 304:**

This product is not an Extremely Hazardous Substance subject to reporting under 40CFR355.

**Sections 311 and 312:**

HC-1: Acute health hazard  
NPH: Not a physical hazard

**Section 313:**

This product does not contain any chemicals subject to reporting under Section 313 of Title III of the Superfund Amendments and Reauthorization Act and 40CFR372.

**CERCLA**

This product does not contain any chemicals subject to reporting as a CERCLA Hazardous Substance under 40CFR302.4.

**RCRA**

This product is not a hazardous waste as listed in 40CFR261.33. It does not exhibit any of the hazardous characteristics listed in 40CFR261, Subpart C.

**SECTION 16: OTHER INFORMATION****LIST OF ACRONYMS:**

ACGIH: American Conference of Governmental Industrial Hygienists  
AICS: Australian Inventory of Chemical Substances  
AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level  
ANSI: American National Standards Institute  
C: Ceiling  
CASRN: Chemical Abstracts Service Registry Number  
CERCLA: Comprehensive Emergency Response, Compensation and Liability Act  
DSL: Domestic Substances List (Canadian)  
EINECS: European Inventory of Existing Commercial Chemical Substances  
HMIS: Hazardous Materials Identification System  
IARC: International Agency for Research on Cancer  
MITI: Ministry of International Trade and Industry (Japanese)  
N/A: Not Applicable  
NDSL: Non-domestic Substances List (Canadian)  
NOR: Not Otherwise Regulated  
NTP: National Toxicology Program  
OSHA: Occupational Safety and Health Administration  
PEL: OSHA Permissible Exposure Limit  
RCRA: Resource Conservation and Recovery Act  
RQ: Reportable Quantity  
SARA: Superfund Amendment Reauthorization Act  
TEL: Short-Term Exposure Limit  
TLV: Threshold Limit Values (registered trademark of ACGIH)  
TPQ: Threshold Planning Quantity  
TSCA: Toxic Substances Control Act  
TWA: Time Weighted Average

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with our products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

KYMENE\* 109 Wet strength resin  
 MSDS No.: 595 6155 0503-01

Supersedes MSDS #: 595 6152 0100-03

Date: 01/24/92

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1. PRODUCT IDENTIFICATION

WARNING! PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION OR SENSITIZATION (ALLERGIC SKIN REACTION). MAY CAUSE MILD, TEMPORARY EYE IRRITATION.

POSSIBLE CANCER HAZARD. KYMENE\* 109 CONTAINS LESS THAN 1% 1,3-DICHLOROPROPANOL (1,3-DCP). 1,3-DCP MAY CAUSE CANCER BASED ON ANIMAL AND OTHER LABORATORY STUDIES. Risk of cancer depends on duration and level of exposure.

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KYMENE\* 109 Wet strength resin

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard: 2 Moderate (2)  
 Flammability hazard: 0 Minimal  
 Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAMES: Aqueous solution of a cationic polyamide-epichlorohydrin adduct

APPEARANCE AND ODOR: Pale amber liquid; odorless

\* Registered Trademark of Hercules Incorporated

(2) Indicates there may be chronic health effects present. See Section V of MSDS.

(1) Explanation of acronyms:

- HMIS: Hazardous Materials Identification System rating for product as supplied.
- CASRN: Chemical Abstract Substance Registry Number
- AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.
- OSHA: Occupational Safety and Health Administration.
- TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.
- TWA: Time Weighted Average
- STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)
- C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)
- SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)
- N/A: Not applicable



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 II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS
 

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CHEMICAL & COMMON NAMES:	%	RECOMMENDED AIRBORNE LEVELS (1)		
		OSHA TWA	TLV-TWA	1989-90
KYMENE* 109	100		Not established	
1,3-Dichloropropan-2-ol (1,3-DCP)	< 1		Not established (3)	

(3) 1,3-DCP is the principal by-product from the manufacture of KYMENE\* 109. Although no TLV has been established, Hercules recommends that the workplace standard (TLV) of 2 ppm be applied.

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 III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS
 

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BOILING POINT: 100 C (212 F)	SOLUBILITY IN WATER: Miscible
VAPOR PRESSURE @ 20 C: Similar to water	SPECIFIC GRAVITY: 1.03
VAPOR DENSITY: Lighter than air	pH: 4.6 - 4.9 (increases with age)
% VOLATILE (VOL.): 87 (water)	EVAPORATION RATE: Similar to water
FREEZING POINT: 0 C (32 F)	

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 IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA
 

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FLASH POINT: Non-flammable

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: N/A

EXTINGUISHING MEDIA:

Product is dispersed in water and as such will not burn. However, water spray, dry chemical, foam, or carbon dioxide may be used on fires involving this product.

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE & EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

Continued...

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

**HAZARDOUS PRODUCTS OF COMBUSTION:**

This product is an aqueous solution which will not support combustion. If heated to decomposition, it may evolve carbon monoxide, carbon dioxide and smoke. Depending on conditions, some nitrogen oxides, ammonia, hydrogen chloride or hydrogen cyanide also may be formed.

**HAZARDOUS POLYMERIZATION:** Will not occur.

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**V. HEALTH HAZARD DATA**

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**WARNING!** PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION OR SENSITIZATION (ALLERGIC SKIN REACTION)  
MAY CAUSE MILD, TEMPORARY EYE IRRITATION.

POSSIBLE CANCER HAZARD. KYMENE\* 109 CONTAINS LESS THAN 1%  
1,3-DICHLOROPROPANOL (1,3-DCP).  
1,3-DCP MAY CAUSE CANCER BASED ON ANIMAL AND OTHER LABORATORY STUDIES.

Risk of cancer depends on duration and level of exposure.

**SIGNS & SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** May cause stinging and temporary redness.  
**SKIN:** Prolonged or repeated contact may cause skin irritation or sensitization (allergic skin reaction).  
See below: Medical conditions generally recognized as being aggravated by exposure.  
**INHALATION:** Inhaling vapor or mist may cause nasal and throat irritation and coughing.  
**INGESTION:** None known.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Promptly wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician if irritation persists.

**INGESTION:** If conscious, the person should immediately drink large quantities of liquid to dilute this product. Induce vomiting. Call a physician if irritation persists. NEVER give liquids to an unconscious person. NEVER induce vomiting in an unconscious person.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

Prolonged or repeated contact may cause skin irritation or sensitization (allergic skin reaction.) (See discussion below.)

PRIMARY ROUTES OF ENTRY: Eyes, skin

**CANCER INFORMATION:**

KYMENE\* 109: The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are NOT regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have NOT been evaluated by the International Agency for Research on Cancer (IARC).

1,3-DICHLOROPROPAN-2-OL (1,3-DCP): A recent unpublished chronic study of 1,3-DCP administered to rats in drinking water at 80 mg/liter for a period of 104 weeks found tumors of the liver, kidney, oral epithelial/tongue, and thyroid gland. At the dose level of 27 mg/liter no test material related effects were noted.

**REPORTED HUMAN EFFECTS:**

KYMENE\* 109: When tested on 52 human subjects in the repeated insult patch test, KYMENE\* 109 (12.5% solids) elicited a sensitization response in two subjects during both the induction and the challenge treatment phases.

In previous studies similar products, tested at 5% solids concentration, on 200 subjects in the Schwartz patch test procedure and on 65 subjects in the Shelanski repeated insult procedure, produced neither irritation or sensitization.

KYMENE\* 109 diluted with sodium bisulfite to 4% resin solids and bisulfite concentrations ranging from 2% to 10%, with pH adjusted to 6.5, has been tested in a 50 human subject repeated insult test and applied as a hair treatment on heads of over 700 women with no evidence of irritation or sensitization. A similar formulation has been used in commercial beauty salons on over 50,000 subjects with no reports of adverse effects.

The above studies suggest that KYMENE\* 109 may have sensitization potential at higher concentrations but does not produce an allergic response in more dilute concentrations.

Many studies and years of commercial use have shown that 1% to 2% (dry weight) added to paper and subsequently dried causes neither skin irritation nor sensitization.

1,3-DICHLOROPROPAN-2-OL (1,3-DCP): None known.

**REPORTED ANIMAL EFFECTS:**

KYMENE\* 109: (Some of the reported studies have been carried out with products very similar to KYMENE\* 109).

Continued...

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**V. HEALTH HAZARD DATA**

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**REPORTED ANIMAL EFFECTS:...Continued**

Acute Oral LD50 (rat) 6834 mg/kg; Acute inhalation (4 hour, rat) greater than 11.2 mg/l (nominal concentration) with no abnormal symptoms noted during exposure or the 14-day post-exposure observation period and no gross pathological findings. Eye irritation (rabbit): unwashed, moderate conjunctivitis through seven days, normal at 14 days; washed, all eyes normal by 2 days. Dermal irritation (rabbit) moderate (Draize score, 3/8). Not a skin irritant by FHSA standards. The following studies were conducted with 5% solids dilution: Acute oral LD50 (mouse) greater than 2500 mg/kg; eye irritation (rabbit) mild conjunctivitis, normal in 48 hours.

A four-week subacute inhalation study was conducted with rats and rabbits using ground paper samples produced from paper treated with 0.75% Kymene\* 109 resin (solids) and cured. No signs or symptoms of irritation were noted at dust concentrations of 0.16 mg/l (greater than 80% of the particles were in the respirable range, 1-5 microns).

1,3 DICHLOROPROPAN-2-OL: Acute studies; Oral LD50 (rat) 110 mg/kg; Oral LD50 (mouse) 100 mg/kg; inhalation LC50 (4 hours, rat) 125 ppm, 2/6 deaths), 250 ppm (6/6 deaths); dermal LD50 (rabbits) 800 mg/kg; skin irritation (rabbit) mild; eye irritation (rabbit) severe. Liver and kidney damage was observed in acute oral and inhalation studies.

Subacute studies: In response to a TSCA test rule, a 13-week oral gavage study with 1,3-DCP was conducted with male and female rats at dose levels of 0.1, 1, 10, and 100 mg/kg body weight/day. The highest level produced decreases in body weight gain, feed consumption, and hematologic parameters, increases in clinical chemistry values and kidney and liver weight ratios. Histopathologic changes were noted in the stomach, kidney, liver, and nasal tissues in both male and female rats. Lesser effects were noted in the 10 mg dose groups; while 1 mg/day was considered a no-observed-adverse-effect level (NOAEL).

Male Wistar rats were exposed orally to 1,3-DCP by gavage at daily doses of 0, 15, or 60 mg/kg for 14 days. Differences between treated and control animals were observed in the appearance of small spermatocele or sperm granulomas in the efferent ducts and/or epididymis. These effects were seen in only a small number of animals and were not dose related. In addition, no morphological changes were noted in kidneys, testes, or vas deferens. Studies conducted by the Upjohn Co. found 1,3-DCP to have no sterilant activity in male rats.

Chronic studies, see above: **CANCER INFORMATION.**

In an 8(e) submission to the EPA, a report of a two-year chronic feeding study in rats disclosed that tris (1,3-dichloropropan-2-ol) phosphate (CAS No. 13674-87-8) caused a statistically significant increase in malignant liver tumors (hepatocellular carcinomas) at 80 mg/kg/day, the highest dose

Continued....

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**V. HEALTH HAZARD DATA**

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**REPORTED ANIMAL EFFECTS:...**Continued

studied. The significance of this study is that the product rapidly metabolized to 1,3-DCP and partial phosphate esters. Both partial esters were inactive in the Ames bacterial mutagen test in the presence of liver homogenate induction, whereas 1,3-DCP was mutagenic without activation (see below).

**OTHER:**

**Genotoxicity:** 1,3-DCP was active in the Ames salmonella bacteria test both in the presence and absence of a liver metabolizing fraction. It caused sister chromatid exchange and chromosome aberrations in Chinese hamster ovary cells in vitro and a mutation at the TK locus in the L5178Y line of mouse lymphoma cells in vitro. 1,3-DCP was active in all tests with and without activation by S-9 fraction from Aroclor\* induced rat liver.

**Aquatic:** KYMENE\* 109 (12.5% solids) was tested to determine its acute toxicity to fish and daphnids. Following are the reported 96-hour static acute LC50s:

Salmon parr	1.6 ppm
Rainbow trout	2.7 ppm
Fathead minnows	6.2 ppm
Daphnia pulex	1.7 ppm

**ADDENDUM:**

Hercules Incorporated has conducted extensive studies on the levels of epichlorohydrin hydrolysis products in a variety of paper mills when Kymene products have been used. The amounts of hydrolysis products in the air, in the paper, and in the process water are either undetectable or so low that they do not present any health concerns. The one exception is air above Kymene in storage tanks. It may contain epichlorohydrin hydrolysis products (1,3-dichloro-2-propanol and 3-chloro-1,2-dihydroxypropane) at levels considerably in excess of suggested limitations (see next paragraph). These tanks should be vented in such a way that epichlorohydrin hydrolysis products do not contaminate the air of the workplace and should be entered only while using an approved tank entry procedure.

Hercules Incorporated recommends that the user of this product establish a monitoring program for airborne levels of epichlorohydrin hydrolysis products. It is recommended that 2 ppm be used as an 8-hour TWA for exposure to each of these products by inhalation if they are found in the tank headspace or in the workplace air. If the user requires information or assistance in establishing a monitoring program, contact Hercules Incorporated for further information.

\* Aroclor is a registered trademark of Monsanto Company for chlorinated biphenyl.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal. Clean surrounding area with soda ash.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method. Use additional fuel if necessary.

This product is biodegradable. Wastewater containing this product can be considered for treatment in an acclimated biological treatment system of adequate capacity.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing vapor or mist.  
Wash thoroughly after handling, and before eating, drinking or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses  
Impervious gloves  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Appropriate protective clothing

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

Keep containers closed.  
Store above 4 C (40 F). Avoid storage temperatures above 32 C (90 F).

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep mist or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Enter confined space only after assuring that concentrations of hazardous ingredients are within the allowable limits or while using NIOSH-approved, supplied-air breathing apparatus.  
Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	KYMENE* 109 Wet strength resin	Mixture	100
1	1,3-Dichloropan-2-ol	96-23-1	< 1

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, HC-2, NPH	NO
1	N/A	N/A	HC-1, HC-2, NPH	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation, 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...



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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard.

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

HERCULES\* POLYMER 567  
 Aminopolyamide solution  
 MSDS No.: 595 6251 0100-01

Supersedes MSDS No.: 920 6251 0100-02 Date: 01/31/92

I. PRODUCT IDENTIFICATION

WARNING! MAY CAUSE EYE AND SKIN IRRITATION.

HERCULES\* POLYMER 567  
 Aminopolyamide solution

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard:	2	Moderate
Flammability hazard:	0	Minimal
Reactivity hazard:	0	Minimal

CHEMICAL & COMMON NAME: Aminopolyamide solution

APPEARANCE AND ODOR: Light amber, cloudy liquid; amine odor

\* Registered Trademark of Hercules Incorporated

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

CHEMICAL AND COMMON NAMES:

RECOMMENDED AIR-BORNE LEVELS (1)  
 OSHA PEL TLV-TWA 1991-92

Aminopolyamide polymer

Not established

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstract Substance Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: 100 C (212 F) SOLUBILITY IN WATER: Miscible  
VAPOR PRESSURE AT 20 C: Similar to water SPECIFIC GRAVITY: 1.09  
VAPOR DENSITY: Lighter than air pH: 9.0 - 10.0  
VOLATILE (VOL.),%: 47 EVAPORATION RATE: Similar to water  
FREEZING POINT: 0 C (32 F)

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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FLASH POINT: Nonflammable

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: N/A

EXTINGUISHING MEDIA:

Water spray, dry chemical, foam, carbon dioxide, or halon

SPECIAL FIREFIGHTING PROCEDURES:

Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: Acids

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

This product is an aqueous solution that will not support combustion. If heated to decomposition, it may generate carbon monoxide, carbon dioxide, and nitrogen oxides.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

---

WARNING! MAY CAUSE EYE AND SKIN IRRITATION.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

EYES: Redness, stinging  
SKIN: Redness, itching  
INHALATION: (Mist) May cause irritation of nose, throat, and respiratory tract.  
INGESTION: None known.

**EMERGENCY & FIRST AID PROCEDURES:**

EYES: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**  
None known.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

None of the components of this product are listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**  
None known.

