



REVISION DATE: 11/25/2019    VERSION 3.0

**[1. Identification]**

Trade name: Krop-Max™  
Product name: Hydroden cyanamide  
Chemical family: Organic chemical  
EPA Reg. No.: 80697-6  
Recommended Use: Plant growth regulator - for dormant spray  
Supplier: Zhejiang Tide CropScience Co., LTD  
21 Hubble, Irvine, CA 92618  
1-949-679-3535

For medical or chemical\* emergencies: Call CHEMTREC®: 1-800-424-9300 (24 hours/day)  
\*Spill, leak, fire, exposure or accident

For non-emergency product information: Call the NATIONAL PESTICIDE INFORMATION CENTER  
1-800-858-7378 (Monday - Friday, 8-12 PM Pacific time)

**[2. Hazard(s) Identification]**

**According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR §1910.1200 (2012)  
Classification of the substance or mixture**

Acute oral (Category 4)  
Acute dermal (Category 4)  
Acute Inhalation (Category 4)  
Eye irritation (Category 2A)  
Acute aquatic toxicity (Category 2)

**GHS pictograms****Signal Word: WARNING****GHS Hazard Statements:**

H302 Harmful if swallowed  
H312 Harmful in contact with skin  
H332 Harmful if inhaled  
H319 Causes serious eye irritation  
H401 Toxic to aquatic life.

**Precautionary Statements:****Prevention:**

- P264 Wash hands thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.  
P271 Use only outdoors or in a well-ventilated area.  
P273 Avoid release to the environment

**Response:**

- P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.  
P330 Rinse mouth.  
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.  
P312 Call a poison center/doctor if you feel unwell.  
P321 Specific treatment (see on this label) correct  
P362 + P364 Take off contaminated clothing and wash it before reuse.  
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P337 + P313 If eye irritation persists: Get medical advice/attention.

**Storage:** See Section 7 for Storage information

**Disposal:**

- P501 Dispose of contents/container in accordance with local/regional/national and international regulations.

**Routes of exposure:** Eyes, skin, ingestion & inhalation.

**Carcinogenicity:** No data available

**Other hazard information:**

**NFPA Ratings:** Health-2 Flammability-0 Reactivity-1

**[3. Composition / Information on Ingredients]**

According to Hazard Communication Standard (HCS) or 29 CFR §1910.1200 (2012).

Active ingredient	CAS No.	EINECS #	Content (w/w,%)	ACGIH(TWA)
Hydrogen Cyanamide	420-04-2	206-992-3	50	2 mg/m <sup>3</sup>
Water	7732-8-5	231-791-2	Balance	NA

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

#### [4. First aid measures]

If poisoning occurs, immediately contact a doctor or Poisons Information Centre, and follow the advice given. Show this Material Safety Data Sheet to the doctor.

**If inhaled:** Remove person to fresh air and keep comfortable for breathing. If person is not breathing, call an ambulance, and then give artificial respiration, preferably mouth –to-mouth, if possible. Call a POISON CENTER or doctor/physician if you feel unwell.

**If on skin:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Get medical advice/attention. Wash contaminated clothing before reuse.

**If in eyes:** Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. If eye irritation persists: Get medical advice/attention.

**If swallowed:** Immediately call a POISON CENTER or doctor/physician if you fell unwell. Rinse mouth. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any thing by mouth to an unconscious person.

**Most important symptoms/effects, acute and delayed:** No information available.

**Note to physician:** Immediate lavage of stomach. Hydrogen cyanamide is not hydrogen cyanide and does not degrade to hydrogen cyanide. Do not induce vomiting or give anything by mouth to an unconscious person.

#### [5. Fire-Fighting measures]

**Suitable extinguishing media:** Solid stream of water may spread the fire. Do not use full jets of water. Use water spray of fog, foam, dry chemical or CO<sub>2</sub>.

**Unsuitable extinguishing media:** No data available

**Special hazards arising from the chemical (hazardous combustion products):** Burning will produce hazardous compounds including oxides of carbon, nitrogen, Burning/thermal decomposition will produce Hydrogen cyanide. Burning will produce fumes of ammonia.

**Special protective equipment and precautions for fire-fighters:** Wear protective clothing and self-contained breathing apparatus.

