

Material Safety Data Sheet

INFORMATION TELEPHONE NO. 1-800-246-5055 Mon-Fri 9am to 5pm (PST)

MSDS No: 2388

HYDREX (R) 100 33350-15

Reichhold, Inc.

Corporate Headquarters

P.O. Box 13582

Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES

1-800-424-9300

Effective Date: 12/03/01

Page 1

1. PRODUCT IDENTIFICATION

Trade Name: HYDREX (R) 100 33350-1 (TAP Marine Vinyl-Ester Resin)
Chemical Family: Vinyl Ester Resin in Styrene
Intended Use: Corrosion-Resistant Resin

NFPA Hazard Classification

Health Hazard: 2
Fire Hazard: 3
Reactivity: 1
Special Hazard:

HMS Hazard Classification:

Health: 2* Moderate Hazard/Chronic Effect
Flammability: 3 Serious Hazard
Reactivity: 1 Slight Hazard
Personal Protection:

2. COMPOSITION / INFORMATION ON INGREDIENTS

Table with 6 columns: CAS No., Name, ACGIH TLV TWA, ACGIH TLV STEL, OSHA PEL, AMOUNT. Rows include Styrene, Silica, Amorphous, Fumed, Cryst.-Free, and Proprietary Vinyl Ester Resin.

Refer to Section 8, Subheading "Exposure Guidelines", for additional information concerning exposure limits. Section 8, "Exposure Guidelines", includes information concerning the OSHA-styrene industry voluntary agreement on exposure limits for styrene.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Amber Opaque Liquid Pungent Odor FLAMMABLE liquid and vapor. Harmful if swallowed - can enter lungs and cause damage May undergo hazardous polymerization.

Route(s) of Entry:

Inhalation, ingestion, skin and eye.

Acute Exposure:

INHALATION: Effects from exposure may include headaches, fatigue, nausea,

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 2

sensation of drunkenness, central nervous system depression and pulmonary edema. Inhalation of vapor or aerosol may cause irritation to the respiratory tract (nose, throat, and lungs). SKIN: Harmful if absorbed through skin. Contact causes skin irritation. Prolonged or repeated skin contact can result in defatting and drying of the skin. EYES: Harmful to eyes. Direct contact with this material causes eye irritation. Symptoms may include stinging, tearing, redness and swelling. INGESTION: Harmful if swallowed. 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. Effects from exposure through ingestion may include gastrointestinal disturbances, pain and discomfort. Effects of exposure by ingestion may also include those indicated by the inhalation route. Styrene is harmful or fatal if liquid is aspirated into the lungs.

Chronic Exposure:

Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans and may aggravate pre-existing disorders of these organs; central nervous system effects, effects on hearing and respiratory tract damage.

Carcinogenicity:

This material contains styrene which is listed by the International Agency for Research (IARC) on Cancer as a group 2B cancer causing agent (possibly carcinogenic to humans).

=====

4. FIRST AID MEASURES

Eye Contact:

Immediately flush eyes with large quantities of clean water for at least 15 minutes. Get immediate medical attention.

Skin Contact:

Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

Ingestion:

DO NOT INDUCE VOMITING. ASPIRATION HAZARD: this material may enter the lungs during vomiting. Immediately give the victim one or two glasses of water or milk to drink. Never give anything by mouth to an unconscious person. GET IMMEDIATE MEDICAL ATTENTION.

Inhalation:

Remove victim to fresh air. Keep warm and quiet. If not breathing, give artificial respiration. If breathing is difficult, give oxygen by trained personnel. GET IMMEDIATE MEDICAL ATTENTION.

=====

5. FIRE FIGHTING MEASURES

Flash Point: 89 degrees F (32 degrees C)
Flash Point Method Used: SetaFlash Closed Cup
Flammable Limits in Air (Lower): 1.1 % in air Styrene
Flammable Limits in Air (Upper): 7 % in air Styrene

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 3

Autoignition: 914 degrees F (490 degrees C) Styrene
TDG Flammability Class: B2

General Hazards:

FLAMMABLE LIQUID: This material's flash point is less than 100 degrees F (38 degrees C). Use water in flooding quantities as a fog to extinguish the fire. DO NOT USE a solid stream of water as that may spread the fire. DO NOT extinguish a fire resulting from the flow of this flammable liquid until the flow of liquid is effectively shut off. This precaution will help prevent the accumulation of an explosive vapor-air mixture after the initial fire is extinguished.