**REPORTED ANIMAL EFFECTS:**  
None known.

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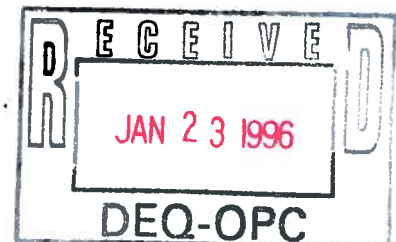
**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Flush to industrial sewer with excess water, or add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

Continued...



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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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...Continued

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility equipped with leachate collection is a suitable alternative.

This product is biodegradable. Wastewater containing this product can be considered for treatment in an acclimated biological treatment system of adequate capacity.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.

Avoid breathing vapor and mist.

Wash thoroughly after handling, and before eating, drinking, or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses

Impervious gloves

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

This product may react with acids and should not be stored near such materials.

**ENGINEERING CONTROLS:**

Provide adequate ventilation.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	HERCULES* POLYMER 567 Aminopolyamide solution	Mixture	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.



**Marubeni**  
AMERICA CORPORATION  
200 Park Avenue  
New York, NY 10166  
Emergency Phone: (212) 599-3969

7-30-91  
Call CHEMTREC 24 hrs 1-800-424-9300  
For Chemical Emergency, Spill, Leak,  
Fire, Exposure or Accident,

## MATERIAL SAFETY DATA SHEET

Effective Date: 6/10/91 Date Printed: 6/10/91

### 1. IDENTIFICATION

Product Name: EPICHLOROHYDRIN

**Synonyms:**

1-chloro-2,3-epoxy propane  
chloro propylene oxide  
chloro methylene oxide  
oxlrane-chloromethyl  
ECH  
EPI

**Chemical Family:**

Epoxy, oxlrane

**Formula:**

$C_3H_5OCl$

**Manufacturer:**

Asahi Glass Co., Ltd., Japan

**CAS #**

106-89-8

**Concentration:**

>99%

### 2. PHYSICAL DATA:

**BOILING POINT:** 241°F, 116°C

**SP. GRAVITY:** 1.173 @ 25/25°C

**VAP PRESS:** 13 mmHg @ 20°C

**APPEARANCE:** Water white liquid

**VAP DENSITY:** 3.2

**ODOR:** Sweet, pungent

**SOL. IN WATER:** 6.6% @ 25°C, 77°F

### 3. FIRE AND EXPLOSION HAZARD DATA:

**FLASH POINT:** 88°F, 31°C

**METHOD USED:** TCC

**FLAMMABLE LIMITS:**

LFL: 3.8 Vol. %

UFL: 21.0 Vol %

**EXTINGUISHING MEDIA:**

Water fog, CO<sub>2</sub>, dry chemical,  
alcohol resistant foam

**FIRE AND EXPLOSION HAZARDS:**

Epichlorohydrin and hydrogen chloride  
vapors

**FIRE-FIGHTING EQUIPMENT:**

Use a positive-pressure, self-contained  
breathing apparatus and full protective  
clothing.

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**V. HEALTH HAZARD DATA**

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**A. MOLTEN product**

**DANGER! MOLTEN RESIN. CAUSES SEVERE BURNS ON CONTACT.**

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Burns can cause irreversible eye injury and blindness. Smoke or fumes from rosin products may cause eye irritation with redness, tearing and discomfort.
- SKIN:** Serious burns will result from contact with molten product. Repeated or prolonged contact may cause an allergic skin reaction (sensitization) in susceptible individuals. See **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**
- INHALATION:** Breathing smoke or fumes from molten rosin products may produce breathing discomfort, coughing and sore throat.
- INGESTION:** None known

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** Cool burns with plenty of low-pressure water. Get medical attention immediately.

**SKIN:** Immediately cool burn area with cold water and cold packs for at least 15 minutes. Do NOT put ice directly on the skin. Do NOT attempt to remove solidified resin from the skin as severe tissue damage may result. Get medical attention.

**INHALATION:** Remove to fresh air. Treat any irritation symptomatically. Call a physician.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen and soften the material.

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**B. SOLID product****SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

- EYES:** Dust may cause irritation by mechanical abrasion.
- SKIN:** See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**
- INHALATION:** None known. None expected.
- INGESTION:** None known.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

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**V. HEALTH HAZARD DATA**

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**B. SOLID product...Continued****EMERGENCY & FIRST AID PROCEDURES:**

SKIN: Wash with soap and running water.

NOTE TO PHYSICIAN: Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

PRIMARY ROUTES OF ENTRY: Eyes, skin

**CANCER INFORMATION:**

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). SEE SECTION II.

**REPORTED ANIMAL EFFECTS:**

ACUTE ORAL LD50: rats, 4,100 mg/kg; mice, 4,100 mg/kg; guinea pigs, 3,700 mg/kg. In a subacute 90-day study, rats fed 5 percent resin in the diet refused food, lost weight, and died during the first few days. No histopathologic changes were noted. At 1 percent, the food consumption and weight gain were temporarily depressed and livers were enlarged; all other parameters were normal with no histologic findings. No effects were observed at 0.2, 0.05, and 0.01 percent levels. A chronic 2-year study was conducted with rats and dogs at 1 percent and 0.05 percent. At 1 percent, the same temporary weight loss was noted with rats and liver enlargement noted with both species. No histologic findings were seen in any of the organs or tissue and no resin-related effect noted on tumor incidence for either species at either feeding level.

**OTHER:**

Dehydroabietic acid was negative in the Ames test with and without activation.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.  
Avoid breathing dust or vapor.  
Wash thoroughly after handling, and before eating, drinking, or smoking.

**A. MOLTEN product - PERSONAL PROTECTIVE EQUIPMENT:**

Face shield, safety glasses and hard hat  
Long-sleeve protective shirt, long pants and work shoes  
Long-cuff lined gloves  
Lined rain suit with protective hood or shoulder shroud or full aluminized or thermal suit with hood  
Protective clothing should be made of six-ounce (6 oz) or greater fabric; polyester should be avoided.  
Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

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**B. SOLID product - PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses  
Impervious gloves  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

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Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**A. MOLTEN product - HANDLING AND STORAGE PRECAUTIONS:**

If allowed to solidify to solid or flake form, this product can exhibit the characteristics of solid or flake resin, and may form flammable dust-air mixtures. See HANDLING AND STORAGE PRECAUTIONS for solid product below. Water contact with hot molten resin may result in foaming or spattering which can cause burns upon skin or eye contact.

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**B. SOLID product - HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

For large bags (1,000 lbs. or greater, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** avoid ignition sources such as sparks and flame. Ground all equipment and the bag. In addition, when emptying where flammable vapors may be present, blanket vessel with an inert gas. **ATTENTION! A GROUNDING CABLE MUST BE ATTACHED TO THE BAG GROUND CONNECTION!**

Avoid dust accumulations and suspending dust in air.

Flake forms are prone to gradual oxidation. Control inventory. Use oldest material first.

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**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	HERCULES* RESIN 731D Disproportionated rosin	8050-09-7	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard  
HC-2 Delayed (chronic) health hazard  
HC-3 Fire hazard  
HC-4 Sudden release of pressure hazard  
HC-5 Reactive hazard  
NHH Not a health hazard  
NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.



HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

HERCULES\* RESIN 861

MSDS No.: 853 2176 0100-02

Supersedes MSDS #: 853 2176 0100-01

Date: 10/06/89

I. PRODUCT IDENTIFICATION

WARNING| STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

HERCULES\* RESIN 861 Synthetic resin

HMIS RATINGS:(1)

Health hazard: 0 Minimal  
Flammability hazard: 1 Slight  
Reactivity hazard: 0 Minimal

APPEARANCE AND ODOR: Amber-colored solid; typical rosin odor

\* Registered Trademark of Hercules Incorporated.

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

Note: The ingredients in this product are not listed in 29 CFR 1910, Subpart Z, nor do they appear in "Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH" for 1989-90.

If these materials are used in a manner that could generate particulates (dust), Hercules recommends that the resin dust be treated as a NUISANCE PARTICULATE according to the American Conference of Governmental Industrial Hygienists (ACGIH).

FOOTNOTES

(1)Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

N/A: Not applicable

Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: N/A SOLUBILITY IN WATER: Negligible  
VAPOR PRESSURE AT 20 C: Not determined. SPECIFIC GRAVITY: 1.06  
VAPOR DENSITY: N/A pH: N/A  
VOLATILE (VOL.),%: Negligible at 20 C EVAPORATION RATE: Slower than butyl acetate  
SOFTENING POINT: 74 C (165 F)

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

WARNING| STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

FLASH POINT: 216 C (420 F)

FLAMMABLE LIMITS: Not determined.

AUTOIGNITION TEMPERATURE: Not determined.

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

SPECIAL FIREFIGHTING PROCEDURES: None

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** Dust may cause irritation by mechanical abrasion.  
**SKIN:** Prolonged and repeated contact may cause a skin sensitization reaction in susceptible individuals (see below - "MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE").  
**INHALATION:** None known. None expected.  
**INGESTION:** None known.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water. **MOLTEN RESINS:** If molten material comes in contact with the skin, cool under a running stream of water. Do NOT attempt to remove the resin from the skin. Removal could result in severe tissue damage. Get medical attention.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

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**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this product after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of waste material in a permitted facility in accordance to local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing dust.  
Wash thoroughly after handling, and before eating, drinking or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Impervious gloves  
Safety glasses  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations. Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:  
**WARNING | STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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**HANDLING AND STORAGE PRECAUTIONS:...**Continued

For large bags (1,000 lbs. or greater), the following warning applies:  
WARNING| STATIC CHARGES GENERATED BY EMPTYING PACKAGE MAY IGNITE FLAMMABLE  
VAPORS OR DUST-AIR MIXTURES. MAY FORM FLAMMABLE DUST-AIR MIXTURES. avoid  
ignition sources such as sparks and flame. Ground all equipment and the  
bag. In addition, when emptying where flammable vapors may be present,  
blanket vessel with an inert gas. ATTENTION| A GROUNDING CABLE MUST BE  
ATTACHED TO THE BAG GROUND CONNECTION|  
Flaked forms are prone to gradual oxidation. Control inventory. Use  
oldest material first.

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep dust concentrations below  
acceptable exposure limits. Discharge from the ventilation system should  
comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate sources of ignition.  
Completely isolate and thoroughly clean all equipment, piping or vessels  
before beginning maintenance or repairs.  
Keep area clean. Product will burn.

---

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

HERCULES\* ROSIN RESIDUE  
 MSDS No.: 999 0420 3011-01

Supersedes MSDS #: OR 524

Date: 05/15/92

-----  
 I. PRODUCT IDENTIFICATION  
 -----

WARNING! MAY CAUSE EYE IRRITATION.  
 PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION OR  
 SENSITIZATION (ALLERGIC SKIN REACTION).  
 CONTAINS 1 TO 3 PERCENT FORMALDEHYDE WHICH MAY CAUSE SKIN  
 CANCER BASED ON ANIMAL DATA.  
 COMBUSTIBLE LIQUID.

HERCULES\* ROSIN RESIDUE

HMS RATINGS: (1)

CASRN: Mixture

Health hazard: 2 Moderate  
 Flammability hazard: 2 Moderate  
 Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Blended rosin-based distillation fractions

APPEARANCE AND ODOR: Dark, viscous liquid; typical rosin or phenolic odor

\* Registered Trademark of Hercules Incorporated

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 (1) Explanation of acronyms:

HMS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstract Substance Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace  
 Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial  
 Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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 II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS
 

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CHEMICAL & COMMON NAMES	CASRN	WT. %	RECOMMENDED AIRBORNE LEVELS (1) 1991-1992	
			OSHA TWA	TLV-TWA
Rosin Residue	Mixture	100	Not established	
Phenols, alkylated	Mixture	1-5	Not established	
Formaldehyde	50-00-0	1-3	1 ppm STEL-2 ppm	1 ppm (A2) (2) (skin) STEL-2 ppm (A2) (skin)

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup> (as formaldehyde), for rosin core solder pyrolysis products should be observed.

(2) A2 Classification = Industrial substances which are suspected human carcinogens.

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 III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS
 

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BOILING POINT (INITIAL): 104 C (220 F)	SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE AT 20 C: Not determined	SPECIFIC GRAVITY: 1.03
VAPOR DENSITY: Not determined	pH: N/A
VOLATILE (WT.), %: Negligible @ 20 C	EVAPORATION RATE: Slower than butyl acetate
FREEZING POINT: Not determined	

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 IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA
 

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## CAUTION! COMBUSTIBLE LIQUID

FLASH POINT: Above 92 C (198 F) Cleveland Open Cup

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: Not determined

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon

SPECIAL FIREFIGHTING PROCEDURES:

Cool containers with water if exposed to fire.  
Use self-contained breathing apparatus.

Continued...



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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS: Stable

INCOMPATIBILITY WITH: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

Carbon monoxide and carbon dioxide, and undetermined pyrolytic (smoke) decomposition products. Depending on conditions, some carboxylic acids and aliphatic aldehydes, including formaldehyde, also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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**WARNING!** MAY CAUSE EYE IRRITATION.  
PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION OR SENSITIZATION (ALLERGIC SKIN REACTION).  
CONTAINS 1 TO 3 PERCENT FORMALDEHYDE WHICH MAY CAUSE SKIN CANCER BASED ON ANIMAL DATA.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** Liquid may cause redness, tearing and discomfort. Smoke or fumes from decomposition of rosin products heated to high temperatures may also cause irritation.

**SKIN:** May cause irritation. See below: **MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.**

**INHALATION:** None known. Breathing smoke or fumes from decomposition of rosin products heated to high temperatures may produce breathing discomfort, coughing and sore throat.

**INGESTION:** None known.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water.

**INHALATION:** Remove to fresh air. Call a physician if irritation persists.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers. However, since formaldehyde and certain alkylated phenols are known skin sensitizers, skin contact should be avoided.

**PRIMARY ROUTES OF ENTRY:**

Eyes, skin, inhalation (at decomposition temperatures)

**CANCER INFORMATION:**

FORMALDEHYDE is regulated as a carcinogen by OSHA. Formaldehyde gas is listed on the NTP list of carcinogens. Formaldehyde gas has been determined to be carcinogenic in animals by IARC. Controversial epidemiological studies of formaldehyde-exposed workers have indicated little or no additional cancer risk related to their exposure.

The other components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

See above- MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

In general, the toxicity of ALKYLATED PHENOLS follows that of phenol, but decreases as the size and complexity of the molecule increases. They are less corrosive and produce less irritation of the skin, but the simpler ones may share phenol's ability to penetrate intact skin.

At the maximum possible concentrations of FORMALDEHYDE in this product, the most likely effect would be skin irritation or an allergic skin reaction, with eye and mucous membrane irritation at elevated temperatures.

Continued...

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**V. HEALTH HAZARD DATA**

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...Continued

**REPORTED ANIMAL EFFECTS:**

Hercules Incorporated has not conducted animal testing with this product. Data from studies on components or similar materials indicate that this product probably has a low order of acute toxicity by mouth or by skin contact and may produce irritation following skin contact. Subchronic administration of major components in the diet of rats led to liver enlargement without pathologic abnormalities at 1%. There were no significant effects noted below dietary levels of 1%.

An inhalation study of thermal decomposition products was conducted by heating a related product to 180 C (356 F). Rats were exposed to vapor and/or decomposition products for 6 hours. No deaths or significant adverse reactions were noted.

In a chronic study, rats exposed to FORMALDEHYDE vapor at 2 ppm developed benign nasal tumors and changes in the cell structure of the nasal passages. It is not tetratogenic in mice and rats.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Scrape up and salvage in metal containers. Soak up small spills with earth or sand. Wash area with detergent and water.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Wash thoroughly after handling, and before eating, drinking, or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.  
Dispose of contaminated shoes and other leather articles.

Continued...

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**VII. APPLICABLE CONTROL MEASURES**

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...Continued

**PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses

Impervious gloves

Appropriate protective clothing

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

Use of appropriate personal protective devices, including respirator (in accordance with OSHA Subpart I, 29 CFR 1910.134), face shield, and body covering, is recommended when handling this product at elevated temperatures.

Keep floors clean and dry.

**HANDLING AND STORAGE PRECAUTIONS:**

Keep away from heat and flame.

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep mist or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Eliminate ignition sources.

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

Keep area clean. Product will burn.

