

1. Product and Company Identification

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Product Name Hydrazine Anhydrous
Part Number RXSOL-60-6042-100

Company Details:

RX MARINE INTERNATIONAL
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2. Composition / Information on ingredients

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| CAS# | Chemical Name | Percent | EINECS/ELINCS |
|----------|---------------|---------|---------------|
| 302-01-2 | Hydrazine | >95 | 206-114-9 |

3. Hazards Identification

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Emergency Overview

| | | |
|------------|---|-----------------------------------|
| Appearance | : | Colorless liquid. Flash Point: 38 |
|------------|---|-----------------------------------|

Danger! Strong reducing agent. Fire and explosion risk in contact with oxidizing agents. May be fatal if absorbed through the skin. Causes eye and skin burns. Causes digestive and respiratory tract burns. Flammable liquid and vapor. Harmful if inhaled or swallowed. May cause allergic skin reaction. Cancer suspect agent. May cause blood abnormalities. May cause liver and kidney damage.

| | | |
|---------------|---|-----------------------|
| Target Organs | : | Blood, kidneys, liver |
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Potential Health Effects

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| Eye | : | May cause irreversible may cause temporary b burns. |
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Skin : May be fatal if absorbed through the skin. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Contact with liquid is corrosive and causes severe burns and ulceration. Contact with the skin may dissolve hair.

Ingestion : Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver and kidney damage. Causes digestive tract burns with immediate pain, swelling of the throat, convulsions, and possible coma. Exposure may cause anemia and other blood abnormalities.

Inhalation : Harmful if inhaled. Irritation may lead to chemical pneumonitis and pulmonary edema. May cause liver and kidney damage. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Vapors may cause dizziness, nausea, itching, burning, and swelling of the eyes.

Chronic : Repeated inhalation may cause chronic bronchitis. May cause cancer according to animal studies. Repeated exposure may cause sensitization dermatitis. May cause reproductive and fetal effects.

4. First Aid Measures

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Eyes : Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do not allow victim to rub eyes or keep eyes closed.

Skin : Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure.

Ingestion : Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation : Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician : Treat symptomatically and supportively.

5. Fire-fighting Measures

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General Information : As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Autoignition temperature varies based upon contact surface. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May be ignited by heat, sparks, and flame. Vapors may form an explosive mixture with air. Containers may explode when heated.

Extinguishing Media : For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Do not get water inside containers. For small fires, use dry chemical, carbon dioxide, or water spray. Cool containers with flooding quantities of water until well after fire is out.

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| Flash Point | : | 38 deg C (100.40 deg F) |
| Autoignition Temperature | : | 270 deg C (518.00 deg F) |
| Explosion Limits, Lower | : | 2.9% |
| Explosion Limits, Upper | : | 98% |
| NFPA Rating | : | Health: 3; Flammability: 3; Instability: 3 |

6. Accidental Release Measures

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|---------------------|---|---------------|
| General Information | : | Use proper pe |
|---------------------|---|---------------|

Spills/Leaks : Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Do not get water inside containers. Approach spill from upwind. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures. Control runoff and isolate discharged material for proper disposal.

7. Handling and Storage

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Handling : Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Keep away from heat, sparks and flame. Use only with adequate ventilation or respiratory protection.

Storage : Keep away from heat, sparks, and flame. Keep away from sources of ignition. Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Storage under a nitrogen blanket has been recommended. Isolate from oxidizing materials and acids.

8. Exposure controls and personal protection

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Engineering Controls : Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

| Chemical Name | ACGIH | NIOSH |
|---------------|--|-------------|
| Hydrazine | 0.01 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous route | 50 ppm IDLH |

Personal Protective Equipment

| | | |
|-------------------|---|--|
| OSHA Vacated PELs | : | Hydrazine: 0.1 ppm TWA; 0.1 mg/m ³ |
| Eyes | : | Wear chemical splash goggles and face shield. |
| Skin | : | Wear appropriate protective gloves to prevent skin exposure. |
| Clothing | : | Wear appropriate protective clothing to prevent skin exposure. |

Respirators : Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.



