

Section 1. Identification

Product name : MAGNACIDE™ H HERBICIDE
 ™ a trademark of Baker Hughes Incorporated.

Product code : XCH

Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Herbicide

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Version : 4.02

Supplier's details : Baker Petrolite LLC
 12645 W. Airport Blvd.
 Sugar Land, TX 77478
 For Product Information/SDSs Call: 800-231-3606
 (8:00 a.m. - 5:00 p.m. CST, Monday - Friday) 281-276-5400

Emergency telephone number (with hours of operation) : CHEMTREC: 800-424-9300 (U.S. 24 hour)
 Baker Petrolite: 800-231-3606
 (001)281-276-5400
 CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 2
 ACUTE TOXICITY (oral) - Category 2
 ACUTE TOXICITY (dermal) - Category 3
 ACUTE TOXICITY (inhalation) - Category 1
 SKIN CORROSION - Category 1B
 SERIOUS EYE DAMAGE - Category 1
 CARCINOGENICITY - Category 2
 AQUATIC HAZARD (ACUTE) - Category 1
 AQUATIC HAZARD (LONG-TERM) - Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Highly flammable liquid and vapor.
 Fatal if swallowed or if inhaled.
 Toxic in contact with skin.
 Causes severe skin burns and eye damage.
 Suspected of causing cancer.
 Very toxic to aquatic life with long lasting effects.

Precautionary statements

Section 2. Hazards identification

- Prevention** : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Wear respiratory protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
- Response** : Collect spillage. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
- Storage** : Store locked up. Store in a well-ventilated place. Keep cool.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Hazards not otherwise classified** : None known.

Additional information

Overexposure to vapors may be fatal. Inhalation exposure studies have determined the rat LC50 to be 26 ppm at one hour exposure and at four hour exposure to be 8.3 ppm. The NIOSH IDLH (Immediately Dangerous to Life and Health) value is 2 ppm. The primary route of exposure is inhalation; acute exposure may result in lacrimation, tracheobronchitis, pneumonia, and lung injury (at 20 ppm). The low odor detection (0.03 – 0.21 ppm) and irritation threshold (0.25 - 0.5 ppm) and acutely irritating effects of acrolein usually prevent chronic toxicity effects. Splashes to the eye may result in blepharconjunctivitis (bloodshot eyes), lid edema, fibrinous or pustular discharge, and deep or long-lasting corneal injury. See Section 11 for additional information.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
Acrolein	90 - 100	107-02-8
Acetaldehyde	0.1 - 1	75-07-0
Hydroquinone	0.1 - 1	123-31-9

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush the eye(s) continuously with lukewarm, gently flowing water for at least 15 minutes while holding the eyelid(s) open. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.
- Skin contact** : Get medical attention immediately. Call a poison center or physician. Wash affected area with soap and mild detergent for at least 15 minutes. Wash with plenty of soap and water. DO NOT USE SODIUM CARBONATE (SODA ASH)/SODIUM BISULFITE NEUTRALIZING SOLUTION! Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Call a poison center or physician. Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : Fatal if inhaled.
- Skin contact** : Causes severe burns. Toxic in contact with skin.
- Ingestion** : Fatal if swallowed.

Over-exposure signs/symptoms

- Eye contact** : pain, watering, redness
- Inhalation** : No specific data.
- Skin contact** : pain or irritation, redness, blistering may occur
- Ingestion** : stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treatment of the irritative effects of acrolein should be symptomatic and supportive. Following inhalation of acrolein, signs of respiratory dysfunction should be sought and hypoxia corrected. Specific treatment for bronchospasm and non-cardiogenic pulmonary edema may be necessary. Hypoxia may also occur following the ingestion of acrolein if there is pulmonary aspiration and/or laryngeal edema. The extent and severity of the corrosive effects on the upper gastrointestinal mucosa should be determined, for example, by endoscopy, and advice should be sought regarding the need for surgical intervention. Probable mucosal damage may contraindicate the use of gastric lavage.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Section 4. First aid measures

See toxicological information (Section 11)