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 VIII. ENVIRONMENTAL & REGULATORY DATA  
 -----

The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	HERCULES* ROSIN RESIDUE	Mixture	100
1	Phenols, alkylated	Mixture	1-5
2	Formaldehyde	50-00-0	1-3

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, HC-2, NPH	N/A
1	N/A	N/A	HC-1	NO
2	1000	500	HC-1, HC-2	YES

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

HERCULES\* ROSIN RESIDUE contains FORMALDEHYDE which is a "Hazardous Substance" listed in 40 CFR 302.4. FORMALDEHYDE has a "Reportable Quantity" of 1,000 lbs.

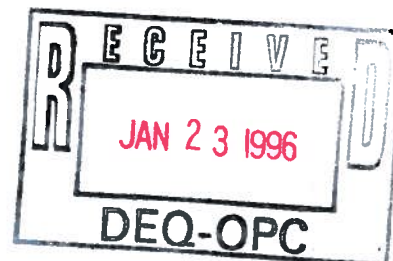
## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...



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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

-----  
HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

# MATERIAL SAFETY DATA SHEET

ANHYDROUS AMMONIA



DISTRIBUTORS:

**TANNER INDUSTRIES, INC.**

DIVISIONS:

**NATIONAL AMMONIA - NORTHEASTERN AMMONIA  
HAMLER INDUSTRIES - BOWER AMMONIA & CHEMICAL**

TACONY & VANKIRK STS., PHILADELPHIA, PA 19135

CORPORATE EMERGENCY TELEPHONE NUMBER: 215-535-7530 CHEMTREC (CMA) 800-424-9300

## DESCRIPTION

CHEMICAL NAME: Ammonia, anhydrous  
SYNONYMS: Ammonia, liquefied  
CHEMICAL FAMILY: Ammonia  
COMPOSITION: 99+% ammonia

FORMULA:  $\text{NH}_3$

CAS REGISTRY NO.: 7664-41-7

MOL WT.: 17.03

## STATEMENT OF HEALTH HAZARD

HAZARD DESCRIPTION: Irritant and corrosive to skin, eye, respiratory tract and mucous membranes. May cause severe burns, eye and lung injuries. Skin and respiratory related diseases aggravated by exposure. Not recognized by OSHA as a carcinogen.

Not listed in the National Toxicology Program annual report.

Not listed as a carcinogen by the International Agency for Research on Cancer.

EXPOSURE LIMITS: Vapor - OSHA - 35 ppm, 27 mg/m<sup>3</sup> STEL, 15 minutes  
25 ppm, 18 mg/m<sup>3</sup> PEL  
ACGIH 25 ppm, 18 mg/m<sup>3</sup> TLV, 8 hour TWA  
35 ppm, 27 mg/m<sup>3</sup> STEL, 15 minutes

## EMERGENCY TREATMENT

EFFECTS OF OVEREXPOSURE: Eye: lachrymation, edema, blindness. Skin: irritation, corrosive burns, blister formation. Contact of liquid with skin freezes the tissue, then produces a caustic burn. Inhalation: heavy, acute exposure may result in severe irritation of the respiratory tract, glottal edema, bronchospasm, pulmonary edema, respiratory arrest. Chronic effects: bronchitis. Extreme exposure (5000 ppm) can cause immediate death from spasm, inflammation or edema of larynx.

EMERGENCY AID: Eye: Flush with copious amount of water for 15 min. Eyelids should be held open and away from eyeball to ensure thorough rinsing. SPEED AND THOROUGHNESS IN RINSING THE EYE IS MOST IMPORTANT IN PREVENTING LATENT PERMANENT INJURIES. Inhalation: move to fresh air. Administer oxygen or artificial respiration if necessary. Skin: flush affected area with copious amount of water for 15 min. Remove contaminated clothing while flushing. Do not rub affected area. Do not apply ointments to skin burns. SEEK IMMEDIATE MEDICAL HELP.

NOTE TO PHYSICIAN: Eye injury may appear as delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilatory actions, including oxygen, may warrant consideration.

## PHYSICAL DATA

BOILING PT.: -33°C (-28°F)  
VAPOR PRESSURE: @ 25.7°C: 10 atm  
SPECIFIC GRAVITY: 0.618

FREEZING PT.: -78°C (-108°F)  
VAPOR DENSITY (Air=1): 0.6  
SOLUBILITY IN WATER: 0°C: 89.9g/100cc;  
100°C: 7.4g/100cc

PERCENT VOLATILE: 100%

EVAPORATION RATE (Water=1): faster than water if in liquid form

APPEARANCE AND ODOR: Colorless gas, pungent odor.

## FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: None

AUTOIGNITION TEMP.: 651°C (1204°F) catalyzed by iron;  
850°C (1562°F) uncatalyzed

FLAMMABLE RANGE IN AIR: 16% to 25% by Volume

EXTINGUISHING MEDIA: Water spray or fog

SPECIAL FIRE-FIGHTING PROCEDURES: Must wear protective clothing and respiratory protection. See PROTECTIVE EQUIPMENT. Stop source if possible. Cool fire-exposed containers with water spray. Stay upwind and use water spray to knock down vapor and dilute. Let fire burn.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Not generally a fire hazard. If relief valves are inoperative, heat-exposed storage containers may become explosion hazards. Contact of ammonia with chemicals such as mercury, chlorine, iodine, bromine, silver oxide, or hypochlorites can form explosive compounds. Special hazard with chlorine to form chloramine gas, also a primary skin irritant and sensitizer. Combustion may form toxic nitrogen oxides.

Revision: April 1992



# MATERIAL SAFETY DATA SHEET

## ANHYDROUS AMMONIA (Continued)

### CHEMICAL REACTIVITY

**STABILITY:** Stable at room temperature. Exothermic reaction with acids.

**CONDITIONS TO AVOID:** Avoid mixing with chlorine bleach, sulfuric or other strong mineral acids; contact with galvanized steel, copper, brass, bronze, gold, mercury, silver, strong oxidizers, hypochlorites and halogens.

See EXPLOSION HAZARDS.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Hydrogen and nitrogen gases above 450°C.

### SPILL OR LEAK PROCEDURES

**STEPS TO BE TAKEN:** Wear respiratory protection and protective clothing; see PROTECTIVE EQUIPMENT. Shut off source if possible. Stay upwind from spills or leaks. Use water spray to absorb ammonia gas and dilute. Caution: Adding water to large spills may increase volatilization of ammonia, thus may increase possibility for exposure.

**WASTE DISPOSAL:** Listed as hazardous substance under CWA: (40 CFR 116.4, 40 CFR 117.3 Reportable Quantity, 100#/45.4kg.). Classed as a hazardous waste under RCRA (40 CFR 261.32 Corrosive, No. D002). Comply with all regulations. Spill will evaporate. Contaminated water may be used on agricultural land as fertilizer. Keep spill from entering streams or lakes.

### SPECIAL PROTECTION AND PROCEDURES

**RESPIRATORY PROTECTION:** MSHA/NIOSH approved air-purifying type with full facepiece for work purposes; self-contained breathing apparatus for entry and escape in emergencies. Refer to 29 CFR 1910.134 and ANSI: Z88.2 for requirements and selection.

**VENTILATION:** Engineering control to 25 ppm or less. Respiratory protection for higher vapor concentration. Refer to 29 CFR 1910.134 and ANSI: Z9.2 for requirements and selection.

**PROTECTIVE EQUIPMENT:** Gas-tight chemical goggles, respiratory protection, impervious outer clothing, gloves, overshoes as needed. Cotton work clothes recommended. Refer to 29 CFR 1910.132 to 1910.136 for requirements.

### SPECIAL PRECAUTIONS

**HANDLING AND STORING:** Store in cool, well-ventilated area with containers tightly closed. OSHA 29 CFR 1910.111 prescribes handling and storage requirements for anhydrous ammonia as a hazardous material.

**WORKPLACE PROTECTIVE EQUIPMENT** as discussed above should be near, but outside of ammonia area. Eyewash and safety shower in immediate vicinity. See 29 CFR 1910.141 for workplace requirements.

**DISPOSAL:** Anhydrous ammonia is listed under RCRA and FWPCA. See WASTE DISPOSAL. Suitably diluted, ammonia may be disposed of on agricultural land as a fertilizer.

**PERSONAL:** Check availability of emergency equipment. Follow proper procedures. Wear needed protective equipment. Do not wear contact lenses.

### LABELING AND SHIPPING

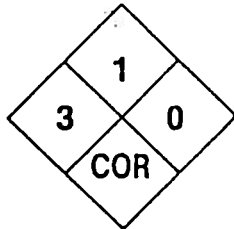
**HAZARD CLASS 2.2** (Nonflammable Gas),

**PROPER SHIPPING NAME:** Ammonia Anhydrous (Inhalation Hazard), 2.2 (Non-Flammable Gas), UN1005, RQ

**PLACARD:** Nonflammable Gas

**IDENTIFICATION NO.:** UN 1005

**National Fire  
Protection Assoc.  
Hazard Rating:**



**Hazardous Materials  
Identification System  
Label:**

ANHYDROUS AMMONIA	
HEALTH	3
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	H

### OTHER REGULATORY REQUIREMENTS

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Title III, Section 304, any accidental environmental release of this chemical equal to or over the reportable quantity of 100 lbs. must be reported promptly to the National Response Center, Washington, D.C. (1-800-424-8802). Any consumer product containing 5% or more ammonia requires a POISON label under FHSA (16 CFR 1500.129(1)).

This material is subject to the reporting requirements of Section 313, Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40CFR372.

EPCBA extremely hazardous substance, 40CFR355, Title III, Section 302 - Ammonia.

EPA Hazard Categories - Immediate: Yes; Delayed: No; Fire: No; Sudden Release: Yes; Reactive: No

**The information, data, and recommendations in this material safety data sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process. The information, data, and recommendations set forth herein are believed by us to be accurate. We make no warranties, either expressed or implied, with respect thereto and assume no liability in connection with any use of such information, data, and recommendations.**



Division of The BOC Group, Inc.

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# MATERIAL SAFETY DATA SHEET

Welding Consumables  
and Related Products  
Conforms to OSHA 1910.1200

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## IDENTIFICATION

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PRODUCT NAME: Hydrogen

CHEMICAL FAMILY: Inorganic  
Flammable Gas

SYNONYMS: Water Gas, Normal Hydrogen

DOT HAZARD CLASS: Flammable gas

CAS NUMBER: 1333-74-0

DOT IDENTIFICATION NUMBER: UN 1049

CHEMICAL FORMULA: H<sub>2</sub>

CHEMTREC: 800-424-9300

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## HEALTH HAZARD DATA

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### TIME WEIGHTED AVERAGE EXPOSURE LIMIT:

Hydrogen is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg. (ACGIH, 1984-85), no OSHA PEL.

### SYMPTOMS OF EXPOSURE:

Inhalation: High concentrations of hydrogen so as to exclude an adequate supply of oxygen to the lungs causes dizziness, deeper breathing due to air hunger, possible nausea and eventual unconsciousness.

### TOXICOLOGICAL PROPERTIES:

Hydrogen is inactive biologically and essentially nontoxic; therefore, the major property is the exclusion of an adequate supply of oxygen to the lungs.

RECOMMENDED FIRST AID TREATMENT:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO HYDROGEN. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

Hazardous Mixtures of Other Liquids, Solids, or Gases:

Hydrogen is flammable over a very wide range in air.

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PHYSICAL DATA

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Boiling Point: =  $-432^{\circ}\text{F}$  ( $-252.8^{\circ}\text{C}$ )

Liquid Density @ Boiling Point:  $4.43 \text{ lb/ft}^3$  ( $70.96 \text{ kg/m}^3$ )

Vapor Pressure @  $70^{\circ}\text{F}$  ( $21.1^{\circ}\text{C}$ ): above the critical temp. of  $-399.8^{\circ}\text{F}$  ( $-239.9^{\circ}\text{C}$ )

Specific Gravity @  $70^{\circ}\text{F}$ , 1 atm (Air=1): 0.070

Solubility in Water: Very slightly

Freezing Point:  $-434.6^{\circ}\text{F}$  ( $-259.2^{\circ}\text{C}$ )

Appearance and Odor: Colorless, odorless gas

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FIRE/EXPLOSION HAZARDS DATA

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Flash Point (Method Used): Gas

Auto Ignition Temperature:  $1058^{\circ}\text{F}$  ( $570^{\circ}\text{C}$ )

LEL: 4

UEL: 74.5

Extinguishing Media: Water, carbon dioxide, dry chemical

Electrical Classification: Class 1, Group B

Special Fire Fighting Procedures: If possible, stop the flow of hydrogen. Cool surrounding containers with water spray. Hydrogen burns with an almost invisible flame of relatively low thermal radiation.

Unusual Fire and Explosion Hazards: Hydrogen is very light and rises very rapidly in air. Should a hydrogen fire be extinguished and the flow of gas continue, increase ventilation to prevent an explosion hazard, particularly in the upper portions of buildings or sheds where the gas might "collect".

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REACTIVITY DATA

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Stability: Stable

Incompatibility (Materials to Avoid): Oxizers

Hazardous Decomposition Products: None

Hazardous Polymerization: Will not occur

Conditions to Avoid: None

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SPILL OR LEAK PROCEDURES

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STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Evacuate all personnel from affected area. Use appropriate protective equipment. IF leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact CHEMTREC for emergency assistance or your closest Airco location.

Waste Disposal Method:

Do not attempt to dispose of residual or unused quantities. Return in the shipping container properly labeled and valve protection cap in place to Airco for proper disposal.

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SPECIAL PROTECTION INFORMATION

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Respiratory Protection: Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.

Ventilation: Hood with forced ventilation.

Local Exhaust: To prevent accumulation above the LEL.

Special: N/A

Mechanical (Gen.): In accordance with electrical codes.

Other: N/A

Protective Gloves: Plastic or rubber.

Eye Protection: Safety goggles or glasses.

Other Protective Equipment: Safety shoes, safety shower.

SPECIAL PRECAUTIONS

Special Labeling Information:

DOT Shipping Name: Hydrogen or Hydrogen, Compressed

DOT Hazard Class: Flammable Gas

DOT Shipping Label: Flammable gas

I.D. No.: UN 1049

Special Handling Recommendations:

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (< 3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional recommendations, consult Compressed Gas Association Pamphlets G-5, P-1, P-14, and Safety Bulletin SB-2. OSHA 1910-Subpart H

Special Storage Recommendations:

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.

For additional recommendations, consult Compressed Gas Association Pamphlets G-5, P-1, P-14, and Safety Bulletin SB-2. OSHA 1910 - Subpart H

Special Packaging Recommendations:

Hydrogen is noncorrosive and may be used with any common structural material.

Other Recommendations or Precautions:

Earth-ground and bond all lines and equipment associated with the hydrogen system. Electrical equipment should be nonsparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipments of a compressed gas cylinder, which has not been filled by the owner or with his (written) consent, is a violation of Federal Law (49CFR).

HERCULES INCORPORATED

WILMINGTON, DELAWARE, 19894

PHONE NUMBERS: Regular - 302-594-5000

After Normal Business Hours and Only for Emergencies involving Safety  
and Health - 302-995-3000I. PRODUCT IDENTIFICATIONChemical Name & Synonyms: Dehydroabietylamine acetate pasteChemical Family: Amine saltCAS No:--Formula: C<sub>22</sub>H<sub>29</sub>O<sub>2</sub>NMolecular Weight: Chief component, 345Trade Name: AMINE DTH ACETATE 70%II. HAZARDOUS INGREDIENTS

Material	%	TLV-TWA VALUES ADOPTED BY ACGIH 1983-84
Dehydroabietylamine acetate	70	Not established

III. PHYSICAL DATA

<u>Boiling Point:</u> 100°C (212°F)(water)	<u>Freezing Point:</u>	Viscosity increases
<u>Vapor Pressure:</u> Not determined	<u>Specific Gravity:</u>	1.03
<u>Vapor Density:</u> 2.0 (Air=1)	<u>Percent Volatile:</u>	30 (By Volume)
<u>Solubility in Water @ 20°C:</u> up to 50%	<u>Evaporation Rate:</u>	Slower; less than 1 (Butyl Acetate=1)
<u>pH:</u> 6.9	<u>Appearance and Odor:</u> Tan, pasty solid; vinegar-like odor.	