Fire Fighting Extinguishing Media:

Use carbon dioxide, foam, dry chemical or water fog to extinguish fire.

Fire Fighting Equipment:

Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. Thoroughly decontaminate all protective equipment after use.

Fire Fighting Instructions:

Evacuate all persons from the fire area to an explosion-protected location. Move non-burning material, as feasible, to a safe location as soon as possible. Fire fighters should be protected from potential explosion hazard while extinguishing the blaze. Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers. DO NOT extinguish a fire resulting from the flow of this flammable liquid until the flow of liquid is effectively shut off. This precaution will help prevent the accumulation of an explosive vapor-air mixture after the initial fire is extinguished. Use water spray to disperse vapors if a spill or leak has not ignited. See Section 13 for disposal considerations.

Fire and Explosion Hazards:

FLAMMABLE LIQUID. Vapors can form an explosive mixture with air. Vapor can travel to a source of ignition (spark or flame) and flash back. This material may polymerize (react) when its container is exposed to heat (as during a fire). This polymerization increases pressure inside a closed container and may result in the violent rupture of the container.

Hazardous Combustion Products:

Combustion may produce carbon monoxide, carbon dioxide and irritating or toxic vapors and gases.

=====

6. ACCIDENTAL RELEASE MEASURES

Accidental Release Measures:

FOR SMALL SPILLS: Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. Use non-sparking (non-metallic) tools to clean up spill. Remove all sources of ignition. NO SMOKING. FOR LARGE SPILLS: Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). NO SMOKING. Persons not wearing protective equipment (see Section 8) should be excluded from the area of the spill until clean-up has been completed. Stop spill at source. Prevent spilled material from contaminating soil or entering drains,

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 4

sewers, streams or other bodies of water. Prevent spilled material from spreading. Immediately notify authorities of any reportable spill as may be required pursuant to regulations. See Section 15 for applicable CERCLA reportable quantities. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other waste materials to waste containers for disposal. See Section 13 for disposal considerations.

=====
7. HANDLING AND STORAGE

Signal Word:

W A R N I N G

Handling Information:

Avoid inhalation and contact with eyes, skin, and clothing. Wash hands thoroughly after handling and before eating or drinking. Remove and wash contaminated clothing before reuse. Use with adequate ventilation. Ground and bond containers when transferring the material to prevent static electricity sparks which could ignite the vapor. Use spark-proof tools and explosion-proof equipment. Consult your supplier of promoters and catalysts for additional instructions on proper mixing and usage. Empty containers may retain product residue (liquid and/or vapor). Do not pressurize, cut, weld, braze, solder, drill, grind, or expose these containers to heat, flame, sparks, static electricity, or other sources of ignition as the container may explode and may cause injury or death. Empty drums should be completely drained and properly bunged. Empty drums should be promptly returned to a drum reconditioner or properly disposed. See Section 13 for disposal considerations.

Storage Information:

Keep away from ignition sources: flames, pilot lights, electrical sparks, and sparking tools. NO SMOKING. Do not store in direct sunlight. Store separate from oxidizing materials, peroxides, and metal salts. Keep container closed when not in use. To ensure maximum stability and maintain optimum resin properties, resins should be stored in closed containers at temperatures below 75 degrees F (25 degrees C). Copper or copper containing alloys should be avoided as containers.

=====
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines:

The Occupational Safety and Health Administration (OSHA), has established for styrene, a Permissible Exposure Limit (PEL) of 100 ppm for an 8 hour Time Weighted Average (TWA); 200 ppm for an acceptable ceiling concentration; and a 600 ppm concentration within a duration of 5 minutes in any 3 hours as an acceptable maximum peak above the acceptable ceiling concentration for an 8 hour shift. While the federal workplace exposure limit for styrene is 100 ppm, OSHA accepted the styrene industry's proposal to voluntarily meet a PEL of 50 ppm on an 8 hour TWA and a Short Term Exposure Limit (STEL) of 100 ppm, 15 minute exposure. The American

Material Safety Data Sheet
INFORMATION TELEPHONE NO. 1-800-275-6353
HYDREX (R) 100 33350-15

MSDS No: 2388

Reichhold, Inc.