**Advice for firefighters:** Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion Prevent use of contaminated buildings, area, and equipment until decontaminated. Dike and collect water used to fight fire to prevent environmental damage due to run off.

#### [6. Accidental release measures]

**Personal precautions, protective equipment and emergency procedures:**

**Precautions:** Isolate hazard area. Keep unauthorized people away. Avoid contact with spilled product or contaminated surfaces. Wear suitable personal protective clothing and equipment (see section 8). Avoid breathing dust/fume/gas/mist/vapors/spray. Remove contaminated clothing and wash before reuse. Ensure adequate ventilation.

**Environmental precautions:** Prevent further release of material if safe to do so. Do not flush material into drains, sewers, waterways and/or ground water systems. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal. Do not apply directly to water, or to areas where surface water is present. Do not apply to intertidal areas below the mean high water mark. Do not contaminate water by

cleaning of equipment or disposal of equipment washwaters or rinsate.

**Methods and materials for containment and cleaning up:**

**Methods for cleaning up:** Ventilate area, Absorb spill with inert material and place in a chemical waste container. Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, ponds ground water or soil.

**Containment:** Isolate spill area. Spills should be absorbed with sawdust, clay or sand, followed by disposal at a sanitary landfill. Rinse spill area with water. Large spills should be handled according to a spill plan. Otherwise, in case of emergency call CHEMTREC® day or night, 1-800-424-9300.

**[7. Handling and Storage]**

**Precautions for safe handling:**

Wear protective gloves/protective clothing/eye protection/face protection. Remove contaminated clothing & wash before re-use.

Do not breathe vapor or mist. Do not get in eyes, on skin or clothing.

Avoid contact with acids, or bases.

Do not use when temperature is above 136°F (40°C).

Wash hands thoroughly after handling.

Avoid release to the environment.

Follow SDS/Label precautions.

**Conditions for safe storage:**

Store in cool and dry place not to exceed 68°F (20°C), away from alkaline, acidic and oxidizing materials.

Do not store near combustible materials and/or direct sunlight. Keep container closed when not in use.

**[8. Exposure controls / Personal protection]**

**Control parameters:**

Components.	CAS-No	Control parameters	Basis
Hydrogen Cyanamide	420-04-2	2 mg/m <sup>3</sup>	OSHA/ACGIH
Sodium phosphate	7558-80-7	10 mg/m <sup>3</sup>	OSHA/ACGIH

**Appropriate engineering controls:**

Closed Systems: This product must be mixed, loaded, and transferred only in a closed system.

Closed Systems and Enclosed Cab Requirements (if applicable): This product must be applied only with the applicator in an enclosed cab. When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

IMPORTANT: When reduced PPE is worn because a closed system is being used, handlers must be provided all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as a spill or equipment break-down.

The operating pressure of the spray rig shall be no more than 40 psi with the use of low pressure nozzles on dilute boom sprays and no more than 100 psi on air fan sprayers. Air fan sprayers should have the fan adjusted so that the spray mist does not greatly exceed the top of vines being sprayed.

**Personal protective equipment:**

Some materials that are chemical-resistant to this product are barrier laminate, butyl rubber, nitrile

rubber, and Viton. If you want more options, follow the instructions for category F on an EPA chemical-resistance category selection chart.

Follow OSHA recommended PPE standard (29 CFR Part 1910.132) be conducted before using this product. Follow Product label-personal protective equipment.

Applicators, mixers, loaders and other handlers must wear:

- Coveralls worn over short-sleeved shirt and short pants
- Chemical-resistant gloves made of any waterproof material such as barrier laminate, butyl rubber >14 mils, nitrile rubber > 14 mils, neoprene rubber > 14 mils, natural rubber > 14 mils, polyethylene, polyvinyl chloride (PVC) > 14 mils, or Viton > 14 mils
- Chemical-resistant footwear plus socks
- Protective eyewear - persons who mix, load or transfer must wear goggles
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, or loading

User Safety Requirements:

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Wash PPE after each day's use.

Do not consume alcoholic beverages prior to, during, or for 24 hours after handling this product.