IV. FIRE AND EXPLOSION HAZARD DATAFlash Point: 191°C (375°F) COCAutoignition Temperature: Not establishedFlammable Limits In Air, % by Volume: NAExtinguishing Media: Water spray, dry chemical, foam, or carbon dioxide.Special Fire-Fighting Procedures: Cool containers with water if exposed to fire.Unusual Fire and Explosion Hazards: See SECTION VI REACTIVITY DATA.Notes: NA = Not Applicable.

The information contained herein is furnished without warranty of any kind. Product users should make independent judgments of suitability of this information to ensure proper use and protect the health and safety of employees.



V. HEALTH HAZARD DATA

Threshold Limit Value: Not established - See Section II

Effects of Overexposure: Causes burns of eyes and skin.

Agency & First Aid Procedures:

EYES: In case of contact, immediately flush with plenty of water for at least 15 minutes. Call a physician.

SKIN: Wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

VI. REACTIVITY DATA

Stable. Conditions to Avoid: None

Incompatibility (Materials to Avoid): None

Hazardous Decomposition Products: Exposure to heat may cause liberation of acetic acid vapors. Burning liberates CO, CO<sub>2</sub>, NH<sub>3</sub>, and smoke.

Hazardous Polymerization Will Not Occur.

VII. SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled: Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

Waste Disposal Method: Dispose of in accordance with local, state, and Federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: None required in normal use.

Ventilation Local Exhaust: -- Special: --  
Mechanical: Recommended Other: --  
(General)

Protective Gloves: Solvent resistant Eye Protection: Chemical goggles

Other Protective Equipment: Face shield, eyewash and safety shower

IX. SPECIAL PRECAUTIONS

Precautionary Labeling:

**DANGER! CAUSES BURNS OF EYES AND SKIN**

Do not get in eyes, on skin, or on clothing.

Avoid breathing vapors or mist.

Wear goggles, face shield, and rubber gloves when handling.

Keep containers closed.

Use with adequate ventilation.

Wash thoroughly after handling.

FIRST AID:

EYES - In case of contact, immediately flush with plenty of water for at least 15 minutes. Call a physician.

SKIN - Wash with soap and running water. Remove contaminated clothing. Wash clothing before reuse.

Other Handling and Storage Conditions: None





UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.  
Industrial Chemicals Division



## MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 08/01/90

Union Carbide urges each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material of the information in this MSDS and any other information regarding hazards or safety; (2) furnish this same information to each of its customers for the product; and (3) request its customers to notify their employees, customers, and other users of the product of this information.

### I. IDENTIFICATION

PRODUCT NAME: ETHYLENE OXIDE

CHEMICAL NAME: Ethylene Oxide

CHEMICAL FAMILY: Oxides

FORMULA: C<sub>2</sub>H<sub>4</sub>O

MOLECULAR WEIGHT: 44.05

SYNONYMS: Dimethylene oxide, Dihydrooxirene, EO, Oxidoethane, ETO, Eto,

CAS # and 75-21-8

CAS NAME: Oxirane

### II. PHYSICAL DATA (Determined on typical material)

BOILING POINT, 760 mm Hg: 10.4 C (50.7 F)

FREEZING POINT: -111.7C; (-169F)

SPECIFIC GRAVITY(H<sub>2</sub>O = 1):  
0.8719 at 20/20 C

VAPOR PRESSURE AT 20°C:  
1,095 mm Hg

VAPOR DENSITY (air = 1):  
1.52

SOLUBILITY IN WATER by wt:  
Completely miscible

EVAPORATION RATE  
(Butyl Acetate = 1): 72

APPEARANCE AND ODOR: See Section IX. Other precautions.

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Union Carbide Chemicals & Plastics Technology Corp.

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EMERGENCY PHONE NUMBER: 1-800-UCC-HELP (Number available at all times) or 304-744-3487

UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.  
Industrial Chemicals Division  
39 Old Ridgebury Road, Danbury, CT. 06817-0001

**III. INGREDIENTS**

<u>MATERIAL</u>	<u>%</u>	<u>TLV (Units)</u>	<u>HAZARD</u>
Ethylene Oxide (CAS# 75-21-8)	100	1 ppm TWAB - OSHA; 0.5 ppm Action Level - OSHA;  5 ppm (15 minute) Excursion level - OSHA;  1 ppm TWAB - ACGIH	See Section V

**IV. FIRE AND EXPLOSION HAZARD DATA**

**FLASH POINT**  
(test method(s)): <0 F, Tag closed cup, ASTM D 56  
<0 F, Tag open cup, ASTM D 1310

**FLAMMABLE LIMITS IN AIR,**  
% by volume: LOWER: 3  
UPPER: 100 (via decomposition)

**EXTINGUISHING MEDIA:** Use water spray or carbon dioxide for small fires; use alcohol foams with aqueous film-forming characteristics for large fires.

**SPECIAL FIRE FIGHTING PROCEDURES:** Wear self-contained breathing apparatus operated in the pressure demand mode and protective clothing. Withdraw immediately in case of rising sound from tank car safety valve. Keep equipment containing Ethylene Oxide cool with water spray from maximum distance. Move containers away from fire if without risk. Solutions of Ethylene Oxide in water can remain flammable down to a dilution ratio of 100/1 of water to Ethylene Oxide by volume. Be aware extinguished fires have the potential to reignite in an explosive manner. Shut off source of fuel to the fire if possible.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Because of the potential for violent decomposition, in any incident where an Ethylene Oxide-containing vessel is being exposed to fire, there should be prompt evacuation of the surrounding population within an appropriate radius (i.e. for maximum safety, evacuate 5000 feet in all directions). Ethylene Oxide may travel or be moved by air currents and be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge or other ignition sources at locations distant from product handling point. Vapor in air has a very low ignition energy level (0.06 mJ) and is prone to static or other low energy ignition sources. For personnel safety, areas must be promptly evacuated after a release has occurred. Ethylene Oxide leaks may spontaneously ignite in insulation. This may expose material inside insulated vessels to temperatures that exceed the decomposition temperature of Ethylene Oxide.

**V. HEALTH HAZARD DATA**

**TLV AND SOURCE:** 1 ppm TWAB - OSHA;  
0.5 ppm TWAB Action Level - OSHA;  
5 ppm (15 minute) Excursion Limit - OSHA;  
1 ppm TWAB - ACGIH.

**EFFECTS OF SINGLE OVEREXPOSURE:**

**SWALLOWING:** A highly unlikely route of exposure. Will cause severe irritation and ulceration of the mouth and throat, abdominal pain, nausea, vomiting, collapse and coma.

**SKIN ABSORPTION:** Sustained contact with the skin is unlikely, but can cause headache, dizziness, nausea and vomiting. A dilute solution may penetrate skin,

producing a chemical burn.

**INHALATION:** May be fatal if inhaled in high concentrations. Causes irritation of the respiratory tract. Depending on the degree of exposure, there may be stinging of the nose and throat, coughing, chest tightness, headache, nausea, vomiting, diarrhea, light-headed feeling, dizziness, weakness, drowsiness, cyanosis, loss of coordination, convulsions and coma. May cause lung injury and delayed onset pulmonary edema.

**SKIN CONTACT:** With liquid or solutions in water, there may occur a local erythema, edema, and formation of vesicles. There may be a latent period of several hours prior to the onset of these signs. Large volumes of ethylene oxide spilled onto the skin may produce a frostbite-like effect.

**EYE CONTACT:** Severe irritation with corneal injury from liquid. Moderate irritation from high concentrations of vapor.

**EFFECTS OF REPEATED OVEREXPOSURE:**

Allergic contact dermatitis may occur in a small proportion of exposed workers. In various reports involving recurrent exposures to high concentrations of Ethylene Oxide vapor, peripheral neurotoxic effects, and, in some cases, indications of central nervous system toxicity, were described. In most cases, there was marked improvement on removal from further exposure. A few cases of cataract formation have also been linked to such exposures. Although one epidemiological study has suggested that Ethylene Oxide exposed women may have an increased incidence of abortions, the laboratory findings indicate that, if adverse reproductive effects are produced by Ethylene Oxide, these occur only at high exposure concentrations. Several studies on Ethylene Oxide exposed workers have demonstrated an increased incidence of chromosomal aberrations and sister chromatid exchanges; the relevance of such effects to human health hazard evaluation is currently uncertain. OSHA considers that, at excessive levels, Ethylene Oxide may present reproductive, mutagenic, genotoxic, neurologic and sensitization hazards.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:**

No evidence of adverse effects from available information.

**SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN**

**HEALTH HAZARD EVALUATION:** Ethylene Oxide has been shown to produce mutagenic and cytogenic effects in a variety of test systems. Animals exposed to Ethylene Oxide vapor for up to two years have shown an increase in the incidence of certain malignant tumors in comparison to non-exposed controls. In humans, an increased occurrence of leukemia and stomach cancer has been reported by one group of investigators who pooled results from three Swedish facilities producing or using Ethylene Oxide, among other materials. Based on experimental and observational data Ethylene Oxide is a suspect cancer hazard, and should be treated as possibly causing cancer in humans. Laboratory studies with mice have shown that acute exposure to Ethylene Oxide vapor at concentrations of 300 ppm and above cause testicular injury as evidenced by concentration-related increased embryonic deaths following the mating of exposed males to nonexposed females (Dominant Lethal Test). Also, a one-generation reproduction study in rats showed decreased numbers of pups at 100 but not at 33 ppm. Inhalation teratology studies have shown fetotoxicity at 100 ppm and above, but no evidence for birth defects.

**Carcinogenic and Mutagenic Assessment:**  
Ethylene Oxide is considered by OSHA, IARC and NTP as a potential human carcinogen and mutagen. See above for further OSHA assessment.

**OTHER EFFECTS OF OVEREXPOSURE:**

See Above.

**EMERGENCY AND FIRST AID PROCEDURES:**

**SWALLOWING:** Give at least two glasses of water. Do not induce vomiting. Call a physician.

**SKIN:** Immediately flush skin with plenty of water while removing contaminated clothing and shoes. Wash skin with soap and water. Call a physician.

**INHALATION:** Remove to fresh air, and administer oxygen if breathing is difficult. If breathing stops, start artificial respiration. Call a physician.

**EYES:** Flush immediately with water and continue for at least 15 minutes. The help of an ophthalmologist should be sought urgently.

**NOTES TO PHYSICIAN:**

- (1) Persons exposed to Ethylene Oxide may develop severe and intractable vomiting, requiring the use of antiemetics given intravenously.
- (2) Prolonged or high vapor concentration exposure may result in the development of pulmonary edema after a latent phase of several hours. Also, respiratory tract injury caused by Ethylene Oxide may predispose to the development of a secondary respiratory infection. Individuals exposed to moderately high vapor concentrations of Ethylene Oxide should be retained for observation.
- (3) Following skin contamination, primary irritation and blister formation may be delayed in onset.

**VI. REACTIVITY DATA**

**STABILITY:** Stable

**CONDITIONS TO AVOID:** Pure Ethylene Oxide will decompose violently if exposed to a high enough temperature, commonly accepted to be above 560 degrees C at atmospheric pressure. This temperature can vary depending upon time, pressure, and conditions of the system. The temperature required for decomposition is reduced as pressure and volume-to-surface ratios are increased. Ethylene Oxide is stable at ordinary conditions of temperature and pressure and in ordinary use, handling, and storage.

**INCOMPATIBILITY (materials to avoid):** Because of the highly reactive nature of Ethylene Oxide, dangerous runaway reactions can result from contamination with alkalies, acids, water, or a wide variety of organic and inorganic materials.

**HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:** Burning can produce carbon monoxide and/or carbon dioxide.

**HAZARDOUS POLYMERIZATION:** May Occur

**CONDITIONS TO AVOID:** Ethylene Oxide will polymerize violently if contaminated with aqueous alkalies, amines, mineral acids, metal chlorides, or metal oxides. Avoid contamination of Ethylene Oxide with trace amounts of other materials. Avoid exposing stored Ethylene Oxide to heat or sources of ignition. Ethylene Oxide will not polymerize spontaneously under normal conditions of temperature, pressure, etc.

**VII. SPILL OR LEAK PROCEDURES**

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

Warning: Forms explosive mixtures with air. Immediately evacuate all personnel from danger areas. Wear self-contained breathing apparatus operated in the pressure demand mode and suitable protective equipment. Remove all sources of ignition. Reduce vapors with fog of fine water spray. Flood the spill with water spray. Shut off leak and ventilate area. Neither pure Ethylene Oxide nor its aqueous solutions should be discharged to streams or sewers.

**WASTE DISPOSAL METHOD:** Do not turn on any ignition source until the area is determined to be free from explosion or fire hazards. Only dilute spill with water, if necessary to make vapors non-flammable. If it can be done safely, prevent runoff, collect and dispose of spill. Ethylene Oxide reacts slowly with water to form ethylene glycol, conversion requiring days for completion.

Discharge of unreacted aqueous mixtures containing Ethylene Oxide into sewers may result in vapor releases exposing personnel or creating flammable mixtures remote from spill locations. With proper control, aqueous solutions, where the Ethylene Oxide has gradually converted to ethylene glycol, are amenable to biological waste treatment. Observe all government regulations.

**VIII. SPECIAL PROTECTION INFORMATION**

**RESPIRATORY PROTECTION (specify type):**

If personnel exposure exceeds exposure limits, select respiratory equipment in accordance with 29CFR 1910.134 and 1910.1047. Positive pressure, full facepiece supplied air respirator is recommended for use up to 2000 ppm. Refer to 29CFR 1910.1047 for further respirator selection specifications.

**VENTILATION:**

When handling Ethylene Oxide indoors cannot be avoided, extra attention should be given to avoiding leaks and providing adequate ventilation. If personnel exposure exceeds exposure limits, apply local exhaust ventilation at points of vapor and liquid release.

**PROTECTIVE GLOVES:**

Butyl rubber gloves. After contact with liquid Ethylene Oxide, these gloves have a lifetime of approximately one-half to one hour.

**EYE PROTECTION:**

Monogoggles; contact lenses should not be worn.

**OTHER PROTECTIVE EQUIPMENT:**

Eye bath, safety shower, and chemical suits and other appropriate protective clothing are recommended where there is significant potential for skin contact. Exposure must be held to the PEL/TLV standard by appropriate engineering and procedural safeguards. Do not allow protective equipment to become contaminated with Ethylene Oxide.

**IX. SPECIAL PRECAUTIONS**

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:**

**DANGER!** Extremely flammable and explosive  
 Causes eye and skin burns.  
 Harmful if inhaled.  
 Harmful if swallowed.  
 May cause respiratory system and nervous system damage.  
 Reproductive hazard.  
 Cancer hazard.

Keep away from heat, sparks and flame.  
 Do not get in eyes, on skin, on clothing.  
 Do not breathe vapor.  
 Do not swallow.  
 Keep container closed.  
 Use only in a closed system.  
 Use with adequate ventilation.  
 Vapors form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges or other ignition sources at locations distant from product handling point.  
 Do not contaminate. Wash thoroughly after handling.  
 Ground all lines during liquid and vapor transfers.

**OTHER PRECAUTIONS:**

**APPEARANCE AND ODOR:** Shipped and stored under nitrogen pressure as a liquid. Colorless gas; nonresidual, ether-like odor above 500ppm. Odor not detectable until well above exposure level.

OSHA regulations are in force that limit personnel exposure to ethylene oxide (29CFR 1910.134 and 1910.1047). These must be strictly adhered to. Provision must be made for safe discharge of vented material and for destruction of liquid wastes. Discharge of aqueous solutions of ethylene oxide must be regarded as constituting both personnel and inflammability hazards. Because of the potential for violent decomposition, containers of ethylene oxide must have proper inert gas blanketing and be given extraordinary protection against fire exposure. Extreme care is appropriate in avoiding contamination of ethylene oxide that could lead to runaway reactions. Contingency planning is

necessary for potential emergencies from spills, fire exposure, or contamination.

WARNING: Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions.

Any use of this product in elevated-temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions. Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapors."

**X. REGULATORY INFORMATION**

**STATUS ON SUBSTANCE LISTS:**

The concentrations shown are maximum or ceiling levels (weight %) to be used for calculations for regulations. Trade Secrets are indicated by "TS".

**FEDERAL EPA<sup>1</sup>**

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in 40 CFR 302.4.

Components present in this product at a level which could require reporting under the statute are:

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Ethylene Oxide	75-21-8	100.00

**Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III**

requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312).