Corporate Headquarters

P.O. Box 13582

Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES

1-800-424-9300

Effective Date: 12/03/01

Page 5

Conference of Governmental Industrial Hygenists (ACGIH) have established, for styrene, Threshold Limit Values (TLV) of 20 ppm or 85 mg/m³ TWA and 40 ppm or 170 mg/m³ Short Term Exposure Limit (STEL), 15 minute exposure, with a skin notation which indicates absorpion through the skin which could add to the employees exposure. The Occupational Safety and Health Administration (OSHA), has established for amorphous silica, a Permissable Exposure Limit (PEL) of 20 mppcf (million particles per cubic foot of air) or 80 mg/m³/%SiO₂ for an 8 hour Time Weighted Average (TWA). The American Conference of Governmental Industrial Hygenists (ACGIH) have established, for amorphous silica, Threshold Limit Values (TLV) of 10 mg/m³ Inhalable (total) particulate and 3 mg/m³ for respirable particulate based on Particulates Not Otherwise Classified (PNOC).

Engineering Controls:

The use of general or local exhaust ventilation may be required to maintain exposures below the regulatory or recommended occupational exposure limits. See occupational exposure limits in Section 2 and under Exposure Guidelines in Section 8. Use explosion-proof ventilation equipment.

Eye Protection:

Wear 1) safety glasses with side shields and a faceshield or 2) goggles and a faceshield. Facilities storing or utilizing this material should be equipped with an eyewash station and safety shower.

Skin Protection:

Wear chemical resistant gloves such as polyvinyl alcohol or Viton (R) . If splashing is likely, wear impervious clothing and boots to prevent repeated or prolonged skin contact. Consult your supplier of personal protective equipment for additional instructions on proper usage.

Respiratory Protection:

A NIOSH/MSHA approved air purifying respirator with organic vapor cartridge or canister may be necessary under certain circumstances where airborne concentrations are expected to exceed exposure limits. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. Protection provided by air purifying respirators is limited. Use a positive pressure air-supplied respirator if 1) there is any potential for an uncontrolled release, 2) exposure levels are not known, or 3) during other circumstances where air purifying respirators may not provide adequate protection.

=====

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|----------------------|---|
| Color: | Amber, Opaque |
| Odor: | Pungent |
| Odor Threshold: | 0.2 ppm Styrene |
| Physical State: | Liquid |
| Solubility in Water: | Insoluble at 20 degrees C (68 degrees F) Dispersion |
| Vapor Pressure: | 6.12 (mm Hg) Styrene |
| Specific Gravity: | 1.04 - 1.12 (Water = 1) at 25 degrees C (77 degrees F) |

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 6

Boiling Point: 295 degrees F (146 degrees C) Styrene
Freezing Point: -22.7 degrees F (-30.4 degrees C) Styrene
Evaporation Rate: < 1 (BuAc=1)
Vapor Density: 3.6 (AIR=1) Styrene
% Volatile: 45 % by weight
VOC Content: 486 grams/liter (calculated)product as supplied
pH: Not applicable

=====

10. STABILITY AND REACTIVITY

Stability:

Stable at normal temperatures and storage conditions. See Section 7 for additional storage information.

Incompatibility:

Avoid contact with strong acids, oxidizing agents (peroxides), metal salts and polymerization catalysts.

Hazardous Decomposition Products:

Thermal decomposition may produce various hydrocarbons and irritating, acrid vapors.

Hazardous Polymerization:

Product will undergo hazardous polymerization at temperatures above 150 F (65 C). Hazardous polymerization will occur if contaminated with peroxides, metal salts and polymerization catalysts.

=====

11. TOXICOLOGICAL INFORMATION

Acute Eye Toxicity:

Studies indicate that exposures to concentrations of styrene above 200 ppm cause irritation of the eyes. Styrene causes transient moderate eye irritation without corneal involvement.

Acute Skin Toxicity:

Draize Skin Primary Irritation Score (range, 0-8) for a 4-hour exposure (rabbits) to styrene is 6.6. Styrene: dermal LD50 (rabbit), 5 g/kg. Styrene causes severe irritation at 72 hours.

