

10707-9

06/19/2013

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

Wendy A. McCombie  
Baker Petrolite Corporation  
c/o Lewis & Harrison, LLC  
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Suite 505  
Washington, DC 20001

 JUN 19 2013

Subject: Label Amendment  
Product Name: Magnacide H Herbicide  
EPA Registration Number: 10707-9  
Application Dated: May 24, 2012  
Decision Number: 465657

Dear Ms. McCombie,

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, is acceptable.

A stamped copy of your label is enclosed for your records. This label supersedes all previously accepted labels. You must submit one (1) copy of the final printed label before you release the product for shipment. Products released for shipment after eighteen (18) months from the date of this letter or the next printing of the label, whichever occurs first, must bear the new revised label. If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA §6(e). Your release for shipment of the product constitutes acceptance of these conditions.

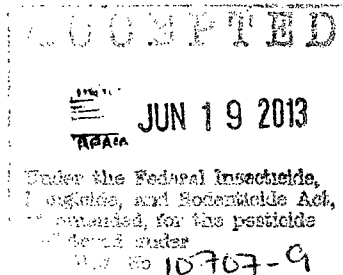
If you have any questions, please contact Emily Hartman of my staff at (703) 347-0189 or [hartman.emily@epa.gov](mailto:hartman.emily@epa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Kathryn V. Montague".

Kathryn Montague, Product Manager 23  
Herbicide Branch  
Registration Division (7505P)  
Office of Pesticide Programs





**MAGNACIDE™ H Herbicide**  
**APPLICATION AND SAFETY MANUAL**

*EPA Registration Number 10707-9*

Manual Revision Date: April 2013

Supersedes: August 2012

THIS PRODUCT MUST BE ACCOMPANIED BY AN EPA-APPROVED PRODUCT LABEL AND THE EPA-APPROVED *MAGNACIDE H Herbicide Application and Safety Manual*. THE *MAGNACIDE H Herbicide Application and Safety Manual* IS LABELING. READ AND UNDERSTAND THE ENTIRE LABELING AND MANUAL PRIOR TO USE. ALL PARTS OF THE LABELING AND MANUAL ARE EQUALLY IMPORTANT FOR SAFE AND EFFECTIVE USE OF THIS PRODUCT.

To the extent consistent with applicable law, Baker Petrolite makes no warranty of merchantability, fitness for any purpose or otherwise, expressed or implied, concerning this product or its uses which extend beyond the use of the product under normal conditions in accord with the statements made in this manual.

**PLEASE SIGN AND RETURN**

The attached MAGNACIDE™ H Herbicide Application and Safety Manual contain instructions for use concerning this label. Federal law requires that this handbook be in the possession of the applicator. Please acknowledge receipt of this handbook by signing below and returning this page to the address listed below.

BAKER PETROLITE CORPORATION  
12645 WEST AIRPORT BOULEVARD  
SUGAR LAND, TX 77478

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title or Capacity

\_\_\_\_\_  
Firm or Organization

**RESTRICTED USE PESTICIDE**  
DUE TO A HIGH ACUTE TOXICITY  
FOR RETAIL SALE TO AND USE BY CERTIFIED APPLICATORS AND ONLY FOR THOSE USES COVERED BY THE  
CERTIFIED APPLICATOR'S CERTIFICATION.

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### List of Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
cfs	Cubic foot per second
cps	Centipoise
DOT	U.S. Department of Transportation
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
gph	Gallons per hour
lbs	Pounds
LD50	Lethal dose to 50% of test population
mg/kg	Milligram per kilogram
MPH	Miles per hour
mm	Millimeter
mmHg	Millimeters of mercury
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OV	Organic vapor
PEL	Permissible exposure level
ppm	Parts per million
psig	Pounds per square inch gauge
psi	Pounds per square inch
PSM	Process Safety Management
RMP	Risk Management Plan
SCBA	Self-contained breathing apparatus
TLV	Threshold limit value
TWA	Time-weighted average

## I. INTRODUCTION

MAGNACIDE™ H Herbicide (active ingredient: acrolein, stabilized) is a product used for the control of submersed and floating weeds and algae in irrigation systems. MAGNACIDE H Herbicide is registered with the United States (U.S.) Environmental Protection Agency (EPA) under Registration Number 10707-9. The legal uses of MAGNACIDE H Herbicide are limited to those listed on the EPA registered product label, this manual and applicable 24(c) (Special Local Need) registrations. MAGNACIDE H Herbicide has been used in the United States in commercial applications since 1959. This manual provides information on the proper application and handling of MAGNACIDE H Herbicide.

This product is toxic by inhalation. Therefore, the EPA has classified MAGNACIDE H Herbicide as a RESTRICTED USE PESTICIDE for retail sale to, and use only by, certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification. The various states each have different requirements concerning record keeping for restricted use pesticides. Contact the appropriate agency in your state for further information. Baker Petrolite has an extensive training and certification program to qualify applicators. All applicators of this product must complete the program prior to use and attend a refresher course annually.

### A. Physical and Chemical Properties of MAGNACIDE H Herbicide

MAGNACIDE H Herbicide is a formulation containing a nominal concentration of 95% (by weight) acrolein, the active ingredient. Typical physical and chemical properties are listed below:

Formula .....	CH <sub>2</sub> CHCHO
Molecular weight .....	56.06
Appearance.....	clear, colorless to light yellow liquid
Odor .....	aldehydic (extremely irritating)
Specific gravity at 60°F .....	0.847
Pounds per gallon at 60°F .....	7.06
Boiling point (@760 mmHg) .....	127°F
Freezing point .....	-124°F
Vapor density .....	1.93 (air = 1.0)
Flash point	
Tag open cup .....	-20°F (approx.)
Tag closed cup .....	-13°F (approx.)
Flammability limits in air	
Lower limit .....	2.8% (by volume)
Upper limit .....	31.0% (by volume)
Solubility at 60°F	
Acrolein in water .....	22% by weight
Water in acrolein.....	7% by weight
Vapor pressure at 100°F.....	8.6 psia
Coefficient of expansion at 59°F.....	0.000762 per °F
Viscosity at 32°F (Abs.).....	0.43 cps
Permissible Exposure Level (PEL)* .....	0.1 ppm

\* PEL, as defined by OSHA, United States Department of Labor.



## B. General Product Information

MAGNACIDE H Herbicide controls submersed and floating vegetation in irrigation systems. Effective treatment rates in irrigation systems range up to 15 part per million (ppm); in other words, 15 parts of MAGNACIDE H Herbicide per 1,000,000 parts of water. In irrigation systems, submersed weed control is obtained at these dosages with application times ranging from 30 minutes to 8 hours (see Table 5, MAGNACIDE H Herbicide Concentration). All typical submersed aquatic weed species and algae appear to be susceptible. Floating forms such as watercress, water hyacinth and water primrose are typically not completely controlled at label rates. Emergent species, such as cattails and tules, are not affected.

Acrolein, the active ingredient in MAGNACIDE H Herbicide, is toxic, flammable, highly reactive chemically, and a lachrymator; however, the process of controlling submersed weeds with this product can be carried out safely and effectively. Closed system application equipment permits the introduction of MAGNACIDE H Herbicide into the irrigation system with minimal handling. MAGNACIDE H Herbicide is supplied in U.S. Department of Transportation (DOT) Specification pressurized containers. It is forced through a metering device using industrial grade nitrogen gas directly into the irrigation system. MAGNACIDE H Herbicide is available in the container sizes shown in Table 1.