Components present in this product at a level which could require reporting under the statute are:

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Ethylene Oxide	75-21-8	100.00

**Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III**

requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material.

Components present in this product at a level which could require reporting under the statute are:

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Ethylene Oxide	75-21-8	100.00

**STATE RIGHT-TO-KNOW**

**CALIFORNIA Proposition 65**

This product contains ETHYLENE OXIDE and trace levels of FORMALDEHYDE, ACETALDEHYDE, ETHYLENE DICHLORIDE, VINYL CHLORIDE, DIOXANE, and PROPYLENE OXIDE which the state of California has found to cause cancer, birth defects or other reproductive harm.



Hazardous Substances on the MSL must be identified when present in products.

Components present in this product at a level which could require reporting under the statute are:  
EXTRAORDINARILY HAZARDOUS SUBSTANCES ( $\Rightarrow$  0.0001%)

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Formaldehyde	50-00-0	.0003
Ethylene Chlorohydrin	107-07-3	.0003
Acetaldehyde	75-07-0	.0002
Ethylene Dichloride	107-06-2	.0001
Ethylene Oxide	75-21-8	100.00
Propylene Oxide	75-56-9	.0030

PENNSYLVANIA Right-To-Know, Hazardous Substance List Hazardous Substances and Special Hazardous Substances on the List must be identified when present in products.

Components present in this product at a level which could require reporting under the statute are:  
SPECIAL HAZARDOUS SUBSTANCES ( $\Rightarrow$  0.01%)

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
Ethylene Oxide	75-21-8	100.00

**Toxic Substances Control Act(TSCA) STATUS:**

The ingredients of this product are on the TSCA inventory.

**CALIFORNIA SCAQMD RULE 443.1 VOC's:**

Not presently available

**NOTE -----**

The opinions expressed herein are those of qualified experts within Union Carbide Chemicals and Plastics Company. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Union Carbide Chemicals and Plastics Company, it is the user's obligation to determine the conditions of safe use of the product.

**REVISED SECTIONS:**

This MSDS has been revised from its previous edition as follows:

Section II: PHYSICAL DATA - Freezing Point; Specific Gravity; and Solubility in Water

Section IV: FIRE & EXPLOSION HAZARD DATA - Special Fire Fighting Procedures; and Unusual Fire and Explosion Hazards

Section V: HEALTH HAZARD DATA - Effects of Single Overexposure for Inhalation; and Emergency and First Aid Procedures for Skin

Section VI: REACTIVITY DATA - Conditions to Avoid re Stability; and Conditions to Avoid re Hazardous Polymerization

Section VII: SPILL OR LEAK PROCEDURES - Waste Disposal Method

Section VIII: SPECIAL PROTECTION INFORMATION - Other Protective Equipment

Section IX: SPECIAL PRECAUTIONS - Precautions to be Taken in Handling and Storage; and Warning

PC: 45950  
F NUMBER: N0161A



HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

POLYRAD\* 0515  
 Ethylene oxide adduct  
 MSDS No.: 856 2187 0400-03

Supersedes MSDS No.: 856 2187 0400-02 Date: 09/03/93

I. PRODUCT IDENTIFICATION

WARNING! CAUSES SEVERE EYE BURNS AND SKIN IRRITATION.

POLYRAD\* 0515 Ethylene oxide adduct

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard: 2 Moderate  
 Flammability hazard: 1 Slight  
 Reactivity hazard: 0 Minimal

CHEMICAL AND COMMON NAME: Ethoxylated (5 mole) technical hydroabietylamine

APPEARANCE AND ODOR: Amber, viscous liquid; slight ammonia odor

\* Registered Trademark of Hercules Incorporated

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

CHEMICAL AND COMMON NAMES:	CASRN	WT %	RECOMMENDED AIR-BORNE LEVELS (1)	
			OSHA PEL	TLV-TWA 1992-1993
Amines, rosin, ethoxylated	61791-17-1	85	Not established	
Amines, rosin	61970-47-4	15	Not established	

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup> (as formaldehyde), for rosin core solder pyrolysis products should be observed.

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

JLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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### III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS

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BOILING POINT: Above 372 C (700 F) SOLUBILITY IN WATER: Less than 5%  
VAPOR PRESSURE AT 20 C: Above 1 mm Hg SPECIFIC GRAVITY: 1.06  
VAPOR DENSITY: Not established pH: N/A  
VOLATILE (VOL.),%: Less than 1 EVAPORATION RATE: Much slower than  
FREEZING POINT: Viscosity increases butyl acetate

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### IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA

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FLASH POINT: 213 C (416 F) SETAFLASH Closed Cup  
FLAMMABLE LIMITS: Not established  
AUTOIGNITION TEMPERATURE: Not established  
EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon  
SPECIAL FIREFIGHTING PROCEDURES:  
Cool containers with water if exposed to fire.  
Use self-contained breathing apparatus.  
UNUSUAL FIRE AND EXPLOSION HAZARDS: None  
STABILITY CONSIDERATIONS: Stable  
INCOMPATIBILITY WITH: Oxidizers  
HAZARDOUS DECOMPOSITION PRODUCTS: None  
HAZARDOUS PRODUCTS OF COMBUSTION:  
Carbon monoxide, carbon dioxide, nitrogen oxides, ammonia and hydrogen cyanide. Depending on conditions, aldehydes and carboxylic acids also may be formed.  
HAZARDOUS POLYMERIZATION: Will not occur.

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-----  
V. HEALTH HAZARD DATA  
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WARNING! CAUSES SEVERE EYE BURNS AND SKIN IRRITATION.

## SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: Redness, pain, swelling, blurred vision  
SKIN: Redness, itching. See MEDICAL CONDITIONS GENERALLY  
RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.  
INGESTION: Not a likely route of industrial exposure.  
INHALATION: Not likely. The product is a viscous liquid with very low  
vapor pressure.

## EMERGENCY &amp; FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low pressure  
water for at least 15 minutes. Remove any contact lenses to ensure  
thorough flushing. Call a physician.

SKIN: Promptly wash with soap and running water. Remove contaminated  
clothing. Wash clothing before reuse.

INGESTION: If conscious, the person should immediately drink large  
quantities of liquid to dilute this product. Induce vomiting. Call a  
physician. Never give liquids to an unconscious person. Never induce  
vomiting in an unconscious person.

-----  
MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:

This product contains rosin or a rosin derivative. Rosin and some of its  
derivatives have been reported to cause an allergic skin reaction  
(sensitization) in susceptible individuals after repeated or prolonged skin  
contact. Hercules Incorporated is unaware of any allergic skin reactions  
caused by industrial exposure to this product or similar materials. A  
thorough search of Hercules medical records has disclosed no case of skin  
sensitization to rosin or its derivatives from industrial exposure in our  
workers. None have been reported by our customers.

PRIMARY ROUTES OF ENTRY: Eyes, skin

## CANCER INFORMATION:

None of the components of this product are listed as carcinogens by the  
National Toxicology Program (NTP). They are not regulated as carcinogens  
by the Occupational Safety and Health Administration (OSHA) and have not  
been evaluated by the International Agency for Research on Cancer (IARC).

## REPORTED HUMAN EFFECTS:

Human studies indicate that short contact time with the skin should not  
produce injury.

Continued...

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**V. HEALTH HAZARD DATA**

---

**REPORTED HUMAN EFFECTS...Continued**

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION II.

**REPORTED ANIMAL EFFECTS:**

Animal studies with a 70% isopropanol solution of Polyrad\* 0515 ethylene oxide adduct gave an approximate lethal dose in rats of 940 mg/kg. The solution was a severe eye and skin irritant when tested on rabbits.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Salvage liquid in metal containers. Wash contaminated areas with vinegar or dilute acetic acid solution followed by water.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.  
Avoid breathing vapor or mist.  
Wash thoroughly after handling, and before eating, drinking, or smoking.  
Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

Chemical goggles  
Impervious gloves  
Appropriate protective clothing  
Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.  
Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

Continued...

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VII. APPLICABLE CONTROL MEASURES

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...Continued

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

This product may react with oxidizers and should be not stored near such materials.

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep vapor or mist concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

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-----  
 VIII. ENVIRONMENTAL & REGULATORY DATA  
 -----

The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	POLYRAD* 0515 Ethylene oxide adduct	Mixture	100
1	Amines, rosin, ethoxylated	61971-17-1	85
2	Amines, rosin	61790-47-4	15

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	HC-1, NPH	N/A
1	N/A	N/A	HC-1	NO
2	N/A	N/A	HC-1	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. TSCA STATUS

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

HERCULES\* AR-150 Surfactant

MSDS No.: 856 2188 0200-02

Supersedes MSDS No.: 856 2188 0200-01

Date: 01/29/93

Master Copy  
 Do Not Remove  
 This Copy

I. PRODUCT IDENTIFICATION

HERCULES\* AR-150 Surfactant

HMIS RATINGS: (1)

CASRN: 8050-33-7

Health hazard:	0	Minimal
Flammability hazard:	1	Slight
Reactivity hazard:	0	Minimal

CHEMICAL AND COMMON NAME: Ethylene oxide derivative of wood rosin

APPEARANCE AND ODOR: Clear amber liquid to soft waxy solid; typical rosin odor

\* Registered Trademark of Hercules Incorporated

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

As Hercules interprets the U.S. Occupational Safety and Health Act and Regulations, including the Hazard Communication Standard 29 CFR 1910.1200 dated August 24, 1987, this product should NOT be considered a health hazard.

If this product is heated to temperatures sufficient to produce smoke or fumes, the TLV-TWA of 0.1 mg/m<sup>3</sup> (as formaldehyde), for rosin core solder pyrolysis products should be observed.

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstracts Service Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable



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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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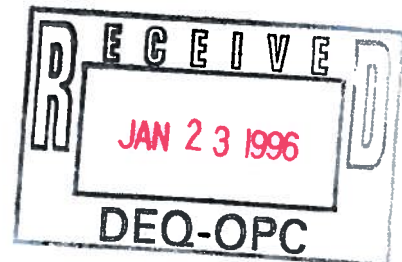
BOILING POINT: Not determined                      SOLUBILITY IN WATER: Complete  
VAPOR PRESSURE AT 20 C: Not determined              SPECIFIC GRAVITY: 1.10  
VAPOR DENSITY: Heavier than air                      pH of 1% SOLUTION: 9  
VOLATILE (WT.),%: Not determined                      EVAPORATION RATE: Slower than  
FREEZING POINT: Not determined    butyl acetate

---

**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

---

FLASH POINT: 132 C (270 F) Pensky-Martens  
FLAMMABLE LIMITS: N/A  
AUTOIGNITION TEMPERATURE: Not determined  
EXTINGUISHING MEDIA: Water spray, dry chemical, foam, carbon dioxide, or halon  
SPECIAL FIREFIGHTING PROCEDURES:  
    Use self-contained breathing apparatus.  
    Cool containers with water if exposed to fire.  
UNUSUAL FIRE AND EXPLOSION HAZARDS: None  
STABILITY CONSIDERATIONS: Stable  
INCOMPATIBILITY WITH: None  
HAZARDOUS DECOMPOSITION PRODUCTS: N/A  
HAZARDOUS PRODUCTS OF COMBUSTION:  
    Carbon monoxide, carbon dioxide, and smoke. Depending on conditions, some  
    aliphatic aldehydes and carboxylic acids also may be formed.  
HAZARDOUS POLYMERIZATION: Will not occur.



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**V. HEALTH HAZARD DATA**

---

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**  
EYES: May cause irritation with redness and itching.  
SKIN: Prolonged and repeated contact may cause skin sensitization  
reaction in susceptible individuals (see below - MEDICAL  
CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY  
EXPOSURE).

Continued...

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**V. HEALTH HAZARD DATA**

---

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:...**Continued

INHALATION: None known. None expected.  
INGESTION: None known.

**EMERGENCY & FIRST AID PROCEDURES:**

EYES: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physical.

SKIN: Wash with soap and running water.

INGESTION: If swallowed, do NOT induce vomiting. Call a physician.

-----

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Hercules Incorporated is unaware of any allergic skin reactions caused by industrial exposure to this product or similar materials. A thorough search of Hercules medical records has disclosed no case of skin sensitization to rosin or its derivatives from industrial exposure in our workers. None have been reported by our customers.

**PRIMARY ROUTES OF ENTRY:** Eyes, skin

**CANCER INFORMATION:**

Not listed as a carcinogen by NTP (National Toxicology Program); not regulated as a carcinogen by OSHA (Occupational Safety & Health Administration); not evaluated by IARC (International Agency for Research on Cancer).

**REPORTED HUMAN EFFECTS:**

None known.

Prolonged exposure to smoke or fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma). See SECTION 11.

**REPORTED ANIMAL EFFECTS:**

No toxicological studies have been conducted with HERCULES\* AR-150 Surfactant. Acute oral and subchronic dietary studies in rats with resins of similar composition showed that these materials are relatively nontoxic. Based on these studies, Hercules does not expect HERCULES AR-150 Surfactant to pose any significant toxicological hazards.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

---

**SPILL PROCEDURES:**

Scrape up and salvage in metal containers. Soak up small spills with earth or sand. Wash area with detergent and water.

**WASTE DISPOSAL METHOD:**

Incineration of combustible wastes in permitted facilities is the preferred disposal method.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

---

**VII. APPLICABLE CONTROL MEASURES**

---

**APPROPRIATE HYGIENIC PRACTICES:**

Do not allow eye or skin contact.

Avoid breathing vapor or mist.

Remove contaminated clothing promptly and clean thoroughly before reuse.

Wash thoroughly after handling, and before eating, drinking or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Chemical goggles

Impervious gloves

Appropriate protective clothing

Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

Handle in areas with adequate ventilation. Use a respirator in accordance with OSHA Subpart I (29 CFR 1910.134), if mist or vapor levels are excessive.

**HANDLING AND STORAGE PRECAUTIONS:** None

**ENGINEERING CONTROLS:**

Adequate ventilation should be provided to keep mist or vapor concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.

---

-----  
 VIII. ENVIRONMENTAL & REGULATORY DATA  
 -----

The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CASRN	WT. PERCENT
P	HERCULES* AR-150 Surfactant	8050-33-7	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, NPH	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulations 40 CFR 261.33 paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261 Subpart C. State or local hazardous waste regulations may apply if different from the federal.

## E. TSCA STATEMENT

The components of this product are included on the EPA TSCA Chemical Substance Inventory.

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
-----

...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC. 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

- HC-1 Immediate (acute) health hazard
- HC-2 Delayed (chronic) health hazard
- HC-3 Fire hazard
- HC-4 Sudden release of pressure hazard
- HC-5 Reactive hazard
- NHH Not a health hazard
- NPH Not a physical hazard

SEC. 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED  
 HERCULES PLAZA  
 WILMINGTON, DE 19894  
 PHONE #: (302) 594-5000 (24 HRS)

NEUPHOR\* 535

MSDS NO.: 285 8012 0100-04

SUPERSEDES MSDS NO.: 285 8012 0100-03

DATE: 03/10/89

-----  
 . PRODUCT IDENTIFICATION  
 -----

CAUTION! MAY CAUSE EYE IRRITATION.

CONTAINS LESS THAN 0.5% METHYLENE CHLORIDE, A SUSPECTED HUMAN CARCINOGEN.

NEUPHOR\* 535 ANIONIC EMULSION SIZE

HMIS RATINGS:(1)

HEALTH HAZARD:	1	SLIGHT
FLAMMABILITY HAZARD:	0	MINIMAL
REACTIVITY HAZARD:	0	MINIMAL

CHEMICAL & COMMON NAME: ROSIN DISPERSION

APPEARANCE AND ODOR: WHITE MILKY LIQUID; SWEET ODOR

REGISTERED TRADEMARK OF HERCULES INCORPORATED

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 FOOTNOTES  
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1) EXPLANATION OF ACRONYMS:

HMIS: HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATING FOR PRODUCT AS SUPPLIED.

SHA PEL: OCCUPATIONAL SAFETY AND HEALTH STANDARDS PERMISSIBLE EXPOSURE LIMIT.

TLV: REGISTERED TRADEMARK OF AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS FOR THRESHOLD LIMIT VALUES.