Acute Inhalation Toxicity:

Styrene: inhalation LC50 (rat), 24 g/m³ /4 hrs. Studies indicate that exposures to concentrations of styrene above 200 ppm cause irritation of the upper respiratory tract. Acute exposure to high concentrations of styrene may produce irritation of the mucous membranes of the upper respiratory tract, nose, and mouth, followed by symptoms of narcosis, muscular contraction, and death due to respiratory center paralysis.

Acute Oral Toxicity:

Styrene: oral LD50 (rat), 5 g / kg. Silica-Amorphous, Fumed: oral LD50 (rat), 3160 mg/kg.

Subchronic:

Styrene: inhalation NOEL(rat) 200 ppm 6 hr / day 13 weeks, target organ effects: auditory response; inhalation LOEL (rat) 800 ppm 6 hr / day 3 - 13 weeks, target organ effects: auditory response. Styrene has been shown

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 7

to cause probable hearing loss in rats exposed for at least six hours per day for three to thirteen weeks to 800 ppm of styrene in the air, as indicated by a rise in the auditory brainstem response threshold and loss of hair cells of the inner ear. No effects were observed in rats exposed to styrene at 200 ppm for 13 weeks. Based on animal studies and human experience, no significant risk of hearing loss is expected in occupationally exposed persons. Overexposure to styrene has been suggested as a cause of the following effects in laboratory animals and may aggravate pre-existing disorders of the following organs in humans; mild, reversible kidney effects, effects on hearing, respiratory tract damage, testis damage and liver damage.

Chronic/Carcinogenicity:

The International Agency for Research on Cancer (IARC) has classified styrene in Group 2B, possibly carcinogenic to humans. IARC concluded that evidence of carcinogenicity from human health studies, was inadequate and based the classification on animal and other relevant data. The animal data included an increased incidence of cancer observed in a few studies in which rats and mice were given styrene by inhalation or by ingestion for their lifetimes. IARC considered the combined results of these cancer studies to provide "limited evidence" of carcinogenicity. Other scientists consider the results of these studies inadequate to assess human carcinogenicity because these studies had either negative or statistically inconclusive results or had serious problems such as poor study design or very high mortality. Other relevant data included results from in-vivo and in-vitro genotoxicity studies. IARC also relied on data on styrene oxide including the results of two studies demonstrating stomach tumors in rats that were fed styrene oxide for their lifetime. Several epidemiology studies involving workers in the styrene, polystyrene or reinforced plastics industries have been conducted. Together, these studies show no increased cancer risk from occupational exposure to styrene. Preliminary results of a recent inhalation study indicated that mice exposed to styrene showed an increased incidence of lung tumors, however no dose response relationship was observed. The relevance of these findings is uncertain since data from other long-term animal studies and from epidemiology studies of workers exposed to styrene do not provide a basis to conclude that styrene is carcinogenic. The American Conference of Governmental Industrial Hygienists (ACGIH) has adopted the listing of Styrene as "A4-Not Classifiable as a Human Carcinogen." There is inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

Teratology:

Styrene did not cause birth defects in orally-dosed rats, mice, rabbits and hamsters exposed by inhalation. Styrene given by inhalation for six hours a day during organ development has been shown to be toxic to fetal mice at 250 ppm and to fetal hamsters at 1000 ppm. Information from human experience and the results of animal studies suggest no significant risk of birth defects or reproductive toxicity of styrene to humans.

Mutagenicity:

Styrene has given mixed positive and negative results in a number of mutagenicity tests. It was not mutagenic in the Ames test without metabolic activation but gave negative and positive mutagenic results with metabolic activation. It has also given negative mutagenic results in the

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 8

Chinese Hamster Ovary Test, and the Forward Gene Mutation Test and positive results in the Sister Chromatid Exchange and the Chromosomal Aberration assay.

=====

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Styrene is toxic to aquatic organisms and should not be released to sewage, drainage systems and all bodies of water at concentrations exceeding approved limits under applicable regulations and permits. Styrene: LC50 (Sheepshead minnow), 9.1 mg / l / 96 hr.

Environmental Fate:

Styrene released to soil is subject to biodegradation. The results of one extensive biological screening study suggest that styrene will be rapidly destroyed by biodegradation in most aerobic environments, but the rate may be slow at low concentrations in aquifers and lake waters and in environments at low pH (6).