**Respiratory protection** A NIOSH's respirator is required whenever work place conditions warrant respirator use.

**Eye protection** Use chemical splash goggles and face shield (ANSI Z87.1 or approved equivalent).

**Skin and body protection** Use impermeable gloves and apron. Chemical resistant gloves.

**General protective measures:** Handle in accordance with good industrial hygiene and safety practice. Do not breathe vapor or mist. Wearing of closed work clothing is recommended. Keep separated from food stuffs and feed stocks. Do not eat, drink or smoke when using this product. Hands and/or face should be washed before breaks and at the end of the shift. Store work clothing separately.

## [9. Physical and chemical properties]

**Appearance:** Clear-light yellow liquid

**Odor:** Odorless

**Odor threshold:** No Data Available

**PH:** 8.364.0-6.0@ 68°F (20 °C)

**Melting point/freezing point:** 45-46t (Based on technical)

**Initial boiling point and boiling range:** 83t (Based on technical)

**Flashpoint:** No Data Available

**Evaporation rate:** No Data Available

**Flammability:** Not flammable

**Upper/lower flammability or explosive limits:** No Data Available

**Explosibility:** Not have explosive characteristics.

**Combustible:** No

**Vapor pressure:** 500mPa at 68°F (20°C) (Based on technical)

**Density:** 1.09 g/ml @ 20°C (1.09 × 10<sup>3</sup> Kg/m<sup>3</sup> @ 20°C)

**Solubility:** Miscible in water

**Partition coefficient: n-octanol/water:** log Kow = 0.82 at 68°F (20°C) (Based on technical)

**Auto-ignition temperature:** Not determined

**Decomposition temperature:** No Data Available

**Viscosity:** 1.15 cSt/s at 20t and 0.84 cSt/s at 40t

**Specific heat:** 0.9 Cal/g @ 20°C (3.77×10<sup>3</sup> J/Kg @ 20°C)

**Note** Physical data are typical values based on material test but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis or as a specification.

## [10. Stability and reactivity]

**Reactivity:** Product will not undergo polymerization

**Chemical Stability:** Store in cool and dry place not to exceed 68°F (20t)

**Possibility of hazardous reactions:** Will not occur under normal conditions.

**Conditions to avoid:** High temperature and direct sunlight.

**Incompatible Materials:** Acids, basics, metals, alkalis, and combustible material.

**Hazardous decomposition products:** Ammonia.

## [11. Toxicological information]

**Exposure routes:** Eyes, skin, ingestion & inhalation.

**Toxicity:**

**Acute toxicity:**

**Acute oral (rats):** LD<sub>50</sub>=313 mg/Kg b.w. in females. May cause "Cyanamide Flush", a transitory intense redness in the face, headache, nausea, vertigo, tachycardia, hypotension, and respiratory distress. Corrosive and may cause severe and permanent damage to mouth, throat and stomach.

**Acute dermal (rabbits):** LD<sub>50</sub>=1,707 mg/Kg b.w. in males, >5,050 mg/Kg b.w. in females

**Acute inhalation (Rats):** LC<sub>50</sub>>2.32mg/L in males and females (No deaths). Harmful if inhaled. If misted, causes irritation of mucous membranes, nose, eyes and throat. May cause coughing and difficulty in breathing. May cause excessive tear formation, coughing, wheezing short of breath, nausea and vomiting. Corrosive may cause burns resulting in permanent damage.

**Acute eye irritation (rabbits):** Moderately irritating. May cause corneal damage or corrosion of eyes if not washed immediately and thoroughly.

**Acute dermal irritation (rabbits):** Slightly irritating. Harmful if absorbed through the skin. Contact causes burning sensations, smarting, inflammation, burns and painful blisters.