TWA: TIME WEIGHTED AVERAGE

NA: NOT APPLICABLE

-----  
 HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE FOR ITSELF WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS.  
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 I. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS  
 -----

CHEMICAL & COMMON NAMES:	RECOMMENDED AIRBORNE LEVELS(1)	
	OSHA PEL	TLV-TWA 1988-89
DIETHYLENE CHLORIDE (75-09-2)	500 PPM (2)	50 PPM, A2 (3)

2) FOR NEUPHOR 535, THE TIME WEIGHTED AVERAGE FOR AN 8-HOUR SHIFT IS 500 PPM. THE ACCEPTABLE CEILING CONCENTRATION IS 1000 PPM. THE OSHA ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTABLE CEILING CONCENTRATION FOR AN 8-HOUR SHIFT IS 2000 PPM FOR 5 MINUTES IN ANY 2 HOURS.

3) A2 CLASSIFICATION = INDUSTRIAL SUBSTANCES SUSPECTED OF CARCINOGENIC POTENTIAL FOR MAN.

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 II. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS  
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OILING POINT: 100 C (212 F)	SOLUBILITY IN WATER: DISPERSIBLE
VAPOR PRESSURE AT 20 C: SAME AS WATER	SPECIFIC GRAVITY: 1.04
VAPOR DENSITY: LIGHTER THAN AIR	PH: 5.5 - 6.5
VOLATILE (VOL.),%: 65	EVAPORATION RATE: SAME AS WATER
FREEZING POINT: 0 C (32 F)	

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 V. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA  
 -----

FLASH POINT: NONFLAMMABLE

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: N/A

EXTINGUISHING MEDIA:

NONE REQUIRED. PRODUCT IS A WATER EMULSION AND AS SUCH WILL NOT BURN. HOWEVER, WATER SPRAY, DRY CHEMICAL, FOAM, OR CARBON DIOXIDE MAY BE USED ON FIRES INVOLVING THIS PRODUCT.

SPECIAL FIREFIGHTING PROCEDURES: NONE

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

CONTINUED...



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U FIRE, EXPLOSION, & REACTIVITY HAZARD DATA

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..CONTINUED

STABILITY CONSIDERATIONS: STABLE

INCOMPATIBILITY WITH: NONE

HAZARDOUS DECOMPOSITION PRODUCTS: NONE

HAZARDOUS PRODUCTS OF COMBUSTION:  
PRINCIPALLY CARBON, CARBON MONOXIDE, AND CARBON DIOXIDE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

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U. HEALTH HAZARD DATA

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CAUTION! MAY CAUSE EYE IRRITATION.

CONTAINS LESS THAN 0.5% METHYLENE CHLORIDE, A SUSPECTED HUMAN CARCINOGEN.

SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: MAY CAUSE MILD REDNESS AND ITCHING.

SKIN: PROLONGED OR REPEATED CONTACT MAY CAUSE IRRITATION.

EMERGENCY & FIRST AID PROCEDURES:

EYES: IN CASE OF CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF LOW-PRESSURE WATER FOR AT LEAST 15 MINUTES. REMOVE ANY CONTACT LENSES TO ENSURE THOROUGH FLUSHING. CALL A PHYSICIAN.

SKIN: WASH WITH SOAP AND RUNNING WATER.

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:

THIS MATERIAL CONTAINS A ROSIN DERIVATIVE. ROSIN AND SOME OF ITS DERIVATIVES HAVE BEEN REPORTED TO CAUSE SKIN SENSITIZATION IN SUSCEPTIBLE INDIVIDUALS. INDIVIDUALS SENSITIZED TO ROSIN DERIVATIVES MAY ALSO REACT TO THIS RESIN.

PRIMARY ROUTES OF ENTRY: EYES, SKIN

CONTINUED...

-----  
1. HEALTH HAZARD DATA  
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..CONTINUED

## CANCER INFORMATION:

THIS PRODUCT CONTAINS LESS THAN 0.5% METHYLENE CHLORIDE.

METHYLENE CHLORIDE HAS BEEN GIVEN A 2B CLASSIFICATION (SUFFICIENT ANIMAL DATA, INADEQUATE HUMAN DATA) BY IARC (INTERNATIONAL AGENCY FOR RESEARCH ON CANCER). THE FIFTH ANNUAL REPORT OF NTP (NATIONAL TOXICOLOGY PROGRAM) WILL LIST METHYLENE CHLORIDE AS A SUSPECT CARCINOGEN. METHYLENE CHLORIDE IS NOT REGULATED AS A CARCINOGEN BY OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIONS.)

THE OTHER COMPONENTS OF THIS PRODUCT ARE NOT LISTED AS CARCINOGENS BY THE NATIONAL TOXICOLOGY PROGRAM (NTP). THEY ARE NOT REGULATED AS CARCINOGENS BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND HAVE NOT BEEN EVALUATED BY THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC).

## REPORTED HUMAN EFFECTS:

METHYLENE CHLORIDE - EXPOSURE TO METHYLENE CHLORIDE VAPOR CAUSES NAUSEA, DIZZINESS, AND CENTRAL NERVOUS SYSTEM DEPRESSION (LIGHTEADEDNESS, DROWSINESS, AND DEPRESSION OF MOTOR SKILLS SUCH AS HAND AND EYE COORDINATION) AT LEVELS THAT GREATLY EXCEED THE TLV VALUES. METHYLENE CHLORIDE IS METABOLIZED TO CARBON MONOXIDE WHICH CAN FORM CARBOXYHEMOGLOBIN WHICH REDUCES THE OXYGEN CARRYING CAPACITY OF BLOOD. LIQUID METHYLENE CHLORIDE MAY CAUSE EYE AND SKIN IRRITATION AND EXPOSURE TO HIGH CONCENTRATIONS OF METHYLENE CHLORIDE VAPORS CAN CAUSE RESPIRATORY IRRITATION WHICH COULD LEAD TO A DELAYED PULMONARY EDEMA, BUT ALL SYMPTOMS ARE EXPECTED TO BE TRANSIENT. LIMITED EPIDEMIOLOGY STUDIES OF OCCUPATIONALLY EXPOSED WORKERS FAILED TO SHOW ANY EFFECTS THAT COULD BE DIRECTLY ATTRIBUTED TO METHYLENE CHLORIDE.

## REPORTED ANIMAL EFFECTS:

NO TOXICITY STUDIES HAVE BEEN CONDUCTED WITH THE FORMULATED PRODUCT.

METHYLENE CHLORIDE - ACUTE EXPOSURE OF ANIMALS TO RELATIVELY HIGH CONCENTRATIONS OF METHYLENE CHLORIDE GENERALLY CAUSES CENTRAL NERVOUS SYSTEM DEPRESSION. VERY HIGH CONCENTRATIONS HAVE BEEN REPORTED TO CAUSE HEART EFFECTS. CHRONIC ANIMAL STUDIES SHOWED LIVER AND KIDNEY CHANGES. SEVERAL CHRONIC STUDIES HAVE SHOWN THAT METHYLENE CHLORIDE IS A POTENTIAL ANIMAL CARCINOGEN. THE NATIONAL TOXICOLOGY PROGRAM HAS REVIEWED THEIR INHALATION STUDY AND CONCLUDED THAT IT IS A CARCINOGEN IN RODENTS. STUDIES IN MICE AND RATS SHOWED NO CLEAR EVIDENCE OF TERATOGENIC EFFECTS BEING ASSOCIATED WITH EXPOSURE TO METHYLENE CHLORIDE.

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I. HEALTH HAZARD DATA

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..CONTINUED

ORAL LD50 (RATS) C. 2,000 MG/KG; INHL LC50 (RATS/8 HOURS) C. 15,000 PPM (WITH SLIGHT NARCOSIS AT 4,000 TO 6,100 PPM). IN RABBITS, A MILD EYE AND SKIN IRRITANT (BUT WILL CAUSE SKIN BURNS WHEN OCCLUDED). ACUTE AND SUBACUTE STUDIES SHOW A SEX AND SPECIES DIFFERENCE: WHEN EXPOSED AT 5,000 PPM, 7 HOURS/DAY, FOR 6 MONTHS, GUINEA PIGS SHOWED A DEPRESSED GROWTH RATE NOT OBSERVED WITH DOGS AND RABBITS. AT 10,000 PPM, 4 HOURS/DAY, FOR 7.5 WEEKS, DOGS AND GUINEA PIGS DEVELOPED LIVER INJURY WHICH WAS NOT FOUND IN MONKEYS, RATS, OR RABBITS. IN CHRONIC STUDIES, HAMSTERS WERE NOT AFFECTED AT 3,500 PPM, 6 HOURS/DAY, 5 DAYS/WEEK FOR 2 YEARS, AND MALE RATS WERE NOT AFFECTED AT 500 PPM 6 HOURS/DAY, 5 DAYS/WEEK, FOR 2 YEARS. HOWEVER, FEMALE RATS AT THE 500 PPM LEVEL SHOWED EXPOSURE RELATED EFFECTS IN THE LIVER AND MAMMARY TISSUE.

IN THE NTP STUDY, RATS OF BOTH SEXES WERE EXPOSED AT 4,000, 2,000, AND 1,000 PPM AND MICE OF BOTH SEXES WERE EXPOSED AT 4,000 AND 2,000 PPM 6 HOURS/DAY, 5 DAYS/WEEK, FOR 2 YEARS.

OTHER:

METHYLENE CHLORIDE IS A MUTAGEN IN BACTERIA BUT NOT IN MAMMALIAN CELLS. IT CAN CAUSE CHROMOSOME ABERRATIONS IN CULTURED CELLS BUT NOT IN LIVING ANIMALS; IT DOES NOT INDUCE MICRONUCLEI IN LIVING ANIMALS. GENERALLY SCE STUDIES HAVE GIVEN NEGATIVE RESULTS.

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I. SPILL PROCEDURES & WASTE DISPOSAL

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PILL PROCEDURES:

DIKE LARGE SPILLS AND PUMP TO SALVAGE CONTAINER. WASH DOWN SMALL SPILLS. SCRUB RESIDUE WITH WATER AND STRONG DETERGENT.

WASTE DISPOSAL METHOD:

INCINERATION IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS. SUPPLEMENTAL FUEL MAY BE REQUIRED.

THIS PRODUCT IS BIODEGRADABLE. WASTEWATER CONTAINING THIS PRODUCT CAN BE CONSIDERED FOR TREATMENT IN AN ACCLIMATED BIOLOGICAL TREATMENT SYSTEM OF ADEQUATE CAPACITY.

---

II APPLICABLE CONTROL MEASURES

APPROPRIATE HYGIENIC PRACTICES:

- AVOID BREATHING VAPOR.
- AVOID CONTACT WITH EYES, SKIN, AND CLOTHING.
- WASH THOROUGHLY AFTER HANDLING, AND BEFORE EATING, DRINKING OR SMOKING.

PERSONAL PROTECTIVE EQUIPMENT:

- IMPERVIOUS GLOVES
- SAFETY GLASSES
- APPROPRIATE RESPIRATORY PROTECTION IS REQUIRED WHEN EXPOSURE TO AN AIRBORNE CONTAMINANT IS LIKELY TO EXCEED ACCEPTABLE LIMITS. RESPIRATORS SHOULD BE SELECTED AND USED IN ACCORDANCE WITH OSHA, SUBPART I (29CFR1910.134) AND MANUFACTURER'S RECOMMENDATIONS.

WORK PRACTICES:

- EYEWASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE EASILY ACCESSIBLE.

HANDLING AND STORAGE PRECAUTIONS: STORE AT ROOM TEMPERATURE.

ENGINEERING CONTROLS:

- ADEQUATE VENTILATION SHOULD BE PROVIDED TO KEEP VAPOR CONCENTRATIONS BELOW ACCEPTABLE EXPOSURE LIMITS. DISCHARGE FROM THE VENTILATION SYSTEM SHOULD COMPLY WITH APPLICABLE AIR POLLUTION CONTROL REGULATIONS.

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I: ENVIRONMENTAL REGULATORY DATA  
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THIS PRODUCT DOES CONTAIN A CHEMICAL THAT MAY BE SUBJECT TO A FEDERAL ENVIRONMENTAL PROTECTION AGENCY REGULATORY REPORTING REQUIREMENT UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA), THE RCRA HAZARDOUS WASTE MANAGEMENT REGULATIONS, OR SARA TITLE III EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986. THE FOLLOWING ENVIRONMENTAL DATA ARE PROVIDED TO ASSIST USERS OF THIS PRODUCT IN DEFINING THEIR REGULATORY ENVIRONMENTAL COMPLIANCE OBLIGATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE HIS/HER COMPLIANCE OBLIGATIONS UNDER THESE AND OTHER FEDERAL OR STATE STATUTES.

## . PRODUCT COMPOSITION

PRODUCT (P) OR COMPONENT NO.	TRADE NAME OR CHEMICAL COMPONENT	CAS NUMBER	PERCENT
P 1	PRODUCT METHYLENE CHLORIDE	75-09-2	0.5 (MAX)

## . SARA TITLE III

## SEC 313 - 40 CFR 372 TOXIC CHEMICAL RELEASE REPORTING REQUIREMENTS

THIS PRODUCT CONTAINS A TOXIC CHEMICAL SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372 TOXIC CHEMICAL REPORTING REQUIREMENTS.

COMPONENT NO.

1

## . CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

NEUPHOR\* 535 CONTAINS METHYLENE CHLORIDE THAT IS A "HAZARDOUS SUBSTANCE" LISTED IN 40 CFR 302.4. NEUPHOR 535 HAS A "REPORTABLE QUANTITY" OF 250,000 LBS.

## . RCRA INFORMATION

THIS PRODUCT IS NOT LISTED IN FEDERAL HAZARDOUS WASTE REGULATION 40CFR261.33, PARAGRAPH (E) OR (F) - I.E., CHEMICAL PRODUCTS THAT ARE CONSIDERED HAZARDOUS IF THEY BECOME WASTES. IT DOES NOT EXHIBIT ANY OF THE HAZARDOUS CHARACTERISTICS LISTED IN 40CFR261, SUBPART C. STATE OR LOCAL HAZARDOUS WASTE REGULATIONS MAY APPLY IF THEY ARE DIFFERENT FROM THE FEDERAL REGULATION.

HERCULES INCORPORATED  
 Hercules Plaza  
 Wilmington, DE 19894  
 Phone #: (302) 594-5000 (24 hrs)

Hi-pHase\* 35  
 Cationic dispersed size  
 MSDS No.: 285 7011 0401-06

Supersedes MSDS No.: 285 7011 0401-05 Date: 10/01/91

I. PRODUCT IDENTIFICATION

CAUTION! MAY CAUSE EYE IRRITATION.

Hi-pHase\* 35  
 Cationic dispersed size

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard: 1 Slight  
 Flammability hazard: 0 Minimal  
 Reactivity hazard: 0 Minimal

CHEMICAL & COMMON NAME: Dispersed rosin size

APPEARANCE AND ODOR: Creamy white liquid; tall oil odor

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\* Registered Trademark of Hercules Incorporated

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

CHEMICAL & COMMON NAMES:	%	RECOMMENDED AIRBORNE LEVELS (1) 1989-1990	
		OSHA TWA	TLV-TWA
Hi-pHase* 35	100	Not established	
Aluminum Sulfate	< 5	2 mg/m <sup>3</sup> (as Al)	2 mg/m <sup>3</sup> (as Al)

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstract Substance Registry Number

AIHA WEEL: American Industrial Hygienists Association, - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable

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**III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS**

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BOILING POINT: 100 C (212 F) SOLUBILITY IN WATER: Dispersible  
VAPOR PRESSURE @ 20 C: Similar to water SPECIFIC GRAVITY: Not determined  
VAPOR DENSITY: Lighter than air pH: 2.2 - 3.2  
VOLATILE (VOL.),%: 65 EVAPORATION RATE: Similar to water  
FREEZING POINT: -8 C (15 F)

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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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FLASH POINT: Non-flammable

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: N/A

**EXTINGUISHING MEDIA:**

Product is dispersed in water and as such will not burn. However, water spray, dry chemical, foam, carbon dioxide, or halon may be used on fires involving this product.

**SPECIAL FIREFIGHTING PROCEDURES:** Use self-contained breathing apparatus.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** None

**STABILITY CONSIDERATIONS:**

Stable. Store at room temperature, as cool as possible but above 4 C (40 F).