Additional information

Persons exposed to vapors may have a delayed reaction and experience severe irritation of the respiratory tract and delayed pulmonary edema. Therefore, it is advisable to keep person exposed to high concentrations of vapor under observation for 24 hours following exposure. If fully conscious promptly drink one to two glasses of water. Get immediate medical attention. Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression, and convulsion may be needed.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : In case of fire, use alcohol-resistant foam, dry chemical or CO₂.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. This material is very toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : carbon dioxide, carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Remark : Toxic gases and vapors (such as carbon monoxide and peroxides) may be released in a fire involving acrolein. In the presence of sufficient oxygen and complete combustion, the combustion products further breakdown to carbon dioxide and water.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : General Information:
Evacuate all personnel to an upwind area and determine medical treatment needs. If qualified to do so through appropriate training contain or mitigate the spill as outlined below. Put on appropriate personal protective equipment. See Section 8 for information on use of respiratory protection appropriate for dealing with small spills. For large spills, wear fully encapsulating, vapor protective clothing (Level A Suit) and seek assistance from local fire department hazardous materials response team. Keep personnel removed and upwind of spill. Shut off all ignition sources; no flares, smoking, or flames in spill area. Approach release from upwind. Ventilate the release area.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and materials for containment and cleaning up

- Small spill** : Small Spill (< 1 pound)
Cover release with sodium carbonate (soda ash)/sodium bisulfite and mix into spill with water. The soda ash/sodium bisulfite and acrolein will form a solid by-product after addition of water. Alternately, absorb with paper towel, dry sand or other absorbent. For ground or surface contamination, remove contaminated media and dispose of properly. Contain all water for proper disposal. Waste must be disposed of in accordance with federal, provincial and local environmental control regulations.
- Large spill** : Vapor suppression: if available, blanket spill area with alcohol-resistant foam to reduce the vapor concentration. Reapply foam as needed to counteract the rapid breakdown of the foam blanket. Pump bulk fluid to appropriate storage containers for proper disposal. After recovery of the bulk fluid, neutralization of any remaining material can be accomplished by covering with sodium carbonate (soda ash)/sodium bisulfite and mixing with water. Ratio is 20 pounds of soda ash to each gallon of acrolein followed by 5 gallons of water per gallon of acrolein. The soda ash/sodium bisulfite and acrolein will form a solid by-product after addition of water. When reactivation is complete scoop the solid material into properly marked containers for disposal. Contain all water for proper disposal. Prevent runoff from entering drains, sewers or waterways.

If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1-800-424-8802.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment. Avoid contact with eyes, skin and clothing. Avoid breathing vapors or spray mists. Use only with adequate ventilation. Store in a secure and well ventilated area. Keep away from heat, sparks and flame. Keep away from incompatible materials. Keep container tightly closed when not in use. To avoid fire or explosion, ensure containers and equipment are properly bonded and grounded prior to transferring product. This is normally accomplished through the use of Baker Petrolite-specified standard application procedures. When using product under non-routine conditions (e.g., laboratory samples), ensure material and container are properly bonded and grounded.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Additional information

Do not reuse empty container. Return empty containers to Taft Manufacturing Company 19815 South Lake Road, Taft, CA 93268.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Acrolein	<p>ACGIH TLV (United States, 3/2019). Absorbed through skin. C: 0.1 ppm, 0 times per shift, 0 hours.</p> <p>NIOSH REL (United States, 10/2016). STEL: 0.8 mg/m³, 0 times per shift, 15 minutes. STEL: 0.3 ppm, 0 times per shift, 15 minutes. TWA: 0.25 mg/m³, 0 times per shift, 10 hours. TWA: 0.1 ppm, 0 times per shift, 10 hours.</p> <p>OSHA PEL (United States, 5/2018). TWA: 0.25 mg/m³, 0 times per shift, 8 hours. TWA: 0.1 ppm, 0 times per shift, 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). STEL: 0.8 mg/m³, 0 times per shift, 15 minutes. STEL: 0.3 ppm, 0 times per shift, 15 minutes. TWA: 0.25 mg/m³, 0 times per shift, 8 hours. TWA: 0.1 ppm, 0 times per shift, 8 hours.</p>
Acetaldehyde	<p>ACGIH TLV (United States, 3/2019). C: 45 mg/m³, 0 times per shift, 0 hours. C: 25 ppm, 0 times per shift, 0 hours.</p> <p>OSHA PEL (United States, 5/2018). TWA: 360 mg/m³, 0 times per shift, 8 hours. TWA: 200 ppm, 0 times per shift, 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). STEL: 270 mg/m³, 0 times per shift, 15 minutes. STEL: 150 ppm, 0 times per shift, 15 minutes. TWA: 180 mg/m³, 0 times per shift, 8 hours. TWA: 100 ppm, 0 times per shift, 8 hours.</p>
Hydroquinone	<p>ACGIH TLV (United States, 3/2019). Skin sensitizer. TWA: 1 mg/m³, 0 times per shift, 8 hours.</p> <p>NIOSH REL (United States, 10/2016). CEIL: 2 mg/m³, 0 times per shift, 15 minutes.</p> <p>OSHA PEL (United States, 5/2018). TWA: 2 mg/m³, 0 times per shift, 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). TWA: 2 mg/m³, 0 times per shift, 8 hours.</p>