=====

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

RCRA HAZARDOUS WASTE: This material and containers that are not empty, if discarded, would be regulated as a hazardous waste under RCRA. Treatment and/or disposal must be completed at a RCRA-permitted Treatment, Storage and Disposal Facility (TSD). The storage and transportation of RCRA hazardous wastes are also regulated by the USEPA. EMPTY DRUMS: "Empty containers", as defined under 40 CFR 261.7 or other applicable state or provincial regulations or transportation regulations, are not classified as hazardous wastes.

RCRA Hazard Class:

D001 (IGNITABLE): When discarded in its purchased form, this material would be regulated under 40 CFR 261.21 as EPA Hazardous Waste Number D001 based on the characteristic of ignitability.

=====

14. TRANSPORT INFORMATION

DOT / IATA / IMDG:

| | |
|-----------------------|----------------------------|
| Proper Shipping Name: | Non Bulk RESIN SOLUTION |
| Hazard Class: | 3 |
| ID Number: | UN1866 |
| Packing Group: | III |
| Label: | |
| Placard: | |
| ERG Number: | 127 |

DOT / IMDG:

Bulk

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 9

Proper Shipping Name: RESIN SOLUTION
Hazard Class: 3
ID Number: UN1866
Packing Group: III
Label:
Placard:
Marine Pollutant:
ERG Number: 127

TDG: Bulk and Non-Bulk
Proper Shipping Name: RESIN SOLUTION
Technical Shipping Name (If n.o.s.): STYRENE
Hazard Class: 3(9.2)
ID Number: UN1866
Packing Group: III
Label:
Placard:
ERG Number: 127

=====
15. REGULATORY INFORMATION

Occupational Safety and Health Act (OSHA):

This material is classified as a hazardous chemical under the criteria of the US Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III: Section 304 - CERCLA:

Styrene (CAS# 100-42-5): Reportable Quantity = 1,000 lb.

SARA Title III: Section 311/312 - Hazard Communication Standard (HCS):

This material is classified as an IMMEDIATE HEALTH HAZARD, DELAYED HEALTH HAZARD, FLAMMABILITY HAZARD, and REACTIVITY HAZARD under the US Superfund Amendment and Reauthorization Act (Section 311/312).

SARA Title III: Section 313 Toxic Chemical List (TCL):

Styrene (100-42-5)

TSCA Section 8(b) - Inventory Status:

All components of this material are listed on the US Toxic Substances Control Act (TSCA) inventory.

TSCA Section 12(b) - Export Notification:

This material does not contain any components that are subject to the US Toxic Substances Control Act (TSCA) Section 12(b) Export Notification requirements.

Canadian Inventory Status:

All components of this material are listed on the Canadian Domestic Substances List (DSL).

Canadian WHMIS:

This material is classified by the Canadian Workplace Hazardous Material Information System as: B2 (flammable liquid) D2A (materials causing other toxic effects, very toxic material) D2B (materials causing other toxic effects, toxic material) F (dangerously reactive material)

MSDS No: 2388
Reichhold, Inc.
Corporate Headquarters
P.O. Box 13582
Research Triangle Park, NC 27709-3582

ALL CHEMICAL EMERGENCIES
1-800-424-9300

Effective Date: 12/03/01

Page 10

California Proposition 65:

WARNING: This product contains a chemical(s) known to the State of California to cause cancer. Styrene Oxide

Additional Canadian Regulatory Information:

The following chemicals are listed on the WHMIS Ingredient Disclosure List:
Styrene Monomer (CAS# 100-42-5)

=====

16. OTHER INFORMATION

MSDS No: 2388
Reason Issued: Updates to sections 2, 9, 14, 15
Prepared By: Environment, Health and Safety Department
Approved Date: 03/10/00
Supersedes Date: 05/15/00

Disclaimer:

This information is provided in good faith and is correct to the best of Reichhold's knowledge as of the date hereof and is designed to assist our customers; however, Reichhold makes no representation as to its completeness or accuracy. Our products are intended for sale to industrial and commercial customers. We require customers to inspect and test our products before use and to satisfy themselves as to suitability for their specific applications. Any use which Reichhold customers or third parties make of this information, or any reliance on, or decisions made based upon it, are the responsibility of such customer or third party. Reichhold disclaims responsibility for damages, or liability, of any kind resulting from the use of this information. THERE ARE NO WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THIS INFORMATION OR TO THE PRODUCT IT DESCRIBES. IN NO EVENT SHALL REICHHOLD BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.