**INCOMPATIBILITY WITH:** Strong alkalis or anionic materials

**HAZARDOUS DECOMPOSITION PRODUCTS:** None

**HAZARDOUS PRODUCTS OF COMBUSTION:**

This product is an aqueous solution which will not support combustion. If heated to decomposition, it may evolve carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids, hydrogen cyanide, nitrogen oxides or ammonia also may be formed.

**HAZARDOUS POLYMERIZATION:** Will not occur.

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V. HEALTH HAZARD DATA  
-----

CAUTION! MAY CAUSE EYE IRRITATION.

## SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:

EYES: Redness, pain, tearing  
SKIN: None expected (See below: MEDICAL CONDITIONS GENERALLY  
RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).  
INHALATION: Inhaling vapor or mist may cause respiratory irritation.  
INGESTION: None known.

## EMERGENCY &amp; FIRST AID PROCEDURES:

EYES: In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician if irritation persists.

INGESTION: If conscious, the person should immediately drink large quantities of liquid to dilute this product. Induce vomiting. Call a physician if irritation persists. NEVER give liquids to an unconscious person. NEVER induce vomiting in an unconscious person.

-----  
MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:

This material contains a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this resin after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to rosin or its derivatives.

PRIMARY ROUTES OF ENTRY: Eyes, skin

## CANCER INFORMATION:

HI-PHASE\* 35: The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

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**V. HEALTH HAZARD DATA**

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...Continued

**REPORTED HUMAN EFFECTS:**

HI-PHASE\* 35: None known.

**ALUMINUM SULFATE:** Ingestion of concentrated solutions has produced gingival necrosis and hemorrhagic gastroenteritis. These effects may be accompanied by incoordination, clonic contractions, and evidence of nephritis.

**REPORTED ANIMAL EFFECTS:**

HI-PHASE\* 35: None known.

**ALUMINUM SULFATE:** The acute oral LD50 (rats) for hydrated aluminum sulfate is 2,812 mg/kg (or 228 mg/kg as Al), while that reported for mice for the anhydrous material is 6,207 mg/kg (or 980 mg/kg as Al). The acute dermal LD50 (rabbit) is greater than 21.4 g/kg. Rabbit skin irritation was mild (0.47/8), and the acute eye irritation was moderate and was confined to the conjunctival membranes. In a 28-day feeding study at 10,000 ppm in the diet (hydrated material), rats showed no grossly observable signs of intoxication. At autopsy, a mild incidence of enlarged and/or cystic kidneys were noted at all dietary levels, including 3,160 ppm and 1,000 ppm.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

Small Spills: Add absorbent, sweep up, and discard. Large Spills: Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

This product is biodegradable. Wastewater containing this product can be considered for treatment in an acclimated biological treatment system of adequate capacity. Incineration in accordance with local, state, and federal regulations is an acceptable alternative. Supplemental fuel may be required.

When the drum is empty, rinse it with plenty of water before discarding.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APROPRIATE HYGIENIC PRACTICES:**

- Avoid contact with eyes, skin, and clothing.
- Wash thoroughly after handling, and before eating, drinking or smoking.
- Avoid breathing mist.
- Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

- Safety glasses
- Impervious gloves
- Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.
- Appropriate protective clothing

**WORK PRACTICES:**

- Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

- Keep containers closed.
- Strong alkalis or anionic materials will cause emulsion to separate. Do not store near such materials.

**ENGINEERING CONTROLS:**

- Adequate ventilation should be provided to keep mist concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

- Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.
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 VIII. ENVIRONMENTAL REGULATORY DATA  
 -----

The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P 1	HI-PHASE* 35 Aluminum Sulfate	N/A 10043-01-3	100 5.0 max.

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P 1	N/A N/A	N/A N/A	HC-1, HC-2, NPH HC-1, NPH	N/A NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

HI-PHASE\* 35 contains aluminum sulfate which is a "Hazardous Substance" listed in 40 CFR 302.4 which has a "Reportable Quantity" of 5,000 lbs.

## D. RCRA INFORMATION

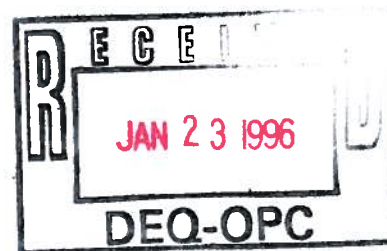
Normal variations in this product may cause its pH to be below 2.5. In those cases the product exhibits the characteristic of CORROSIVITY as defined in hazardous waste regulations 40 CFR 261 Subpart C and disposal of unused product must comply with hazardous waste regulations.

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...



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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard  
HC-2 Delayed (chronic) health hazard  
HC-3 Fire hazard  
HC-4 Sudden release of pressure hazard  
HC-5 Reactive hazard  
NHH Not a health hazard  
NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

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MATERIAL SAFETY DATA SHEET

10/18/91  
PAGE: 01 of 07

HERCULES INCORPORATED  
Hercules Plaza  
Wilmington, DE 19894  
Phone #: (302) 594-5000 (24 hrs)

HERCAT\* 627  
Cationic emulsion size  
MSDS No.: 285 7011 0800-02

Supersedes MSDS #: 285 7011 0800-01 Date: 10/11/91

I. PRODUCT IDENTIFICATION

CAUTION! MAY CAUSE EYE IRRITATION.

HERCAT\* 627  
Cationic emulsion size

HMIS RATINGS: (1)

CASRN: Mixture

Health hazard: 1 Slight  
Flammability hazard: 0 Minimal  
Reactivity hazard: 0 Minimal

CHEMICAL AND COMMON NAME: Cationic dispersion of rosin

APPEARANCE AND ODOR: Creamy white liquid; tall oil odor

\* Registered Trademark of Hercules Incorporated

II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS

CHEMICAL & COMMON NAMES	%	RECOMMENDED AIRBORNE LEVELS (1) 1989-1990	
		OSHA TWA	TLV-TWA
HERCAT* 627	100	Not established	
Aluminum Sulfate	< 30	2 mg/m3 (as Al)	2 mg/m3 (as Al)

(1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

CASRN: Chemical Abstract Substance Registry Number

AIHA WEEL: American Industrial Hygienists Association - Workplace Environmental Exposure Level.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

STEL: Short term exposure limit (See 29 CFR 1910.1048, March 1, 1989, revision)

C: Ceiling exposure concentration (See 29 CFR 1910.1000, March 1, 1989, rev.)

SKIN: May be absorbed through skin (See 29 CFR 1910.1048, March 1, 1989, rev.)

N/A: Not applicable



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### III. TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS

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BOILING POINT: 100 C (212 F) SOLUBILITY IN WATER: Dispersible  
VAPOR PRESSURE AT 20 C: Similar to water SPECIFIC GRAVITY: Not determined  
VAPOR DENSITY: Lighter than air pH: 2.2 - 2.8  
VOLATILE (VOL.),%: 65 EVAPORATION RATE: Similar to water  
FREEZING POINT: 0 C (32 F)

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### IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA

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FLASH POINT: Non-flammable

FLAMMABLE LIMITS: N/A

AUTOIGNITION TEMPERATURE: N/A

EXTINGUISHING MEDIA:

Product is dispersed in water and as such will not burn. However, water spray, dry chemical, foam, carbon dioxide, or halon may be used on fires involving this product.

SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

STABILITY CONSIDERATIONS:

Stable. Store at room temperature, as cool as possible but above 4 C (40 F).

INCOMPATIBILITY WITH: Strong alkalies or anionic materials

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS PRODUCTS OF COMBUSTION:

This product is an aqueous solution which will not support combustion. If heated to decomposition, it may evolve carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids, hydrogen cyanide, nitrogen oxides or ammonia also may be formed.

HAZARDOUS POLYMERIZATION: Will not occur.

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**V. HEALTH HAZARD DATA**

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CAUTION! MAY CAUSE EYE IRRITATION.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

EYES: Redness, pain, tearing  
SKIN: None expected (See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE).  
INHALATION: Inhaling vapor or mist may cause respiratory irritation.  
INGESTION: None known.

**EMERGENCY & FIRST AID PROCEDURES:**

EYES: In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

SKIN: Wash with soap and running water.

INHALATION: Remove to fresh air. Treat any irritation symptomatically. Call a physician if irritation persists.

INGESTION: If conscious, the person should immediately drink large quantities of liquid to dilute this product. Induce vomiting. Call a physician if irritation persists. NEVER give liquids to an unconscious person. NEVER induce vomiting in an unconscious person.

---

**MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE:**

This material contains a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals under certain non-industrial exposure conditions of repeated and prolonged skin contact. Individuals sensitized to rosin derivatives may also react to this resin after skin contact. Hercules is unaware of any allergic skin reactions caused by industrial exposure to rosin or its derivatives.

PRIMARY ROUTES OF ENTRY: Eyes, skin

**CANCER INFORMATION:**

HERCAT\* 627: The components of this product are NOT listed as carcinogens by the National Toxicology Program (NTP). They are not regulated as carcinogens by the Occupational Safety and Health Administration (OSHA) and have not been evaluated by the International Agency for Research on Cancer (IARC).

**REPORTED HUMAN EFFECTS:**

HERCAT\* 627: None known.

Continued...

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**V. HEALTH HAZARD DATA**

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**REPORTED HUMAN EFFECTS:...**Continued

**ALUMINUM SULFATE:** Ingestion of concentrated solutions has produced gingival necrosis and hemorrhagic gastroenteritis. These effects may be accompanied by incoordination, clonic contractions, and evidence of nephritis.

**REPORTED ANIMAL EFFECTS:**

**HERCAT\* 627:** None known.

**ALUMINUM SULFATE:** The acute oral LD50 (rats) for hydrated aluminum sulfate is 2,812 mg/kg (or 228 mg/kg as Al), while that reported for mice for the anhydrous material is 6,207 mg/kg (or 980 mg/kg as Al). The acute dermal LD50 (rabbit) is greater than 21.4 g/kg. Rabbit skin irritation was mild (0.47/8), and the acute eye irritation was moderate and was confined to the conjunctival membranes. In a 28-day feeding study at 10,000 ppm in the diet (hydrated material), rats showed no grossly observable signs of intoxication. At autopsy, a mild incidence of enlarged and/or cystic kidneys were noted at all dietary levels, including 3,160 ppm and 1,000 ppm.

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

**Small Spills:** Add absorbent, sweep up, and discard. **Large Spills:** Dike to contain and pump into drums for use or disposal.

**WASTE DISPOSAL METHOD:**

This product is biodegradable. Wastewater containing this product can be considered for treatment in an acclimated biological treatment system of adequate capacity. Incineration in accordance with local, state, and federal regulations is an acceptable alternative. Supplemental fuel may be required.

When the drum is empty, rinse it with plenty of water before discarding.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APROPRIATE HYGIENIC PRACTICES:**

- Avoid contact with eyes, skin, and clothing.
- Wash thoroughly after handling, and before eating, drinking or smoking.
- Avoid breathing mist.
- Remove contaminated clothing promptly and clean thoroughly before reuse.

**PERSONAL PROTECTIVE EQUIPMENT:**

- Safety glasses
- Impervious gloves
- Appropriate respiratory protection is required when exposure to an airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturer's recommendations.
- Appropriate protective clothing

**WORK PRACTICES:**

- Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

- Keep containers closed.
- Strong alkalies or anionic materials will cause emulsion to separate. Do not store near such materials.

**ENGINEERING CONTROLS:**

- Adequate ventilation should be provided to keep mist concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations.

**PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE:**

- Completely isolate and thoroughly clean all equipment, piping or vessels before beginning maintenance or repairs.
-

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 VIII. ENVIRONMENTAL REGULATORY DATA
 

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The following environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P 1	HERCAT* 627 Aluminum Sulfate	N/A 10043-01-3	100 30.0 max.

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC. 313 TOXIC CHEMICAL (YES, NO)
P 1	N/A N/A	N/A N/A	HC-1, HC-2, NPH HC-1, NPH	N/A NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

HERCAT\* 627 contains aluminum sulfate which is a "Hazardous Substance" listed in 40 CFR 302.4 which has a "Reportable Quantity" of 5,000 lbs.

## D. RCRA INFORMATION

Normal variations in this product may cause its pH to be below 2.5. In those cases the product exhibits the characteristic of CORROSIVITY as defined in hazardous waste regulations 40 CFR 261 Subpart C and disposal of unused product must comply with hazardous waste regulations.

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...

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VIII. ENVIRONMENTAL REGULATORY DATA  
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...Continued

## FOOTNOTES:

SEC. 302 - Threshold Planning Quantity, Extremely Hazardous Substance (EHS) (40 CFR 355 Emergency Planning and Notification regulations)

N/A: This chemical is not an EHS. Therefore, there is no Threshold Planning Quantity (TPQ).

SEC. 304 - Reportable Quantity for Releases of an EHS (40 CFR 355, Appendix A)

N/A: This chemical is not an EHS. Therefore, there is no Reportable Quantity (RQ).

SEC 311/312 - 40 CFR 370 Hazardous Chemical Reporting Requirements "Hazard Categories"

HC-1 Immediate (acute) health hazard

HC-2 Delayed (chronic) health hazard

HC-3 Fire hazard

HC-4 Sudden release of pressure hazard

HC-5 Reactive hazard

NHH Not a health hazard

NPH Not a physical hazard

SEC 313 - 40 CFR 372 Toxic Chemical Release Reporting Requirements

NO: This component is NOT subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements.

YES: This component is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 Toxic Chemical Reporting requirements. Percent composition (or estimated range) is listed above.

N/A: This product is a mixture. As such, it is not listed as a Toxic Chemical under 40 CFR 372, Sect. 313 reporting requirements. Reportable constituents are listed individually where they exceed threshold concentration limits.

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HERCULES INCORPORATED HAS COMPILED THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS MATERIAL SAFETY DATA SHEET FROM SOURCES BELIEVED TO BE RELIABLE AND TO REPRESENT THE MOST REASONABLE CURRENT OPINION ON THE SUBJECT WHEN THE MSDS WAS PREPARED. NO WARRANTY, GUARANTY OR REPRESENTATION IS MADE AS TO THE CORRECTNESS OR SUFFICIENCY OF THE INFORMATION. THE USER OF THIS PRODUCT MUST DECIDE WHAT SAFETY MEASURES ARE NECESSARY TO SAFELY USE THIS PRODUCT, EITHER ALONE OR IN COMBINATION WITH OTHER PRODUCTS, AND DETERMINE ITS ENVIRONMENTAL REGULATORY COMPLIANCE OBLIGATIONS UNDER ANY APPLICABLE FEDERAL OR STATE LAWS.

HERCULES INCORPORATED

PAMITE\* TALL OIL ROSIN (All grades)

Hercules Plaza

Wilmington, DE 19894

Phone #: (302) 594-5000 (24 hrs)

MSDS No.: 676 4401 0100-03

Supersedes MSDS No.: 676 4401 0100-02

Date: 08/24/90

## I. PRODUCT IDENTIFICATION

WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE.  
MAY FORM FLAMMABLE DUST-AIR MIXTURES.  
(FOR BAGS 1000 LBS. OR GREATER, SEE SECTION VII FOR ADDITIONAL HAZARDS).

PAMITE\* TALL OIL ROSIN (All grades)

HMIS RATINGS:(1)

Health hazard:	0	Minimal
Flammability hazard:	1	Slight
Reactivity hazard:	0	Minimal

APPEARANCE AND ODOR: Amber-colored solid; typical rosin odor

\* Registered Trademark of Hercules Incorporated.

## (1) Explanation of acronyms:

HMIS: Hazardous Materials Identification System rating for product as supplied.

OSHA: Occupational Safety and Health Administration.

TLV: Registered trademark of American Conference of Governmental Industrial Hygienists for Threshold Limit Values.

TWA: Time Weighted Average

N/A: Not applicable

Hercules Incorporated has compiled the information and recommendations contained in this Material Safety Data Sheet from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

**Master File**  
**Do Not Remove**  
**this Copy**



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**IV. FIRE, EXPLOSION, & REACTIVITY HAZARD DATA**

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...Continued

**EXTINGUISHING MEDIA:** Water spray, dry chemical, foam, carbon dioxide, or halon

**SPECIAL FIREFIGHTING PROCEDURES:** Use self-contained breathing apparatus.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** May form flammable dust-air mixtures.

**STABILITY CONSIDERATIONS:** Stable

**INCOMPATIBILITY WITH:** None

**HAZARDOUS DECOMPOSITION PRODUCTS:** None expected.

**HAZARDOUS PRODUCTS OF COMBUSTION:**

Carbon monoxide, carbon dioxide and smoke. Depending on conditions, some aliphatic aldehydes and carboxylic acids also may be formed.