Consult local authorities for acceptable exposure limits.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

Appropriate engineering controls

- : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Individual protection measures

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Section 8. Exposure controls/personal protection

- Eye/face protection** : Chemical safety goggles. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. Recommended: > 8 hours: (breakthrough time) Butyl rubber gloves.
- Skin protection** : Long sleeved shirts and work pants.
- Respiratory protection** : Full-face respirator use is required when connecting or disconnecting containers to application equipment, or any situations where the permissible exposure limit may be exceeded. As per NIOSH, full-face air-purifying respirators may be worn to protect personnel up to 2 ppm (IDLH) acrolein. Exposure levels of unknown concentrations or greater than 2 ppm acrolein or in an oxygen deficient atmosphere require the use of full-face positive pressure supplied-air breathing apparatus.

Additional information

Persons exposed to vapors may have a delayed reaction and experience severe irritation of the respiratory tract and delayed pulmonary edema. Therefore, it is advisable to keep person exposed to high concentrations of vapor under observation for 24 hours following exposure.

The STEL of 0.3 ppm for acrolein was vacated by Court order, but it is still in effect in AK, CA, MI, MN, NC, TN and WA.. The OSHA permissible exposure levels shown above are the OSHA 1989 levels or from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Petrolite recommends that these lower exposure levels be observed as reasonable worker protection.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

- Physical state** : Liquid.
- Color** : Colorless to light yellow.
- Odor** : Aldehyde like.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point/freezing point** : -87°C (-124.6°F)
- Initial Boiling Point** : Not available.
- Boiling point, initial boiling point, and boiling range** : 53°C (127.4°F)
- Flash point** : Closed cup: -25°C (-13°F) [TCC]
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : >1 (Ether (anhydrous) = 1)
- Flammability** : Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Toxic gases and vapors (such as carbon monoxide and peroxides) may be released in a fire involving acrolein. In the presence of sufficient oxygen and complete combustion, the combustion products further breakdown to carbon dioxide and water.
- Lower and upper explosion limit/flammability limit** : Lower: 2.8%
Upper: 31%
- Vapor pressure** : 31.3 kPa (234.9 mm Hg) @ 22°C
- Relative vapor density** : 1.93 [Air = 1]

Section 9. Physical and chemical properties

Relative density	: 0.85 (15.6°C)
Density	: 7.1 (lbs/gal)
Solubility in water	: Soluble (22% by weight @ 20°C)
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: 220°C (428°F)
Decomposition temperature	: Not available.
Viscosity	: Dynamic (20°C): 0.329 cP

VOC	: Not available.
Pour Point	: -86.7°C (-124.1°F)

Particle characteristics

Median particle size	:
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Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
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Chemical stability	: The product is stable.
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Possibility of hazardous reactions	: Hazardous reactions or instability may occur under certain conditions of storage or use.
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Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
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Incompatible materials	: Reactive or incompatible with the following materials: oxidizing materials, acids and alkalis. Loss of hydroquinone stabilizer may result in polymerization under certain conditions. Air introduced into closed containers may cause a slow polymerization, resulting in loss of product quality.
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Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
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Additional information