**Skin sensitization (mice):** Does not elicit sensitizing reaction in guinea pig.

**Note:** Acute effects may be intensified by exposure to ethanol.

**Sub chronic Toxicity (Based on technical):** Hydrogen cyanamide by the oral route in rats caused hepatotoxicity (hydropic liver cell degeneration, individual liver cell degeneration, enlarged periportal hepatocytes with clumped cytoplasm, and bile duct proliferation), and thyroid toxicity (small follicular lumens without colloid, separated by proliferating epithelial cells and inter-follicular cells). The lowest-observed-effect-level (LOEL) for hepatotoxicity (28 days) in rats was 4.6 mg/kg-day. The 28-day no-observed-effect-level (NOEL) for bile duct hyperplasia in rats dosed by gavage was 5 mg/kg-day. In the same 28-day gavage study, the LOEL for thyroid toxicity was 5 mg/kg-day. The 90 day NOEL for thyroid toxicity in rats exposed to hydrogen cyanamide in the diet was 0.8 mg/kg-day. Dogs also exhibited thyroid toxicity in response to hydrogen cyanamide by gavage. The NOEL (90 days) for thyroid toxicity (reduced plasma thyroxin levels) in dogs dosed with hydrogen cyanamide by gavage was 2

mg/kg-day. In the same study, the LOEL for testicular atrophy and oligospermia in the dog, was 0.6 mg/kg-day.

**Chronic Toxicity (Based on technical):** Hydrogen cyanamide was not oncogenic in the rat, but chronic exposure caused thyroid toxicity (reduced colloid and the formation of micro-follicles, reduced T3 and thyroxine levels in the plasma). The NOEL for thyroid toxicity in the rat was 1 mg/kg-day. Hydrogen cyanamide was oncogenic in the mouse, causing a significant, dose-related increase in granulosa-theca tumors in the ovary. In addition, hydrogen cyanamide caused nephrotoxicity (fibrosis and scarring, atrophic/basophilic tubules, and vacuolar degeneration and necrosis), chronic cystitis of the urinary bladder, hepatotoxicity (biliary proliferation and centrilobular hypertrophy) in the mouse. The NOEL for mouse hepatotoxicity was 29.5 mg/kg-day. The NOEL for mouse nephrotoxicity and chronic cystitis was 13.7 mg/kg-day. In dogs, hydrogen cyanamide caused thyroid toxicity (lower thyroxine levels), changed clinical chemistry indicating reduced over-all metabolism, testicular effects (neutrophil infiltration of testes, oligospermia), and clinical signs (tremors and excessive salivation). The NOEL for these effects in dogs was 0.2 mg/kg-day.

**Genotoxicity (Based on technical):** Hydrogen cyanamide was not mutagenic in the Ames test, and did not stimulate unscheduled DNA synthesis in vitro. It did induce chromosomal aberrations in Chinese hamster cells in vitro. However, it did not produce micronucleus formation in vivo. Thus, the genotoxic potential of hydrogen cyanamide is considered equivocal.

**Reproductive Toxicity (Based on technical):** Hydrogen cyanamide by gavage was not reported to cause any significant histomorphologic changes in parental rats or offspring associated with the treatments. No reproductive effects of hydrogen cyanamide were reported in a study acceptable under FIFRA. The adult NOEL was 1.25 mg/kg/day for decrement in body weight. There was no NOEL for neonatal pup survival (days 0-4). The LOEL was 1.25 mg/kg-day. In an earlier, unacceptable study, dietary exposure to hydrogen cyanamide was reported to cause atrophic seminiferous tubules and interstitial cell proliferation in rats.

**Developmental Toxicity (Based on technical):** In rabbits, the NOEL for maternal toxicity (significant decrement in weight gain) was 6 mg/kg-day. The NOEL for developmental toxicity (retinal folds) was 2 mg/kg-day. Hydrogen cyanamide by gavage caused an increased incidence of diaphragmatic hernias and depression of fetal body weights in rats. The NOEL for developmental effects in rats was 15 mg/kg-day. The maternal NOEL for clinical signs (hypoactivity, hunched posture, fecal and urine stains, protruding eyes, malocclusion, and chromodacryorrhea) in rats was 5 mg/kg-day.