**Table 1. MAGNACIDE H Herbicide Container Sizes**

Container Type	Acrolein Net Weight (lbs.)	Acrolein Volume at 60° F (gallons)
Cylinder	58	8.2
Cylinder	370	52.4
Portable Skid Tank	2,300	326.0
Portable Skid Tank	2,450	347.0
Portable Skid Tank	2,500	354.0
Portable Skid Tank	3,000	425.0

Those interested in the commercial application of MAGNACIDE H Herbicide should contact:

BAKER PETROLITE CORPORATION  
12645 WEST AIRPORT BOULEVARD  
SUGAR LAND, TX 7748

## II. CONTROLLING SUBMERSED AQUATIC VEGETATION WITH MAGNACIDE H HERBICIDE

### A. Introduction

Aquatic vegetation is a serious pest in many of the world's waterways. This is particularly true in irrigation systems where weeds and algae reduce waterflow below the designed capacity of the system. Unhindered weed growth causes the water level to rise, thus increasing the chance of overflow and canal breaks. Weeds collect silt and debris, necessitating periodic costly cleanouts. Occasionally these weeds break loose, clogging weirs, siphons and other irrigation structures. Control of this vegetation is a costly but necessary part of the maintenance of these systems. The process of controlling submersed aquatic vegetation with MAGNACIDE H Herbicide, as described in this manual, is an economical and effective means of overcoming many of these problems.

## B. Mode of Action on Plants

MAGNACIDE H Herbicide is a general cell toxicant which reacts with various vital enzyme systems. The dead plant tissues gradually disintegrate without releasing any large masses of vegetation to clog canal structures. The weeds disintegrate slowly and clear out over a period of 1 to 14 days, depending on the water temperature and species of aquatic weeds present. The time for restoration of the canal to full capacity will depend on the rate at which the weeds disintegrate; however, some increase in capacity may be apparent within a few hours, as the weeds become flaccid and collapse to the canal bed.

## C. Weed Specificity

Although MAGNACIDE H Herbicide appears to be toxic to all submersed weeds and algae, no special studies have been conducted to determine the relative susceptibility of the various species. However, among submersed aquatic weeds, forms such as *Zannichellia sp.* and *Potamogeton crispus* are more easily controlled than the forms which also have floating leaves such as *P. nodosus* and *P. illinoiensis*. The latter types are best controlled when immature. The following examples of species are controlled by recommended label use rates:

### Submersed and Floating Aquatic Weeds:

<i>Callitriche</i> spp.	Water starwort
<i>Ceratophyllum demersum</i>	Hornwort
<i>Elodea canadensis</i>	Waterweed
<i>Heteranthera dubia</i>	Waterstargrass
<i>Lemna gibba</i>	Duckweed
<i>Potamogeton crispus</i>	Curlyleaf pondweed
<i>Potamogeton foliosus</i>	Leafy pondweed
<i>Potamogeton illinoiensis</i>	Pondweed
<i>Potamogeton nodosus</i>	American pondweed
<i>Potamogeton obtusifolius</i>	Pondweed
<i>Potamogeton pectinatus</i>	Sago pondweed
<i>Potamogeton richardsonii</i>	Richardson pondweed
<i>Potamogeton sulcatus</i>	Floating pondweed
<i>Najas</i> spp.	Naiad
<i>Zannichellia palustris</i>	Horned pondweed

### Algae:

<i>Anabaena</i> spp.	Bluegreen algae
<i>Chara</i> spp.	Stoneworts
<i>Cladophora</i> spp.	Green algae
<i>Hydrodictyon reticulatum</i>	
<i>Navicilla pelliculosa</i>	Freshwater diatom
<i>Selenastrum capricornutum</i>	Green algae
<i>Skeletonema costatum</i>	Marine diatom
<i>Spirogyra</i> spp.	Green algae

### III. PRECAUTIONARY STATEMENTS

#### A. Hazards to Humans

**DANGER. EXTREMELY FLAMMABLE AND IRRITATING VAPOR AND LIQUID. POISONOUS BY INHALATION, SKIN CONTACT OR SWALLOWING. DO NOT BREATHE VAPOR. CORROSIVE. CAUSES EYE AND SKIN DAMAGE. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. KEEP AWAY FROM FIRE, SPARKS AND HEATED SURFACES.**

Liquid MAGNACIDE H Herbicide is absorbed by the skin and is particularly irritating to any lesion and to the eyes. The vapor is highly toxic and a strong irritant (lachrymator) which acts principally on the mucous membranes of the eyes, nose, throat and lungs. The vapor concentration tolerable to humans (0.1-1 ppm in air) serves as a warning of its presence and is close to the concentration that can cause lung injury (2-4 ppm). If you can smell the vapor, or if you experience lung or eye irritation, move away from the area immediately. Inhalation of the vapor can result in serious, permanent injury to the lungs. Additional information is available in Appendix A. Toxicity, Environmental Fate, and Crop Tolerance Information.

The occupational exposure levels for acrolein, the active ingredient in MAGNACIDE H Herbicide are shown in Table 2.

**Table 2. Occupational Exposure Levels for Acrolein**

PEL (OSHA)	TLV (ACGIH)
TWA	Ceiling
0.1 ppm	0.1 ppm

PEL = Permissible Exposure Level

OSHA = Occupational Health and Safety Administration

TWA = Time-Weighted Average

ACGIH = American Conference of Governmental Industrial Hygienists

Ceiling – the concentration that should not be exceeded even instantaneously

#### B. First Aid

Have the product container, label or application and safety manual with you when calling a poison control center or doctor, or going for treatment. **CALL A PHYSICIAN IMMEDIATELY IN ALL CASES OF SUSPECTED POISONING.**

##### 1. If Inhaled

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.
- Call a poison control center or doctor for further treatment advice.

##### 2. If on Skin or Clothing

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15 – 20 minutes.
- Call a poison control center or doctor for treatment advice.

##### 3. If in Eyes

- Hold eyes open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first five minutes, then continue rinsing eye.
- Call a poison control center for treatment advice.

##### 4. If Swallowed

- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by the poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

## 5. Note to Physician

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

**WARNING SIGNS AND SYMPTOMS:** Liquid MAGNACIDE H Herbicide is absorbed by the skin and is particularly irritating to any lesion and to the eyes. The vapors act principally on the mucous membrane of the eyes and respiratory tract.

**TREATMENT:** Treat exposed area as a chemical burn. Thoroughly flush eyes with water and treat symptomatically. Persons exposed to MAGNACIDE H Herbicide vapors have a delayed reaction and experience irritation of the respiratory tract. In severe cases, this may progress to pulmonary edema. Therefore, it is advisable to keep persons exposed to MAGNACIDE H Herbicide under observation for 24 hours following exposure.

## C. Environmental Hazards Statement

This product is toxic to fish and wildlife. Keep out of lakes, streams or ponds. Fish, shrimp and crabs will be killed at application rates recommended. Do not apply where they are important resources. Do not apply to water drainage areas where runoff or flooding will contaminate ponds, lakes, streams, tidal marshes and estuaries. Do not contaminate water by cleaning of equipment or disposal of wastes. Notify your state Fish and Game Agency before applying this product. Use only as specified.