Incompatible with Alkalis, amines, light, and oxidizing materials. Alkaline or strong acid contamination can cause a reaction which can be rapid and violent. Prevent water contamination of acrolein storage containers.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Acrolein	LC50 Inhalation Gas.	Rat	8 ppm	4 hours
	LC50 Inhalation Vapor	Rat	26 ppm	1 hours
	LC50 Inhalation Vapor	Rat	18 mg/m ³	4 hours
	LC50 Inhalation Vapor	Rat	8.3 ppm	4 hours
	LD50 Dermal	Rabbit	160 mg/kg	-
	LD50 Dermal	Rabbit	231.4 mg/kg	-
	LD50 Oral	Rat	26 mg/kg	-
	LD50 Oral	Rat	29 mg/kg	-

Section 11. Toxicological information

Acetaldehyde Hydroquinone MAGNACIDE™ H HERBICIDE	LC50 Inhalation Gas.	Rat	13300 ppm	4 hours
	LC50 Inhalation Vapor	Mouse	23000 mg/m ³	4 hours
	LC50 Inhalation Vapor	Rat	13300 mg/m ³	4 hours
	LD50 Dermal	Rabbit	3540 mg/kg	-
	LD50 Oral	Rat	661 mg/kg	-
	LD50 Oral	Rat	302 mg/kg	-
	LC50 Inhalation Vapor	Rat	26 ppm	1 hours
	LC50 Inhalation Vapor	Rat	8.3 ppm	4 hours
	LD50 Dermal	Rabbit	231.4 mg/kg	-
	LD50 Oral	Rat	29 mg/kg	-

Irritation/Corrosion

No available toxicity data.

Sensitization

No available toxicity data.

Mutagenicity

No available toxicity data.

Carcinogenicity

Classification

Product/ingredient name	OSHA	IARC	NTP
Acrolein	-	3	-
Acetaldehyde	None.	2B	Reasonably anticipated to be a human carcinogen.
Hydroquinone	-	3	-

Reproductive toxicity

No available toxicity data.

Teratogenicity

No available toxicity data.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Acetaldehyde	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not applicable.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : Fatal if inhaled.
- Skin contact** : Causes severe burns. Toxic in contact with skin.
- Ingestion** : Fatal if swallowed.

Section 11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: pain, watering, redness
Inhalation	: No specific data.
Skin contact	: pain or irritation, redness, blistering may occur
Ingestion	: stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

General	: No known significant effects or critical hazards.
Carcinogenicity	: Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Reproductive toxicity	:

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
MAGNACIDE™ H HERBICIDE	29	231.4	Not available.	0.05	Not available.
Acrolein	26	300	8	0.018	Not available.
Acetaldehyde	Not available.	3540	Not available.	Not available.	Not available.
Hydroquinone	302	Not available.	Not available.	Not available.	Not available.

Additional information

Irritation - Draize Test (Rabbit)
 Skin - 2 mg/24H: Severe
 Eye - 50 ug/24H: Severe
 Skin - 15 ppm solution: Not irritating

A potential human health effect resulting from overexposure is the development of permanent lung damage in the form of decreased pulmonary (lung) function, and delayed pulmonary edema (fluid in the lungs) which can lead to chronic respiratory disease. As a highly reactive aldehyde, prolonged or repeated overexposures can produce long-term respiratory effects by significantly reducing ciliary action in the upper airways (i.e., interfering with the body's ability to clear mucous and foreign substances from the respiratory tract) and causing tissue damage throughout the lungs manifested as emphysema.

Section 11. Toxicological information

Acrolein levels of 0.4 to 4.9 ppm caused eye and nose irritation and structural changes in the respiratory system of hamsters, rats and rabbits (Ref. 1). Acrolein produced greater susceptibility to respiratory infections in mice (Ref. 2) and rats (Ref. 3).

Developmental/Reproduction studies

Acrolein has been tested for developmental and reproductive health effects. Results from developmental studies (Ref. 4, 5) indicated this material did not cause teratogenic effects in rats or rabbits at doses that caused maternal toxicity. A twogeneration rat reproductive study (Ref. 6) did not reveal any evidence of reproductive toxicity in either sex from any treatment group (maximum dose = 7.2 mg/kg). A second two-generation reproductive study in rats did not reveal any evidence of reproductive toxicity in either sex from any treatment group (maximum dose = 6 mg/kg) (Ref. 6).

Dermal Testing

In a 21 day dermal toxicity test in rabbits dosed at 7, 21 and 63 mg/kg of acrolein, toxicity was evidenced by slight to significant reduction in body weight gain, nasal mucous discharge, lethargy, slight to moderately lowered food consumption and increased frequency of lesions of the skin and lungs. Slight mortality in female rabbits dosed at 21 and 63 mg/kg was observed. No notable effects in hematology, blood chemistry, organ weights or organ weight ratios were observed (Ref. 7).