## [12. Ecological information]

### **Ecotoxicity:**

**Eco-chronic toxicity:** N/A.

### **Avian toxicity:**

Acute Oral LD<sub>50</sub>: 1,201 mg/Kg b.w. to northern bobwhite

### **Aquatic organism toxicity:**

Acute EC<sub>50</sub>-96 hrs: 145.34 mg/L (Oncorhynchus mykiss)-Fish

Acute EC<sub>50</sub>-48 hrs: 6.24 mg/L (Daphania)

### **Persistence/Degradability:**

Not readily biodegradable. Cyanamide in water/sediment is moderately degradable. Evidence for inherent biodegradability. Biodegradable in the soil (sediment). Under acid conditions (pH < 4) Breaker hydrolyses to urea, which is easily biodegradable

**Bioaccumulative potential:** No bioaccumulation potential based on study results.

**Mobility in soil:** Hydrogen cyanamide was only slightly mobile in soil.

### **[13. Disposal considerations]**

Waste and empty container must be disposed of in accordance with local State, provincial Federal regulations and laws. Incineration is the preferred method.

Do not contaminate water, food or feed by disposal.

#### **Waste Disposal:**

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

#### **Container Disposal:**

**5-gallon containers:** Non-refillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Offer for recycling, if available. Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**15-gallon containers:** Non-refillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Offer for recycling, if available. Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**55-gallon containers:** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the re-filler. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

### **[14. Transport information]**

#### **USA Ground Proper Shipping Description**

UN3265, Corrosive liquid, acidic, organic, N.O.S., (Hydrogen Cyanamide 50% solution), III, 8

#### **IATA Proper Shipping Description**

UN3265, Corrosive liquid, acidic, organic, N.O.S., (Hydrogen Cyanamide 50% solution), III, 8

#### **IMO Proper Shipping Description:**

UN3265, Corrosive liquid, acidic, organic, N.O.S., (Hydrogen Cyanamide 50% solution), III, 8

## [15. Regulatory information]

### FIFRA

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. The following is the hazard information as required on the pesticide label:

**EPA Reg. No.:** 80697-6

**EPA Signal word:** WARNING

### PRECAUTIONARY STATEMENTS

#### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

##### WARNING

Causes substantial but temporary eye injury. Causes skin irritation. May be fatal if swallowed or if absorbed through skin. Do not get in eyes, on skin, or on clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.

##### ENVIRONMENTAL HAZARDOUS

Do not apply this product to any area in which an endangered species has been identified or in such a manner that drift from applications of this product could result in destroying an endangered species. This limitation applies only to areas that have been identified by and are protected by State and Federal agencies. Do not apply closer than 300 yards to the mean high water mark for intertidal areas or closer than 300 yards to surface water. Do not apply to crops growing closer than 300 yards to rivers, streams, or their flowing tributaries. Do not contaminate water by the cleaning of equipment or disposal of equipment washwater or rinsate. Do not apply when weather conditions favor drift from treated areas or where runoff is likely to occur. Do not spray when bees are active in the field.

This chemical can contaminate surface water through ground spray applications. Under some conditions it may also have a high potential for runoff into surface water after application. These include poorly draining or wet soils with readily visible slopes toward adjacent surface waters, frequently flooded areas, areas overlaying extremely shallow ground water, areas with in-field canals or ditches that drain to surface water, areas not separated from adjacent surface waters by vegetated filter strips, and areas overlaying tile drainage systems that drain to surface water. This pesticide is highly toxic to freshwater invertebrates and moderately toxic to birds and mammals. Drift and runoff may be hazardous to aquatic organisms in neighboring areas.

### US Federal Regulations

**TSCA list** TSCA 8(b) inventory: Cyanamide

**SARA Title III - section 302 - notification and information** None.

**SARA Title III - section 313 - toxic chemical release reporting** None.

**SARA Title III - section 311/312 - hazard identification**

**Acute health hazardous:** This product contains none of the components listed as Extremely Hazardous substances.

**OSHA Hazardous Components:** Hydrogen Cyanamide

**USA States Regulatory Reporting CA Prop65:** This product does not contain any substances known to the State of California to cause cancer.

**Right to know:** Cyanamide is listed in Florida, Illinois, Massachusetts, Minnesota, New Jersey, Pennsylvania, and Rhode Island toxic substances disclosure to employee act:

**Canadian Regulations:** Hydrogen cyanamide is listed on Canada's DSL List

**Environmental**

**CERCLA** None.

**WGK (Water Danger/Protection)** Hydrogen Cyanamide

**Safe Drinking Water Act Maximum Contaminant Levels** None.

**RCRA CLASSIFICATION:** Under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. None.

### **[16. Other information]**

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