## IV. PROPER HANDLING OF MAGNACIDE H HERBICIDE

This section details the required handling methods for MAGNACIDE H Herbicide and summarizes the importance of personal safety equipment, proper storage and equipment use, and spill and fire control. All persons handling MAGNACIDE H Herbicide must be properly trained and certified in the correct application techniques and be familiar with its properties and emergency response procedures prior to performing an application. Baker Petrolite has an extensive training and certification program to qualify applicators; refresher training is required annually. All applications must be made during daylight hours.

### A. Personnel Safety

If handled or used improperly, MAGNACIDE H Herbicide is very dangerous, particularly the concentrate. When setting up and breaking down application equipment, a full-face air purifying respirator with organic vapor (OV) cartridges approved by the National Institute of Occupational Safety and Health (NIOSH) and butyl rubber gloves must be worn. For visual inspection of equipment during treatment, chemical splash goggles must be worn. If spilled on clothing, gloves, or shoes, remove them immediately and wash thoroughly with soap and water before reuse. Do not reuse footwear until thoroughly aired. Apply product in the open air with adequate ventilation. Reseal the container tightly. After use and before eating, drinking or smoking, wash hands, arms, and face thoroughly with soap and water. After each day's use wash gloves, respirator and contaminated clothing.

Applicators must also have fresh water available in case of accidental irritation to the eyes or skin from MAGNACIDE H Herbicide liquid or vapors. In addition, the applicator must have a ten (10) pound dry chemical fire extinguisher at his disposal when working with MAGNACIDE H Herbicide. All of the equipment mentioned above must be provided for the applicator's use during each application. Personnel who may be involved with the storage, transportation, use, disposal or emergency response of MAGNACIDE H Herbicide must be trained in the safety and health aspects of acrolein, including, but not limited to, the use of personal protective equipment, respiratory protection and emergency response as explained in the relevant OSHA standards.

## B. Process Safety Management

Personnel should be aware of the requirements of OSHA Standard 1910.119, Process Safety Management of Highly Hazardous Chemicals. The major objective of process safety management (PSM) of highly hazardous chemicals is to prevent unwanted releases of hazardous chemicals especially into locations which could expose employees and others to serious hazards. With regard to MAGNACIDE H Herbicide, PSM applies to a process involving acrolein at or above the 150-pound threshold quantity. To ensure compliance, consult local, state and federal safety regulations. A generic template is available to customers to assist in the development of their facilities PSM program.

## C. Storage and Equipment

Store containers of MAGNACIDE H Herbicide in a secured, well-ventilated area away from children, animals, food, feedstuffs, seed, fertilizers, and other chemicals. No alkalis or oxidizing materials should be near. Any electrical equipment should be Class 1 - Division 2 and properly grounded. MAGNACIDE H Herbicide has a defined shelf life and should be used in a timely manner; therefore stock rotation is strongly recommended. If partially full containers are held from one season to the next, ensure there is a nitrogen blanket of 20 – 30 psig applied to the container. Do not reuse empty container. Return empty containers to Baker Petrolite.

All equipment used in the MAGNACIDE H Herbicide system must be chemically compatible. Materials must not cause a reaction with the MAGNACIDE H Herbicide. All equipment and hardware must be free from all traces of contaminants, especially alkalis (such as ammonia and caustics) and acids. Contamination of MAGNACIDE H Herbicide with these substances can cause the container to rupture. All parts used in the MAGNACIDE H Herbicide Application Kit have been thoroughly tested for their compatibility with our product. No substitutions should be made without authorization from Baker Petrolite.

If MAGNACIDE H Herbicide is stored at a single location in quantities greater than 5,000 pounds net, a Risk Management Plan (RMP) is required. To ensure compliance, consult local, state and federal regulations.

## D. Spill Control Procedure

### 1. Information

MAGNACIDE H Herbicide spills can be deactivated using sodium carbonate (soda ash). Sodium carbonate (in powder form) should be added to the spill followed by dilution with water. This will polymerize the acrolein forming a hard, odorless polymer. The deactivated polymer can then be placed in marked containers for disposal at an approved waste disposal facility. Never flush or allow spilled MAGNACIDE H Herbicide to flow into sewers or natural waterways as this can result in biological upset of treatment systems, kill fish in waterways, or create a toxic hazard. Notify proper authorities as required by local regulations.

### 2. Procedure for Handling Spills

1. All personnel responding to a spill of MAGNACIDE H Herbicide must have completed the appropriate training as outlined in 29 CFR 1910.120 (q), Emergency Response to Hazardous Substance Releases.
2. Evacuate all nonessential personnel to an upwind area.
3. All decontamination personnel must wear self-contained breathing apparatus (SCBA) and appropriate protective clothing.
4. Contain spill by diking with dirt.
5. Add sodium carbonate (soda ash) to the spill in powdered form. Follow by dilution and mixing with water.
6. When deactivation is complete, scoop the polymer in properly marked containers for disposal at an approved hazardous waste disposal facility in compliance with state and/or federal requirements.

## E. Disposal

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

## F. Fire and Polymerization Hazards

MAGNACIDE H Herbicide is a highly volatile liquid. In certain combinations with air (2.8 - 31% by volume) vapors have an explosive potential if ignition sources are present. Keep away from fire, sparks and heated surfaces.

Liquid MAGNACIDE H Herbicide is highly chemically reactive and readily forms polymers; this reaction generates tremendous heat. Contamination with alkalis or strong acids can initiate rapid polymerization. Contamination with all foreign materials must be avoided. If the product is stored or handled improperly, the polymerization may proceed with sufficient violence to rupture the container.

MAGNACIDE H Herbicide polymerizes slowly in the presence of air. Therefore, all containers are packaged with a blanket of nitrogen to exclude air. Hydroquinone is added to inhibit oxygen-catalyzed polymerization; however, hydroquinone does not inhibit polymerization catalyzed by alkalis and strong acids. To avoid the possibility of air contamination during use, MAGNACIDE H Herbicide must only be pressured from the container with industrial grade nitrogen.

## G. Fire Control

Pursuant to local regulations, the appropriate fire department should be notified of the location where MAGNACIDE H Herbicide is stored.

MAGNACIDE H Herbicide is highly flammable and produces toxic vapors. All fire fighting personnel must wear self-contained breathing apparatus and protective clothing. On a small fire, use carbon dioxide or dry chemical extinguishers. Alcohol-type foam is recommended for large fires. Water spray may be effective if used in large quantities, at least 20 volumes of water per volume of MAGNACIDE H Herbicide. Use water spray to help disperse vapors and cool containers. If container is heavily exposed to fire, evacuate area and let fire burn. For additional details, reference the acrolein Emergency Response Plan (ERP). A generic template is available to customers to assist in the development of their facilities ERP program.

Note: At elevated temperatures, such as in fire conditions, there is the possibility of violent rupture of MAGNACIDE H Herbicide containers.

## V. DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. MAGNACIDE H Herbicide is a water soluble material for the control of submersed and floating weeds and algae in irrigation canals. This material must be applied in accordance with directions in the MAGNACIDE H Herbicide Application and Safety Manual by a certified applicator or under a certified applicator's supervision. Do not permit dairy animals to drink treated water. Do not use where waters will flow into potential sources of drinking water. Water treated with MAGNACIDE H Herbicide must be used for irrigation of fields, either crop bearing, fallow or pasture, where the treated water remains on the field OR held for 6 days before being released into fish bearing waters or where it will drain into them.