Gloves Suit

9. Physical and chemical properties

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|---------------------------|---|-------------------------------|
| Physical State | : | Liquid |
| Appearance | : | Colorless |
| Odor | : | Strong odor - ammonia-like |
| pH | : | Not available |
| Vapor Pressure | : | 10 mm Hg @ 20 deg C |
| Vapor Density | : | 1.1 (air=1) |
| Evaporation Rate | : | Not available |
| Viscosity | : | 0.90 |
| Boiling Point | : | 113 deg C |
| Freezing/Melting Point | : | 1.4 deg C |
| Decomposition Temperature | : | Not available |
| Solubility | : | Soluble. |
| Specific Gravity/Density | : | 1.01 (water=1) |
| Molecular Formula | : | N ₂ H ₄ |
| Molecular Weight | : | 32.05 |

10. Stability and reactivity

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|----------------------------------|---|-------------------------|
| Chemical Stability | : | Thermally unstable |
| Conditions to Avoid | : | Light, ignition sources |
| Hazardous Decomposition Products | : | Oxides of nitrogen |
| Hazardous Polymerization | : | Has not been reported |

Incompatibilities with Other Materials : Substance is highly reactive reducing agent. Incompatible with oxidizing agents (including air), acids, and some metal oxides and metals. Substance may spontaneously ignite in air when in contact with porous materials. Ignites on contact with dinitrogen oxide and tetroxide, hydrogen peroxide, tetryl, and nitric acid. Explodes on contact with dicyanofurazan, n-halomides, potassium, silver compounds, sodium hydroxide, titanium compounds, and trioxxygen difluoride. Explosive compounds may result from contact with air, chloromethylnitrobenzene, lithium perchlorate, metal salts, methanol + nitromethane, sodium , and sodium perchlorate. Also incompatible with barium oxide or calcium oxide, benzeneseleninic acid or anhydride, calcium, carbon dioxide + stainless steel, 1-chloro-2,4-dinitrobenzene, cotton waste + heavy metals, (difluoroamino)difluoroacetonitrile, iodine pentoxide, rust, ruthenium(III) oxide, thiocarbonyl azide thiocyanate,

11. Toxicological information

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| | | |
|---------------------------|---|-------------------------------------|
| RTECS# | : | CAS# 302-01- |
| LD50/LC50 | : | LD50/LC50 |
| Dermal, guinea pig : LD50 | : | 190 mg/kg |
| Inhalation, mouse : LC50 | : | 252 ppm/4H |
| Inhalation, mouse : LC50 | : | 1000 mg/m3/2H |
| Inhalation, mouse : LC50 | : | 320 mg/m3/4H |
| Inhalation, rat : LC50 | : | 570 ppm/4H |
| Inhalation, rat : LC50 | : | 130 mg/m3/2H |
| Oral, mouse : LD50 | : | 59 mg/kg |
| Oral, mouse : LD50 | : | 59 mg/kg |
| Oral, rat : LD50 | : | 60 mg/kg |
| Oral, rat : LD50 | : | 60 mg/kg |
| Skin, rabbit : LD50 | : | 91 mg/kg |
| ACGIH | : | A3 - Confirmed humans |
| California | : | Carcinogen, in |
| NTP | : | Suspect carcin |
| IARC | : | Group 2B carc |
| Mutagenicity | : | DNA Damage Inhibition: mo DNA |
| Synthesis | : | hamster ovary Transformatio |
| Neurotoxicity | : | No informatio |

Epidemiology : This substance has shown a high tumor-generating potential in multiple studies. Hydrazine has been classified as carcinogenic in many rodent studies following long-term administration. The major target tissues include: liver, lungs, and respiratory tract. Please refer to Patty's Industrial Hygiene and Toxicology for specific information. Substance is listed by CA Proposition 65. IARC has determined that there is sufficient evidence of carcinogenicity to animals and inadequate evidence for humans.