Chronic toxicity/Oncogenicity studies

In a 12-month chronic toxicity test in dogs (Ref. 9), the highest dose (2 mg/kg) tested resulted in changes in blood chemistry, but no compound-related tumors or lesions were observed. An 18-month oncogenicity study in mice (Ref. 10) did not reveal any compound-related tumors or lesions; the highest dose tested (4.5 mg/kg) resulted in increased mortality in the test group. A 24-month chronic toxicity/oncogenicity study in rats (Ref. 11) also did not reveal any compound related tumors or lesions. The high dose, 2.5 mg/kg, caused an increased mortality in the test group. No indications of cancer were found in the tests.

Other Studies

Mutagenicity studies

Effects of Acrolein on the In Vitro Induction of Chromosomal Aberrations in CHO Cells: No significant increase in the number of chromosomal aberrations above the background (Ref. 12). Effects of Acrolein on the In Vivo Induction of Chromosomal Aberrations in Rat Bone Marrow Cells: No significant increase in the number of chromosomal aberrations above the background (Ref. 13). Salmonella Liquid Suspension Mutant Fraction Assay: Acrolein did not induce concentration-dependent mutagenicity in any of the 5 Salmonella strains, either in the presence or absence of metabolic activation (Ref. 14). Metabolism Data

Metabolism studies in freshwater fish, shellfish, goats, hens, rats and leaf lettuce indicate that acrolein is metabolized and does not accumulate in the tissue (Ref. 15-19).

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Acrolein	Acute EC50 30 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 0.018 mg/l Marine water	Crustaceans - Americamysis bahia - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 0.67 mg/l	Daphnia	96 hours
	Acute LC50 0.5 ppm	Daphnia	96 hours
	Acute LC50 0.016 mg/l	Fish	96 hours
	Acute LC50 0.02 mg/l	Fish	96 hours
	Acute LC50 0.57 ppm	Fish	96 hours
	Acute LC50 0.18 ppm	Fish	96 hours
	Acute LC50 14 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 9.1 µg/l Fresh water	Fish - Pimephales promelas	32 days
Acetaldehyde	Acute EC50 236600 µg/l Fresh water	Algae - Navicula seminulum	96 hours
	Acute EC50 48250 to 59100 µg/l Fresh water	Daphnia - Daphnia magna - Larvae	48 hours
	Acute LC50 >100000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 43100 µg/l Fresh water	Fish - Pimephales promelas	96 hours

Section 12. Ecological information

Hydroquinone	Acute LC50 162 µg/l Fresh water	Daphnia - Daphnia pulicaria	48 hours
	Acute LC50 44 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
MAGNACIDE™ H HERBICIDE	Acute LC50 24 mg/l	Fish	96 hours

Persistence and degradability

Conclusion/Summary : In an aerobic aquatic metabolism study, the water phase revealed the rapid degradation of acrolein with all metabolites further mineralized to carbon dioxide. Results indicate hydration was an early step in acrolein degradation. The first-order kinetic half-life of acrolein was determined to be 33.7 hours in the water phase under laboratory conditions. Under field conditions, the half-life of acrolein in freshwater ranged from six to ten hours (Ref. 20). In an aerobic soil metabolism study the half-life of acrolein was found to be 4.2 hours in soil-water mixtures and was ultimately transformed into carbon dioxide (Ref.21).

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{oc}) :

Other adverse effects : No known significant effects or critical hazards.