Information contained in the following pages will assist the applicator in determining: (1) the required treatment rate; (2) the proper size orifice for MAGNACIDE H Herbicide application; (3) the nitrogen application pressure to use; and (4) the proper setup and shutdown of the MAGNACIDE H Herbicide application equipment (as distributed by Baker Petrolite).

## A. MAGNACIDE H Herbicide Application from Containers

MAGNACIDE H Herbicide is forced from the container with nitrogen gas and introduced directly into the irrigation system over a period of 30 minutes to 8 hours. Because of its high activity against submersed vegetation, only concentrations up to 15 ppm are required for control. The amount of MAGNACIDE H Herbicide required to treat the irrigation system is primarily determined by the volume of water and weed density, although water velocity, temperature and quality must also be considered. Canal flow is generally stated in cubic feet per second (cfs) and the amount of material used can be expressed in terms of this value (typical water measurement equivalents are found in Appendix C). As an example, if MAGNACIDE H Herbicide is recommended at rate of 1 gallon/cfs, a canal flowing at 10 cfs will need a total of 10 gallons of material.

MAGNACIDE H Herbicide, added over a time interval, proceeds down the irrigation system in a "wave" of treated water reacting with weeds as it moves. Because the wave of treated water bathes the weeds in herbicide as it travels, the amount of herbicide the weeds receive is determined by: (1) concentration and (2) exposure time. In fast flowing canals (linear velocity greater than 2 mph), masses of vegetation may be compacted or bent by the water; channeling may occur, preventing the free movement of the treated water through the weeds. The same situation may prevail in canals heavily infested with weed growth. Consequently, all plants may not receive their proportionate share of the available herbicide and control will be less effective. Therefore, in canals with heavy weed infestation or water flowing faster than 2 mph, the dosages may need to be increased (up to 15 ppm) and/or the duration of treatment extended for effective treatment.

## B. MAGNACIDE H Herbicide Treatment Rate Selection

This section provides instructions on determining the appropriate treatment rates for various weed conditions in irrigation systems. The application time is determined at the convenience of the applicator and the specific system design. The rate of flow of the chemical is controlled by the orifice size and nitrogen pressure. Generally most application time options begin with a four hour treatment and future optimizations are determined based on specific canal results.

In order to begin calculation of the appropriate treatment levels, four basic items of information must be determined:

1. The weed growth condition – the more severe the weed growth condition, the more MAGNACIDE H Herbicide which will be required for control. Use Table 3, Weed Growth Condition Chart to determine the weed growth condition and gallons of MAGNACIDE H Herbicide per cubic foot per second (cfs) for effective treatment.
2. Canal rate of flow – the volume of water that passes a particular reference section in a unit of time. Usually designated as cubic feet per second (cfs). Calculated as mean depth in feet times mean width in feet times the linear velocity in feet per second.
3. Temperature (°F) of the water to be treated.
4. Application time desired - normal application times will range from 30 minutes to 8 hours. Items to be considered in selecting an application time are:
  - a. Contact time: MAGNACIDE H Herbicide is a contact herbicide. In fast flowing canals (2 mph or more) extend the application time to insure good contact. In slower canals (0.5 mph or less), shorten the application time.
  - b. Concentration of MAGNACIDE H Herbicide in parts per million (ppm) may be controlled by adjusting the application time holding volume of chemical applied constant). Concentrations must not exceed 15 ppm.

After the above 4 items have been determined, the applicator can calculate the orifice size and nitrogen pressure setting required to conduct the treatment. The orifice plate sizes and nitrogen pressure settings are located in Table 4. The table is used by reading across from the calculated gallons per hour of MAGNACIDE H Herbicide to the appropriate orifice size and up to the correct nitrogen setting.

**Table 3. Weed Growth Condition Chart**

<u>Condition Code</u>	<u>MAGNACIDE H Herbicide per cfs</u>
A. Little algae and pondweed less than 6 inches long	= 0.17 gallons per cfs (for preventive maintenance)
B. Algae (non-floating) and pondweed less than 12 inches long	= 0.25 gallons per cfs (for preventive maintenance)
C. Algae (some floating) and pondweed 12 - 24" long	= 0.50 gallons per cfs
D. Algae (some floating) and mature pondweed	= 1.0 gallons per cfs
E. Choked condition	= 1.5 gallons per cfs

**NOTE:** Water temperatures also affect the amount of MAGNACIDE H Herbicide required for effective treatment. MAGNACIDE H Herbicide is less soluble in cooler water and plant reactivity is lowered. The above conditions are for water temperatures above 60°F. Correct the amount of MAGNACIDE H Herbicide required for effective treatment as follows:

<u>Water Temperatures</u>	<u>Increase Amount of MAGNACIDE H Herbicide</u>
60°F - 55°F	20%
55°F - 50°F	50%
50°F or below	100%

**The concentration of MAGNACIDE H Herbicide must not exceed 15 ppm.** After the applicator has calculated the application rate for effective treatment, a check of Table 5 must be made to ensure the resulting concentration does not exceed 15 ppm. In situations where a temperature adjustment has been made, the applicator must use the following formula to determine ppm concentration and ensure the treatment rate does not exceed 15 ppm:

$$\frac{\{(Total\ gallons\ of\ MAGNACIDE\ H\ Herbicide) / (Canal\ Flow\ in\ cfs)\} \times 1884}{Application\ time\ (minutes)}$$

= ppm (MAGNACIDE H Herbicide concentration)

Alternatively, if a treatment is selected based on a desired ppm concentration in the water, the following formula may be used to determine the application rate.

$$MAGNACIDE\ H\ Herbicide\ (ppm) \times cfs \times 0.032 = Gallons\ per\ Hour\ (gph)\ MAGNACIDE\ H\ Herbicide$$



### C. MAGNACIDE H Herbicide Application Examples

The following two examples will assist the applicator in developing expertise in determining treatment rates for appropriate applications.

#### Example A:

1. Weed growth condition: Some algae and pondweed 10 inches in length.
2. Canal rate of flow is 50 cfs.
3. Temperature of 65°F.
4. Application time 3 hours.

#### Step 1

Based on the parameters listed for Example A, a Condition Code B, or 0.25 gallons of MAGNACIDE H Herbicide per cfs exists (from Table 3, the Weed Growth Condition Chart).

**NOTE:** Temperature is above 60°F.

#### Step 2

Determine total volume of MAGNACIDE H Herbicide required for effective treatment by multiplying canal rate of flow (cfs) by weed growth condition code (MAGNACIDE H Herbicide per cfs) to determine the total gallons of MAGNACIDE H Herbicide.

**50 cfs X 0.25 gallons MAGNACIDE H Herbicide per cfs = 12.5 gallons of MAGNACIDE H Herbicide required**

#### Step 3

Determine gallons per hour of MAGNACIDE H Herbicide required by dividing the total gallons of MAGNACIDE H Herbicide (calculated in Step 2) by the desired application time (3 hours).

**12.5 gallons MAGNACIDE H Herbicide / 3 hours = 4.2 gph of MAGNACIDE H Herbicide**

#### Step 4

Determine the appropriate orifice size and nitrogen pressure setting for this treatment rate. Go to Table 4, Orifice Flow Table. Locate the gallons per hour of MAGNACIDE H Herbicide calculated in Step 3 (or the closest number to the calculated value) in the table. Read to the left column to find the orifice size and read to the top row to find the appropriate nitrogen pressure setting. We determine 4.1 gph is the closest number to 4.2 gph and locate the orifice size and pressure setting of:

<u>Orifice Size, Inches</u>	<u>Pressure Setting, psig</u>
0.025	25

#### Step 5

Check Table 5 to ensure treatment rate does not exceed 15 ppm. Locate 3 hours on the Application Time Column and read across to Condition B (Step 1) to determine treatment rate is 2.6 ppm.