Teratogenicity : Effects on Newborn: Viability index, subcutaneous-rat TDLo=80mg/kg Embryo or Fetus: Death and Fetotoxicity, inhalation-rat TCLo= 1mg/m3/24H. Specific Developmental Abnormalities: Central nervous system/Musculoskeletal/Urogenital, intraperitoneal-rat TDLo=30mg/kg.

Reproductive Effects : Post-implantation mortality, inhalation-rat TCLo=4mg/m3/2H. Maternal Effects: Ovaries/Fallopian tubes.Inhalation, ratTCLo=5ppm/6H; Paternal Effects: Testes/Sperm duct/Epididymis.Inhalation-hamster TCLo=1ppm/6H.

Other Studies:

12. Ecological information

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Ecotoxicity : No data available. Rainbow trout (fresh water) 146ppm/0.5H (Lethal) Guppy (hard water): LC50 = 3.85mg/L/96H Guppy (soft water): LC50 = 0.61mg/L/96HBluegill sunfish: LC50 = 1.08mg/L/96H

Environmental : Biodegradation is not expected to be significant when large amounts of hydrazine are released due to the high microbial toxicity of hydrazine; at lower concentrations, however, hydrazine biodegradation could be important. Volatilization of hydrazine should not be important from

moist soil surfaces given an estimated Henry's Law constant of 6.1×10^{-7} atm-cu m/mole, calculated from experimental values for vapor pressure and water solubility.

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|----------|---|--------------------------|
| Physical | : | No information available |
|----------|---|--------------------------|

Other : Bioconcentration in guppies was studied using a hydrazine concentration in water of 0.5 ug/g. After 96 hours, the concentration of hydrazine in guppies was about 144 ug/g. These values give a bioconcentration factor of 316. An estimated BCF value of 0.01 was calculated for hydrazine, using a measured log Kow of -2.07(2) and a recommended regression-derived equation. According to a classification scheme, these BCF values suggest that bioconcentration in aquatic organisms may be high, as for guppies; however, based on this compound's values for log Kow and water solubility, the potential

13. Disposal considerations

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Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

| | | |
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| RCRA P-Series | : | Not listed |
| RCRA U-Series | : | CAS# 302-01- |

14. Transport information

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| | US DOT | Canada TDG |
|-----------------------|----------------------|---------------|
| Shipping Name: | Hydrazine, Anhydrous | Hydrazine, An |
| Hazard Class: | 8 | 8 |
| UN Number: | UN2029 | UN2029 |
| Packing Group: | I | I |

15. Regulatory information

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US FEDERAL

| | | |
|---|---|-----------------------------------|
| TSCA | : | CAS# 302-01- |
| Health & Safety Reporting List | : | None of the ch |
| Chemical Test Rules | : | None of the ch |
| Section 12b | : | None of the ch |
| TSCA Significant New Use Rule | : | None of the ch |
| CERCLA Hazardous Substances and corresponding RQs | : | CAS# 302-01- |
| WGK (Water Danger/Protection) | : | CAS# 302-01- |
| Canada - DSL/NDSL | : | CAS# 302-01- |
| Canadian Ingredient Disclosure List | : | CAS# 302-01- |
| SARA Section 302 Extremely Hazardous Substances | : | CAS# 302-01- |
| SARA Codes | : | CAS # 302-01- |
| Section 313 | : | None of the ch by OSHA. |
| OSHA | : | CAS# 302-01- lists: California |
| STATE | : | CAS# 302-01- lists: California |

Clean Air Act:

CAS# 302-01-2 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depleters.
This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Hydrazine, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 302-01-2: 0.04 æg/day NSRL

European/International Regulations**European Labeling in Accordance with EC Directives**

Hazard Symbols : T C N

Risk Phrases:

R 10 Flammable.

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 34 Causes burns.

R 43 May cause sensitization by skin contact.

R 45 May cause cancer.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

Canada - WHMIS

This product has a WHMIS classification of E, B2, D1B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

16. Other information

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| | | |
|--------------------|---|-----------|
| MSDS Creation Date | : | 7/01/1999 |
| Revision #7 Date | : | 6/29/2007 |

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