Additional information

This product is very toxic to aquatic organisms:

Bluegill sunfish (*Lepomis macrochirus*), 96 hour LC50, 24 ppb

Rainbow trout (*Oncorhynchus mykiss*), 6 hour LC50, 24 ppb

Water flea (*Daphnia magna*), 48 hour LC50, 22 ppb

Eastern oysters (*Crassostrea virginica*), 96 hour EC50, 180 ppb

Mysid shrimp (*Mysidopsis bahia*), 96 hour LC50, 500 ppb

Mysid shrimp (*Holmesimysis costata*), 96 hour LC50, 790 ppb

Sheepshead minnows (*Cyprinodon variegatus*), 96 hour LC50, 570 ppb










Marine copepod (*Acartia tonsa*), 48 hour LC50, 55 ppb

Saltwater diatom (*Skeletonema costatum*), 120 hour EC50, 27 ppb

Section 13. Disposal considerations

Disposal methods : Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	UN1092	UN1092	UN1092	
UN proper shipping name	Acrolein, stabilized	ACROLEIN, STABILIZED	Acrolein, stabilized	Forbidden
Transport hazard class(es)	6.1 (3)   	6.1 (3)   	6.1 (3)   	
Packing group	I	I	I	
Environmental hazards	Yes.	Yes.	Yes.	

Additional information

DOT Classification

- : **Special provisions**
Toxic-Inhalation Hazard, Zone A

Remarks

DOT SP-14341 (DOT: SP-14341 applies only to 4BW welded cylinders.)

TDG Classification

- : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.26-2.36 (Class 6), 2.18-2.19 (Class 3), 2.7 (Marine pollutant mark).

The marine pollutant mark is not required when transported by road or rail.

Special provisions toxic by inhalation

Remarks ERAP #: ERP2-0132. 24 Hour Number: 1-844-380-8099 Equivalency Certificate No. SU 10922 (Ren. 9). Dangerous goods may be marked in accordance with 49 CFR

IMDG

- : The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.
Emergency schedules F-E S-D

IATA

- : The environmentally hazardous substance mark may appear if required by other transportation regulations.

Special precautions for user : Self-accelerating polymerization temperature (SAPT):

Cylinder (370 lbs / 168 kg): 89 °C

T-22 Skid tank (2240 lbs / 1016 kg): 78 °C

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

DOT Reportable Quantity

Acrolein, 0.15 gal of this product.
Hydroquinone, 4401 gal of this product.

Section 14. Transport information

Marine pollutant Acrolein

North-America NAERG : 131P

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 12(b) one-time export:** No products were found.
TSCA 12(b) annual export notification: No products were found.
United States inventory (TSCA 8b): All components are listed or exempted.
Clean Water Act (CWA) 307: Acrylaldehyde; Benzene
Clean Water Act (CWA) 311: Acrylaldehyde; Acetaldehyde; Benzene
Clean Air Act (CAA) 112 regulated toxic substances: Acrylaldehyde

United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) :

List name	Status	Ingredient name	Name on list	Conc.
United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Listed	Acrolein	Acrolein	95
United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Listed	Acetaldehyde	Acetaldehyde	0.1 - 0.9
United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Listed	Propionaldehyde	Propionaldehyde	0.1 - 1
United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Listed	Hydroquinone	Hydroquinone	0.1 - 0.5
United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Listed	Benzene	Benzene	0 - 0.1

SARA 302/304

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
Acrolein	90 - 100	Yes.	500	71.4	1	0.14
Hydroquinone	0.1 - 1	Yes.	500 / 10000	-	100	-

SARA 311/312

Classification : FLAMMABLE LIQUIDS - Category 2
ACUTE TOXICITY (oral) - Category 2
ACUTE TOXICITY (dermal) - Category 3
ACUTE TOXICITY (inhalation) - Category 1
SKIN CORROSION - Category 1B
SERIOUS EYE DAMAGE - Category 1
CARCINOGENICITY - Category 2

SARA 313

	Product name	CAS number	%
Supplier notification	Acrolein	107-02-8	90 - 100
	Acetaldehyde	75-07-0	0.1 - 1

California Prop. 65

⚠ WARNING: This product can expose you to chemicals including benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including acetaldehyde, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Canada

Canada (CEPA DSL): :

All components are listed or exempted.

Additional information

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Section 16. Other information

National Fire Protection Association (U.S.A.)



History

- Date of printing** : 11/29/2022
- Key to abbreviations** :
- ATE = Acute Toxicity Estimate
 - BCF = Bioconcentration Factor
 - GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 - IATA = International Air Transport Association
 - IBC = Intermediate Bulk Container
 - IMDG = International Maritime Dangerous Goods
 - LogPow = logarithm of the octanol/water partition coefficient
 - MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)

N/A = Not available

SGG = Segregation Group

UN = United Nations

✔ Indicates information that has changed from previously issued version.

[Notice to reader](#)

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