**Example B:**

1. Weed growth condition: Floating algae and floating pondweed 12 - 24" long.
2. Canal rate of flow 120 cfs.
3. Temperature 57°F.
4. Application time 4 hours.

**Step 1**

Based on the parameters listed for Example B, a Condition Code C or 0.50 gallons of MAGNACIDE H Herbicide per cfs exists (from Table 3, Weed Growth Condition Chart).

**NOTE:** A water temperature of 57°F will require a 20% increase in treatment rate.

**Step 2**

Determine total volume of MAGNACIDE H Herbicide required for effective treatment by multiplying the canal rate of flow (cfs) by weed growth condition code (MAGNACIDE H Herbicide per cfs) to find the total gallons of MAGNACIDE H Herbicide. Since the water temperature is below 60°F, a 20% increase in the volume of MAGNACIDE H Herbicide is required.

**120 cfs X 0.50 gallons of MAGNACIDE H Herbicide per cfs = 60 gallons of MAGNACIDE H Herbicide.**

Temperature Adjustment:

**60 gallons MAGNACIDE H Herbicide x 0.20 = 12 gallons**

**60 gallons + 12 gallons = 72 total gallons MAGNACIDE H Herbicide**

**Step 3**

Determine the gallons per hour of MAGNACIDE H Herbicide required for treatment by dividing the total gallons of MAGNACIDE H Herbicide (calculated in Step 2) by the desired application time (4 hours).

**72 total gallons MAGNACIDE H Herbicide / 4 hours = 18 gph of MAGNACIDE H Herbicide.**

**Step 4**

Determine the appropriate orifice size and nitrogen pressure setting for this treatment rate. Go to Table 4, Orifice Flow Table. Locate the gallons per hour of MAGNACIDE H Herbicide calculated in Step 3 (or the closest number to the calculated value). Read to the left column to find the orifice size and read to the top row to find the appropriate nitrogen pressure setting. We determine 18.5 gph is the closest number to 18 gph and locate the orifice size and pressure setting:

Orifice Size, Inches

Pressure Setting, psig

0.045

50

**Step 5**

To determine the total gallons of MAGNACIDE H Herbicide to be used based on the Table 4 value, multiply the gallons per hour MAGNACIDE H Herbicide by the total application time.

**(18.5 gallons per hour MAGNACIDE H Herbicide) x (4 hours Application Time) = 74 total gallons MAGNACIDE H Herbicide**

Use the ppm calculation formula to ensure the application rate will not exceed 15 ppm.

**$\frac{\{(74 \text{ total gallons MAGNACIDE H Herbicide}) / (120 \text{ cfs})\} \times 1884}{240 \text{ minutes (application time)}}$**

**= 4.8 ppm MAGNACIDE H Herbicide**

#### D. Preventive Maintenance Program

It has been determined through various field studies that the most effective and economical method of aquatic weed control is obtained by utilization of a preventive maintenance program. Preventive maintenance programs require less herbicide usage. Better application results will also be obtained, as the weeds are more susceptible while immature. This program consists of:

1. Making a series of MAGNACIDE H Herbicide applications over the irrigation season such that the aquatic weeds are never allowed to reach a "problem" condition.
2. The first MAGNACIDE H Herbicide application should be made as soon as aquatic weed growth appears (Weed Condition Code A or B). This will normally occur 3 - 6 weeks after the canal receives a constant supply of water.
3. The second and subsequent applications should be made at intervals, depending upon the regrowth of aquatic weeds. Regrowth will depend on several variables such as water and atmospheric temperatures, species of aquatic plant, turbidity of water, water quality and sunlight conditions.
4. By utilizing the preventive maintenance program, the irrigation system will be kept free of weeds throughout the irrigation season, solving water delivery problems and minimizing off season maintenance created by aquatic weeds.

Table 4. Orifice Flow Table

Orifice Size (in.)	Nitrogen Pressure Settings										
	6 psig	8 psig	10 psig	15 psig	20 psig	25 psig	30 psig	40 psig	50 psig	60 psig	
	Gallons per Hour										
0.014	0.65	0.72	0.85	1.05	1.2	1.3	1.4	1.6	1.9	2.1	
0.016	0.85	0.98	1.05	1.3	1.5	1.7	1.9	2.2	2.4	2.6	
0.020	1.3	1.5	1.6	2.1	2.4	2.7	2.8	3.3	3.7	4.0	
0.025	2.1	2.3	2.6	3.2	3.7	4.1	4.5	5.1	5.9	6.3	
0.030	2.8	3.3	3.7	4.6	5.3	5.9	6.4	7.3	8.5	9.2	
0.035	3.9	4.5	5.1	6.2	7.2	7.9	9.2	10.5	11.1	12.5	
0.045	6.4	7.0	8.5	10.5	11.8	13.1	14.2	16.5	18.5	21.0	
0.055	9.8	11.1	12.4	15.0	17.0	20.0	22.0	25.0	27.0	30.0	
0.070	15.0	17.0	21.0	25.0	28.0	32.0	35.0	40.0	46.0	49.0	
0.081	21.0	24.0	27.0	33.0	38.0	42.0	47.0	53.0	60.0	65.0	

Table 5. MAGNACIDE H Herbicide Concentrations

Application Time	MAGNACIDE Herbicide Concentrations Flowing Irrigation Canals					
	Concentration in ppm at Various Gallons/cfs Rates					
	Weed Condition A Gal/cfs 0.17	Weed Condition B Gal/cfs 0.25	Weed Condition C Gal/cfs 0.50	Weed Condition D Gal/cfs 1.0	Weed Condition E Gal/cfs 1.5	
30 Minutes	10.0	-	-	-	-	
1 Hour	5.0	7.8	-	-	-	
2 Hours	2.6	3.9	7.8	-	-	
3 Hours	1.7	2.6	5.2	10.4	-	
4 Hours	1.3	2.0	3.9	7.9	11.8	
6 Hours	-	1.3	2.6	5.2	7.9	
8 Hours	-	1.0	1.9	3.9	5.9	

## VI. APPLICATIONS FROM CYLINDERS AND SKID TANKS

### A. Label Instructions

The applicator must wear all appropriate personnel protective equipment including a full-face respirator when setting up or breaking down application equipment. The applicator must also ensure the availability of fresh wash water, either in a fixed or portable supply, for personal emergency use. The applicator should know the procedures thoroughly; rehearse them if necessary before the job. Turn all valves cautiously, ensuring there are no leaks and all hardware is working properly. Use only specified equipment as distributed by Baker Petrolite. Application equipment should be inspected prior to and during each application to ensure it is working properly. Only industrial grade nitrogen should be used to minimize the presence of oxygen. Oxygen will slowly consume the hydroquinone (stabilizer) and leave the MAGNACIDE H Herbicide susceptible to polymerization.

Once the application equipment is in place, and the treatment is in progress, an applicator **must** monitor the treatment if the containers are not secured. If the containers are secured (e.g., locked enclosures), the applicator should check on the treatment periodically.