**HAZARDOUS POLYMERIZATION:** Will not occur.

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**V. HEALTH HAZARD DATA**

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**SIGNS AND SYMPTOMS OF OVEREXPOSURE IN THE WORKPLACE:**

**EYES:** Dust may cause irritation by mechanical abrasion. Smoke or fumes from decomposition of rosin products heated to high temperatures may cause eye irritation, with redness, tearing and discomfort.

**SKIN:** See below: MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE.

**INHALATION:** Breathing smoke or fumes from decomposition of rosin products heated to high temperatures may produce breathing discomfort, coughing and sore throat.

**INGESTION:** None known.

**EMERGENCY & FIRST AID PROCEDURES:**

**EYES:** In case of contact, immediately flush with plenty of low-pressure water for at least 15 minutes. Remove any contact lenses to ensure thorough flushing. Call a physician.

**SKIN:** Wash with soap and running water. **MOLTEN RESINS:** If molten material comes in contact with the skin, cool under a running stream of water. Do NOT attempt to remove the resin from the skin. Removal could result in severe tissue damage. Get medical attention.

**NOTE TO PHYSICIAN:** Material should not be forcibly pulled from the skin. Mineral oil may be used to loosen the material.

Continued...

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**VI. SPILL PROCEDURES & WASTE DISPOSAL**

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**SPILL PROCEDURES:**

If material is not contaminated, scoop into clean containers for use. If contaminated, scoop into containers for disposal.

**WASTE DISPOSAL METHOD:**

Incineration of combustible waste material in a permitted facility in accordance with local, state, and federal regulations is the recommended disposal method. Landfilling in a licensed facility is a suitable alternative.

Refer to Section VIII for specific Federal Environmental and Regulatory Data regarding use or disposal of this product.

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**VII. APPLICABLE CONTROL MEASURES**

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**APPROPRIATE HYGIENIC PRACTICES:**

Avoid contact with eyes, skin, and clothing.

Avoid breathing dust.

Wash thoroughly after handling, and before eating, drinking or smoking.

**PERSONAL PROTECTIVE EQUIPMENT:**

Safety glasses

Impervious gloves

Appropriate respiratory protection required when exposure to airborne contaminant is likely to exceed acceptable limits. Respirators should be selected and used in accordance with OSHA Subpart I (29 CFR 1910.134) and manufacturer's recommendations.

Personnel exposed to hot molten material should wear protective clothing that provides protection from thermal burns. Full face shield, lined rain suit (or other heat resistant material), and lined impervious gloves are recommended.

**WORK PRACTICES:**

Eyewash fountains and safety showers should be easily accessible.

**HANDLING AND STORAGE PRECAUTIONS:**

For small packages, the following warning applies:

**WARNING! STATIC CHARGES GENERATED BY EMPTYING PACKAGE IN OR NEAR FLAMMABLE VAPORS MAY CAUSE FLASH FIRE. MAY FORM FLAMMABLE DUST-AIR MIXTURES.** Avoid ignition sources such as sparks and flame. Ground all equipment. In addition, when emptying bags where flammable vapors may be present, blanket vessel with inert gas, ground operator, and pour material slowly into conductive, grounded chute.

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 VIII. ENVIRONMENTAL & REGULATORY DATA
 

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Following Environmental and regulatory data are provided to assist users of this product in defining their regulatory environmental compliance obligations.

## A. PRODUCT COMPOSITION

PRODUCT (P) or COMPONENT NO.	TRADE NAME or CHEMICAL COMPONENT	CAS NUMBER	WT. PERCENT
P	PAMITE* TALL OIL ROSIN	N/A	100

## B. SARA TITLE III (See footnotes)

COMPONENT NO.	SEC. 304 EHS RQ (lbs)	SEC. 302 EHS TPQ (lbs)	SEC. 311/312 HAZARD CATEGORY	SEC 313 TOXIC CHEMICAL (YES, NO)
P	N/A	N/A	NHH, HC-3 (dust)	NO

## C. CERCLA (40 CFR 302.4 HAZARDOUS SUBSTANCE &amp; REPORTABLE QUANTITIES)

This product does NOT contain any hazardous substances listed in 40 CFR 302.4.

## D. RCRA INFORMATION

This product is not listed in federal hazardous waste regulation 40 CFR 261.33, paragraph (e) or (f) - i.e., chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation.

## E. OTHER

None

Continued...

PRODUCT NAME: ALUMINUM SULFATE SOLUTION

Transportation Emergencies, Call (800) 424-9300 (CHEMTREC)  
Health Emergencies, contact Your Local Poison Center  
Caution: Causes irritation. Avoid contact with skin, eyes or clothing.

I. PRODUCT INFORMATION

Product Name: Aluminum Sulfate Solution  
Chemical Name: Aluminum Sulfate Solution  
CAS Number: 10043-01-3

Formula:  $Al_2(SO_4)_3 \cdot 14 H_2O$   
Chemical Family: Inorganic Salt

Typical Composition

$Al_2(SO_4)_3 \cdot 14 H_2O$   
Water

%  
48%  
52%

Exposure Standard: The ACGIH has established a TLV of 2 mg/m<sup>3</sup> for aluminum in the form of soluble salts.

II. PERSONAL PROTECTION INFORMATION

- Ventilation: Handle in open or well ventilated areas.
- Eye: Prevent eye contact through the use of chemical safety glasses, goggles or a face shield.
- Skin: Prevent skin contact through the use of protective clothing, gloves and footwear.
- Respiratory: Where mists or aerosols may occur, use a NIOSH<sup>1</sup> approved half-face piece cartridge air purifying respirator.
- Other: Eye wash and shower shall be available.

III. HEALTH INFORMATION

PHYSIOLOGICAL & HEALTH EFFECTS

Routes of Entry:

- Eyes: Irritant to the eyes.
- Skin: Irritation may result by contact with concentrated solutions.



- Inhalation:** Inhalation of mists may cause considerable irritation.
- Ingestion:** Oral and gastrointestinal irritation and local tissue damage. Nausea, vomiting, diarrhea may occur.
- Toxicity:** The acute oral LD50 is greater than 5000 mg/kg.

#### EMERGENCY & FIRST AID PROCEDURES

- Eyes:** IMMEDIATELY flush with large quantities of water for at least 15 minutes. Seek medical attention.
- Skin:** IMMEDIATELY flush affected area with water for 15 minutes. Remove contaminated clothing. Seek medical attention.
- Inhalation:** Remove to fresh air. Keep warm. Give artificial respiration if not breathing. Seek medical attention.
- Ingestion:** Give large quantities of water. Induce vomiting. Seek medical attention.

#### SYMPTOMS OF OVEREXPOSURE

- Acute:** Oral and gastrointestinal irritation if swallowed. Skin contact will cause irritation.
- Chronic:** Long term exposure to skin by concentrated solutions will cause irritation. Prolonged contact with dilute solutions may cause irritation.

#### IV. REACTIVITY DATA

- Stability:** Stable at ambient temperatures and atmospheric pressure.
- Conditions To Avoid:** This material will undergo reactions typical of acidic substances.
- Incompatibility:** Aluminum sulfate will react with strong alkalies to form aluminum hydroxide.

#### Hazardous Decomposition

**Products:** Thermal decomposition may release toxic oxides of sulfur.

#### Hazardous

**Polymerization:** Will not occur.

## V. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance and

**Odor:** Clear to slightly amber liquid. No odor.

**Boiling Point:** 101°/214°F

**Melting Point:** N/A

**Vapor Density  
(air = 1):** Same as air.

**Vapor Pressure:** Less than 1 mm Hg @ 30°C (86°F)

**Solubility in water:** Completely

**Specific Gravity  
(H<sub>2</sub>O = 1):** 1.29 to 1.34

**Molecular weight:** 594

**pH:** 3.5 (1% aqueous solution)

**Other (i.e. wtg.  
per gallon):** Approximately 11.1 lbs/gal

## VI. SPECIAL PRECAUTIONS

### Handling and Storage

**Precautions:** Store in tanks designed to withstand the corrosive effects of aluminum sulfate. Stainless steel or fiberglass tanks are recommended.

## VII. FIRE PROTECTION INFORMATION

**Flash Point:** N/A.

**Flammable  
Limits:** N/A

### Extinguishing

**Media:** Water, dry chemicals, foam or carbon dioxide.

### Special Firefighting

**Procedures:** Prevent human exposure to fire, smoke, fumes or products of combustion.



## VIII. TRANSPORTATION REQUIREMENTS

Department of  
Transportation  
Classification:

DOT Proper Shipping Name: ALUMINUM SULFATE SOLUTION

Corrosive Liquid, N.O.S.

## UN/NA Identification

Number: UN 1760

## IX. SPILL OR LEAK PROCEDURES

## Environmental

## Impact:

Releases to streams may kill aquatic life. Large releases to land may react with soil and may penetrate great distances underground.

## Precautions if

Spilled or Released: Contain released material by diking and neutralize with soda ash.

## Neutralizing

## Chemicals:

Soda ash, slaked lime.

## Waste Disposal

## Methods:

Consult state or federal regulatory agencies for disposal procedures.

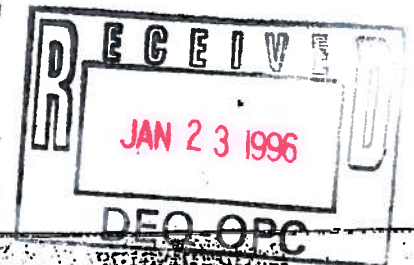
## Reportable

## Quantities:

5,000 lbs. - 450 gallons

## NOTE:

Supplier's Phone Number (601) 494-3055



## Disclaimer

Southern Ionics, Inc. believes that the information contained in this material safety data sheet is accurate as of the date indicated. However, it makes no warranty, express or implied, as to either the accuracy of the information or the properties, fitness or safety of the chemical identified in part 1 and assumes no liability or responsibility in connection with the information contained herein or as a result of the use of this material if the chemical is altered, combined with another substance, or subjected to physical or chemical processes. Each company or person using or distributing this material safety data sheet is responsible for ensuring its accuracy, applicability, and suitability at the time and under the particular circumstances used or distributed.



# Product Safety Information

## **N-521® BIOCID**

(Technical Grade)

### **A Fungicide for Use in the Manufacture of Registered Pesticides Only**

This Product Safety Information Sheet is principally directed to managerial, safety, hygiene and medical personnel. The description of physical, chemical and toxicological properties and handling advice is based on experimental results and past experience. It is intended as a starting point for the development of health and safety procedures.

#### **I. PHYSICAL AND CHEMICAL PROPERTIES**

Chemical Composition: Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione (99.0%), CAS# 533-74-4;

Other (1.0%)

Formula:  $C_5H_{10}N_2S_2$

Molecular Weight: 162.27

Physical State: White crystalline solid

Bulk Density: 90.6 lbs/ft<sup>3</sup> (1.45 g/mL) at 68° F/20° C

Melting Point: 216-221° F/102-104° C (endothermic)

Solubility: 0.2 g/100g in water

Odor: Sulfide-type

#### **II. CHEMICAL REACTIVITY**

This material hydrolyzes slowly with water to release methyl isothiocyanate and carbon disulfide. This breakdown is necessary to effect the biocidal activity of the material and should not pose a health and safety hazard if the material is properly handled and stored. The presence of heavy metal salts accelerates the breakdown without affecting the biocidal activity. Chlorine, in excess of 10 ppm in water solutions, also accelerates the breakdown but reduces the biocidal activity.

It will react with dilute acids to form salts with a mild exotherm. It reacts with aqueous bases at a moderate rate (nonviolent).

#### **III. STABILITY**

This material is stable at ambient environmental temperatures and atmospheric pressure. However, it may slowly decompose at temperatures greater than 212° F/100° C.

#### **IV. FIRE HAZARD**

Under fire conditions, this material may support combustion and decompose to give off toxic materials such as methyl isothiocyanate.

#### **V. FIREFIGHTING TECHNIQUE**

Vapors are irritating to the respiratory tract and may cause breathing difficulty and pulmonary edema. Symptoms may be delayed several hours or longer depending upon exposure.

As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate nonessential personnel from the fire area.

When there is a potential for exposure to smoke, fumes or products of combustion, firefighters should wear full-face, self-contained breathing apparatus and impervious clothing such as gloves, hoods, suits and rubber boots.

Use standard firefighting techniques in extinguishing fires involving this material—use water, dry chemicals, foam or carbon dioxide. High pressure water hoses may spread product from broken containers, increasing contamination hazard. Use of contaminated buildings, areas and equipment must be prevented until they are properly decontaminated.

#### **VI. TOXICOLOGY**

**CAUTION:** Harmful if swallowed. May cause skin irritation. May cause allergic skin reaction. Avoid contact with skin, eyes, or clothing. May form hazardous vapors on contact with water. Do not breathe dust or vapor.

##### **Ingestion**

The acute oral LD50 is 584 mg/kg in female rats. The acute oral LD50 is greater than 500 but less than 1000 mg/kg in male rats. The acute oral LD50 is 650 mg/kg in mice. A single oral dose of 50 mg/kg produced decreased physical activity and lacrimation in male rats. A single oral dose of 500 mg/kg produced decreased

In case of suspected poisoning, refer to the procedure and emergency contacts in Section VII—FIRST AID.

In case of spillage, refer to the procedure and emergency contacts in Section IX—SPILL HANDLING.

In case of animal poisoning, call a veterinarian or call collect, day or night (203) 226-6602 (Stauffer Chemical Company) or (800) 424-9300 (Pesticide Team Safety Network/Chemtrec)

In case of contamination with other materials, call (800) 424-9300 (Pesticide Team Safety Network/Chemtrec)

**NOTE:** For CHEMTREC assistance when calling from Washington, D.C., Virgin Islands, Guam, Samoa, Puerto Rico or Alaska, call collect, day or night (202) 483-7616.

#### **Inhalation**

This material must be handled in open (e.g. outdoor) or well ventilated areas. Where adequate ventilation is not available and use conditions generate airborne dust or aerosol, inhalation must be prevented through the use of NIOSH-approved respirators. Respirator selection must address the potential for exposure under the use conditions.

#### **Exposure Limit Information**

No exposure limit has been established for this material.

#### **IX. SPILL HANDLING**

Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices (refer to Section VIII).

Small spills can be handled routinely. Use adequate ventilation and wear a respirator to prevent inhalation. Wear suitable protective clothing and eye protection to prevent skin and eye contact. Use the following procedures:

Sweep up the spilled material being careful not to create dust. Place the sweepings into an appropriate chemical waste container. Seal container and dispose of in an approved landfill. Flush the spill area with water to remove any residue.

Large spills should be handled according to a predetermined plan. For assistance in developing a plan, contact the Chemical Systems Division, Stauffer Chemical Company, Westport, CT 06881.

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IN CASE OF EMERGENCY, CALL, DAY OR NIGHT  
(800) 424-9300 (CHEMTREC)

FROM WASHINGTON, D.C., VIRGIN ISLANDS, GUAM,  
SAMOA, PUERTO RICO OR ALASKA, CALL COLLECT  
DAY OR NIGHT: (202) 483-7616

PESTICIDE TEAM SAFETY NETWORK/CHEMTREC

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#### **X. CORROSIVITY TO MATERIALS OF CONSTRUCTION**

This material is not corrosive to materials commonly used in the construction of shipping and handling equipment.

#### **XI. STORAGE REQUIREMENTS**

Containers should be stored in a cool, dry, well ventilated area. Store away from flammable materials, sources of heat and flame and foodstuffs. Exercise due caution to prevent damage to or leakage from the container. Guard against water contamination to prevent decomposition.

#### **XII. DISPOSAL OF UNUSED MATERIAL**

Material that cannot be used as directed on the product label must be disposed of according to Federal and State procedures under the Resource Conservation and Recovery Act (RCRA).

*NOTE:* State regulations may be more stringent than Federal regulations.

#### **XIII. DISPOSAL OF CONTAINER**

*DO NOT REUSE.* Dispose of empty containers according to approved Federal and State procedures under the Resource Conservation and Recovery Act. (RCRA).

#### **XIV. ENVIRONMENTAL PRECAUTIONS**

This material is toxic to fish. Do not contaminate water sources by cleaning equipment or disposing of wastes.