Maintain accurate records of all MAGNACIDE H Herbicide applications including:

1. Date
2. Time application started and stopped
3. Location
4. Flow of canal (cfs)
5. Water temperature
6. Orifice size and pressure setting
7. Parts per million concentration of MAGNACIDE H Herbicide
8. Amount of MAGNACIDE H Herbicide injected
9. Any additional information required by the state/federal authorities.

### B. Application Instructions

The following section provides step by step instructions for the setup, testing and shutdown of application equipment. Refer to Figure 1, MAGNACIDE H Herbicide Application Setup, and Figure 2, MAGNACIDE H Herbicide Application Kit for associated diagrams.

1. Calculate proper orifice size and regulator pressure setting using the appropriate tables shown in Section V, Directions for Use.
2. Install orifice plate in orifice assembly (18). Make sure the screen filter is clean and in place. Wrap threads on orifice assembly with two layers of Teflon® tape to ensure that a good seal is obtained. Wrap the threaded portions (14) of the nitrogen (blue) (A) and MAGNACIDE H Herbicide (orange) (B) assemblies with two layers of Teflon tape to ensure that a good seal is obtained.
3. Secure nitrogen cylinder to prevent it from falling over. Do not lay cylinder down on its side. Connect nitrogen regulator (1) to nitrogen cylinder. Connect nitrogen hose (5) to cross tee (4).

**Note:** It is necessary to examine the integrity of the nitrogen check valve and excess flow valve each time a new cylinder of nitrogen is used.

4. To check excess flow valve: ensure nitrogen cylinder valve (F) is shut off and nitrogen pressure handle (G) is closed (counterclockwise). Remove check valve and attachments. Excess flow valve should remain attached to the regulator. Open nitrogen cylinder valve. Start to open quickly (clockwise) the nitrogen regulator pressure handle. Excess flow valve (2) should activate to prevent unrestricted flow of nitrogen. Repair or replace excess flow valves if necessary. Close nitrogen cylinder valve (F) and nitrogen pressure handle (G).

5. To check integrity of check valve: reinsert check valve (3) backwards (arrow pointing toward regulator). Open nitrogen cylinder valve (F). Turn nitrogen regulator pressure handle (G) clockwise to approximately 10 psi. Listen and check with finger to see if any nitrogen is escaping through the check valve. Repair or replace check valve if necessary. Close nitrogen cylinder valve (F) and nitrogen pressure handle (G). Reverse check valve (arrow pointing away from cylinder), retape and reassemble nitrogen regulator system in original configuration.

**Note:** Put on gloves, respirator and have wash water available before proceeding to Step 6.

6. Open container bonnet. Check MAGNACIDE H Herbicide container valves, nitrogen intake valve (blue) (C) and MAGNACIDE H Herbicide discharge valve (orange) (D) to ensure that they are in the closed and secured (locked) position. Inspect purging assembly ball valve (blue) (11) and bleed off valve (6) on the application equipment to ensure each is closed.
7. Remove the plugs from the nitrogen intake (blue) (C) and MAGNACIDE H Herbicide (orange) (D) valves. Remove any Teflon tape that may be in the valves. This tape could restrict flow of MAGNACIDE H Herbicide and the desired application rate may not be obtained. Connect the nitrogen assembly (blue) (A) assembly to the nitrogen intake valve (blue) (C). Connect the MAGNACIDE H Herbicide assembly (orange) (B) to the MAGNACIDE H Herbicide discharge valve (orange) (D).
8. Connect the MAGNACIDE H Herbicide injection hose (21) to the MAGNACIDE H Herbicide assembly (B) at the orifice outlet (19). A weight must be attached to the end of the injection hose (22) to insure that the hose remains submerged. Prevent coils in the hose if possible. Drop the weighted end of the injection hose into the canal at a point where MAGNACIDE H Herbicide will mix thoroughly. If a canal location with good mixing is not available, alternative measures such as a recirculation pump should be used to obtain an adequate product mix in the water.
9. Connect nitrogen hose (5) to the nitrogen assembly (blue) (A) on container.
10. In order to pressure test the application system for leaks, slowly open the nitrogen cylinder valve (F). Adjust regulator (G) to 30 psi. Check for leaks on nitrogen assembly, using soap solution. Retighten connections if necessary.
11. Disconnect nitrogen hose at quick coupler (8) on nitrogen assembly (A). Reconnect nitrogen quick coupler (8) to the blue purge valve (9) on orange MAGNACIDE H Herbicide assembly (B). Open handle on purge valve (11). Check for leaks using soap solution. Retighten connections if necessary. Close nitrogen cylinder valve (F) and open bleed valve (6) to relieve nitrogen pressure. Reconnect nitrogen hose (5) to nitrogen assembly (blue) (A) on container.
12. Slowly open blue nitrogen intake valve (C) on container. Read container pressure on low pressure regulator gauge (7). If reading is greater than desired pressure setting for application (Step 1), the excess pressure must be bled off. Connect the MAGNACIDE H Herbicide injection hose (21) to the pressure bleed off valve (blue) (6). Bleed the container pressure down below the desired application pressure. After bleeding down, the hose can be purged with nitrogen by closing the container blue nitrogen intake valve (C), opening the nitrogen cylinder valve (F) and opening the nitrogen pressure handle for 30 seconds. Close the bleed off valve (6) and remove the MAGNACIDE H Herbicide hose (21). Reconnect the application hose (21) to MAGNACIDE H Herbicide assembly (orange) (B).
13. Open nitrogen cylinder valve (F) and set pressure, as calculated in Step 1, using the nitrogen regulator pressure handle (G). Check for leaks.
14. Slowly open blue nitrogen cylinder valve (C). The container will pressurize with nitrogen to the desired setting. Check for leaks.
15. Slowly open orange MAGNACIDE H Herbicide container valve (D). You should observe MAGNACIDE H Herbicide flowing through the injection hose (21).

16. Check for leaks on the orange MAGNACIDE H Herbicide assembly (B) and hose (21). If a leak is detected, close the orange MAGNACIDE H Herbicide discharge valve (D). If necessary, rinse with water. In most cases, the leak can be repaired by tightening the threaded connections on the orange MAGNACIDE H Herbicide assembly (B) and hose (21).

**Note:** The orange MAGNACIDE H Herbicide assembly (B) and injection hose (21) may need to be disassembled and retaped with Teflon tape to repair the leak. Follow shutdown steps 20 - 26 to purge MAGNACIDE H Herbicide from assembly and hose before disassembly of injection equipment. Repair leak and follow Application Instruction Steps 8 - 16. Be sure nitrogen pressure is readjusted to desired application pressure as determined in Application Instruction Step 1.

17. Make note of time that application begins.
18. Periodically check MAGNACIDE H Herbicide application equipment to insure that equipment is functioning properly.
19. Monitor the nitrogen cylinder pressure during application to ensure it never drops below 100 psi. If nitrogen pressure does drop below 100 psi, the 100 psi check valve (30) will stop the flow of nitrogen from the nitrogen cylinder. This valve, in addition to the 1 psi check valve (3), will prevent any backflow of MAGNACIDE H Herbicide vapors into the nitrogen cylinder.

### C. Shutdown Procedure

**Note:** Put on respirator and gloves and have wash water available before proceeding to Step 20.

20. Close orange MAGNACIDE H Herbicide discharge valve (D); note end time of application and determine the duration of application. Note in application record.
21. Close blue nitrogen intake valve (C) and secure the valve handle.
22. Remove nitrogen hose from nitrogen assembly (blue) (A).
23. Connect nitrogen hose female quick coupler (8) to the blue purge valve (9) on orange MAGNACIDE H Herbicide assembly (B). With the nitrogen regulator pressure handle (G), increase pressure 10 psi higher than the application pressure. Open handle on purge valve (11). Nitrogen will flow through the application hose and bubbles will be seen in the canal. Let nitrogen flow for at least 60 seconds to purge all MAGNACIDE H Herbicide out of injection hose. Check any coils for remaining chemical.
24. Open and close orange MAGNACIDE H Herbicide discharge valve (D) several times to force all MAGNACIDE H Herbicide in chemical assembly and valve back into container.
25. Close orange MAGNACIDE H Herbicide discharge valve (D) and secure. Close purge valve (11).
26. Remove nitrogen hose female quick coupler (8) from purge valve (9).
27. Close nitrogen cylinder valve (F).
28. Bleed pressure from nitrogen regulator (1) with pressure bleed off valve (6) on regulator.
29. If MAGNACIDE H Herbicide container is empty, the pressure in the tank must be adjusted for return. Reattach the nitrogen hose (5) to the nitrogen assembly (Blue) (A) on the container. Read the MAGNACIDE H Herbicide container pressure on the low pressure nitrogen gauge (7). If the container pressure exceeds 10 psig, the excess pressure must be bled off. Connect the MAGNACIDE H Herbicide injection hose (21) to the bleed off valve (blue) (6). Bleed the container pressure down to 10-12 psi. Close the nitrogen intake valve (C) on the container. After bleeding down, the hose can be purged with nitrogen, opening the nitrogen cylinder valve (F) and opening the nitrogen regulator pressure

handle and opening the pressure bleed off valve (6) for 30 seconds. Close the nitrogen cylinder valve (F). Relieve the nitrogen regulator pressure by opening the bleed (blue) (6). Detach the MAGNACIDE H Herbicide injection hose. Lock the nitrogen intake valve C on the MAGNACIDE H Herbicide container.

30. Disconnect nitrogen regulator (1) from nitrogen cylinder. Wrap regulator in a protective covering to protect it from damage.
31. Replace nitrogen cylinder valve stem cover, if applicable.
32. Remove blue nitrogen assembly (A) from container valve (C), place in wash water, and install valve plug.
33. Disconnect injection hose (21) from orange MAGNACIDE H Herbicide assembly (B) if still attached.
34. Remove orange MAGNACIDE H Herbicide assembly from container valve (D), place in wash water, and install valve plug.
35. Secure container bonnet lid.
36. Remove respirator and gloves.
37. Wash assemblies and application hose with fresh water to remove any remaining traces of MAGNACIDE H Herbicide in order to prevent any inadvertent exposure to acrolein vapors. Disassemble MAGNACIDE H Herbicide assembly (B). Remove Teflon tape, wash filter screen and orifice plate.
38. Store all equipment properly. Store all personal protective equipment separately from application equipment to prevent contamination.

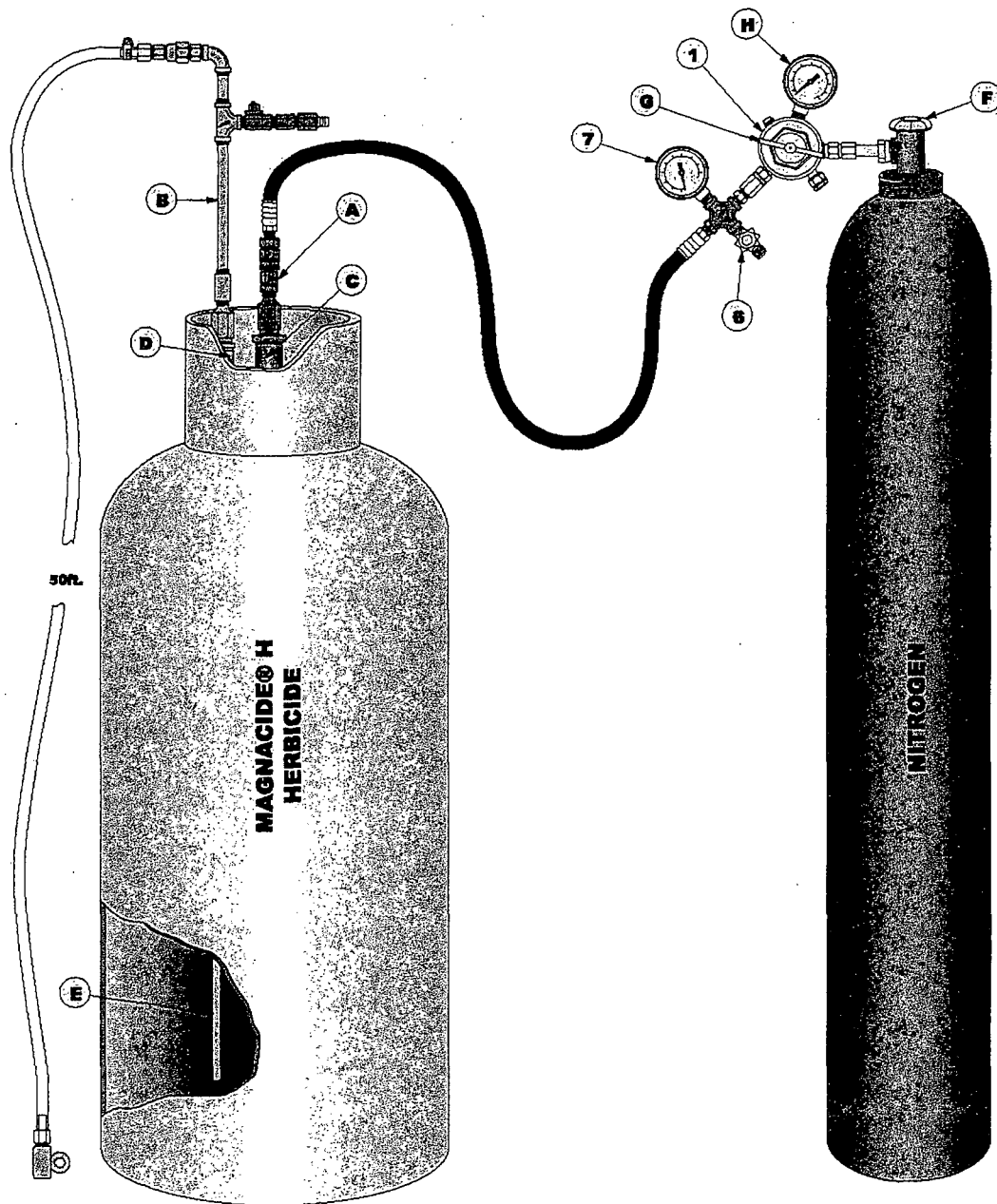


**VII. MAGNACIDE H HERBICIDE APPLICATION SET UP INDEX**  
**(for use with Figure 1. MAGNACIDE H Herbicide Application Set Up)**

- A. Nitrogen assembly (blue)
  - B. MAGNACIDE H Herbicide assembly (orange)
  - C. MAGNACIDE H Herbicide container nitrogen intake valve
  - D. MAGNACIDE H Herbicide container discharge valve
  - E. MAGNACIDE H Herbicide dip tube (delivers chemical from bottom of cylinder to assembly B)
  - F. Nitrogen cylinder valve
  - G. Nitrogen regulator pressure handle
  - H. Nitrogen cylinder high pressure (psi) gauge
- 
- 1. Nitrogen regulator with high pressure gauge
  - 6. Pressure bleed off valve (blue)
  - 7. Low pressure nitrogen gauge

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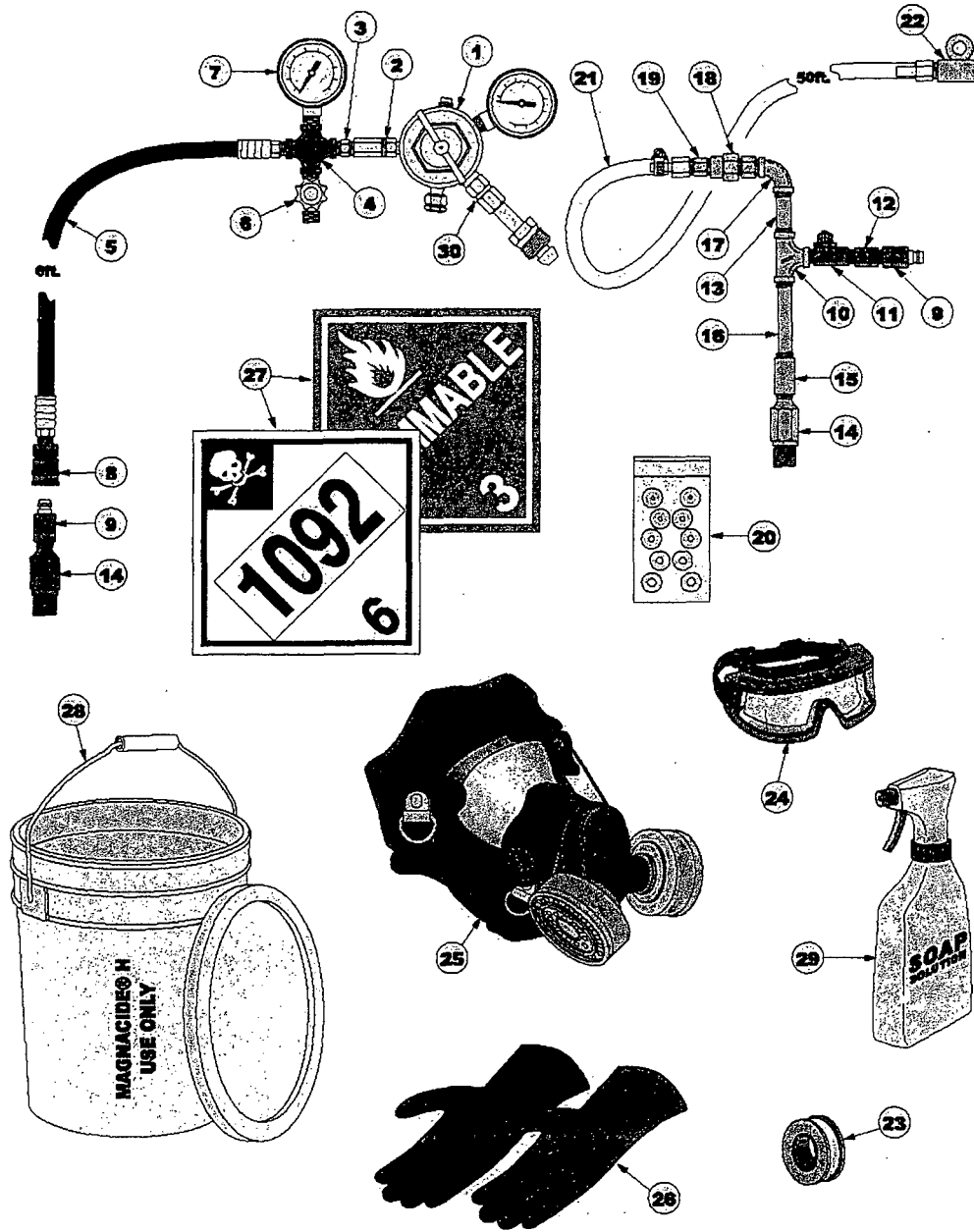
Figure 1. MAGNACIDE H Herbicide Application Set Up



**VIII. MAGNACIDE H HERBICIDE APPLICATION KIT INDEX**  
(for use with Figure 2. MAGNACIDE H Herbicide Application Kit)

1. Nitrogen regulator with high pressure gauge
2. Excess flow valve
3. 1 psi check valve
4. Cross tee
5. Nitrogen hose
6. Pressure bleed off valve
7. Low pressure nitrogen gauge
8. Nitrogen hose female quick coupler
- 9, 14. Nitrogen assembly (A)
- 9 - 19. MAGNACIDE H Herbicide assembly with attached purging assembly
- 18 - 19. Orifice assembly with screen filter
20. One set of orifice plates
21. 50' MAGNACIDE H Herbicide injection hose
22. Hose end for attaching weight
23. Teflon tape
24. Goggles
25. Respirator
26. Butyl rubber gloves
27. Placards (8 total – 1092 and flammable)
28. Plastic 6-gallon bucket with lid
29. Soap solution
30. 100 psi check valve

Figure 2. MAGNACIDE H Herbicide Application Kit



## IX. TRANSPORTING MAGNACIDE H Herbicide CONTAINERS

Transportation of hazardous chemicals is regulated by the U. S. Department of Transportation (DOT). The DOT requirements for transporting MAGNACIDE H Herbicide (acrolein, stabilized) are as follows:

1. Transporting vehicle must be placarded when hauling full, partial or empty containers. Required placards are Inhalation Hazard 1092 (6) and Flammable Liquid (3), available at cost through Baker Petrolite. All four sides of the transporting vehicle must have placards displayed, with the 1092 placards (primary hazard) in left or upper position.
2. Driver must carry correct shipping papers at all times. These must include the correctly worded bill-of-lading supplied by Baker Petrolite or commercial freight line, material safety data sheet for MAGNACIDE H Herbicide, and Chemtrec emergency response information (supplied with bill-of-lading).
3. Special drivers license requirements are in effect for transporting hazardous materials; drivers must have a Commercial Drivers License with Hazardous Materials Endorsement. For details, contact the Department of Motor Vehicles in your state.

Bills-of-lading for transportation of empty containers are available from your Baker Petrolite chemical representative or Baker Petrolite Corporation's Bakersfield, CA office.

## X. RETURN OF EMPTY MAGNACIDE H Herbicide CONTAINERS

Empty containers are to be returned, freight collect, to:

**Taft Manufacturing Company**  
19815 S. Lake Rd.  
Taft, CA 93268

**Please Note:** No partly used containers should be returned to Taft Manufacturing Company without prior notification. For information concerning the return of partly used containers, contact:

**Taft Manufacturing Company**  
19815 S. Lake Rd.  
Taft, CA 93268  
(661) 763-7103

Normally, no credit will be issued for unused material returned from opened cylinders or skid tanks.

### A. Preparation for Shipment of Empty Containers

Prepare empty containers for shipment as follows:

1. Relieve container pressure down to 10-12 psig. This is normally accomplished by venting into the irrigation system during treatment.
2. Replace plugs in the inlet and outlet valves and tighten securely.
3. Secure (lock) valve handles.
4. Close lid and secure with latch.
5. Containers must be transported upright. Alert the carrier to secure containers to prevent overturning during transport.

The DOT has special shipping paper requirements for shipment of empty containers which previously contained a hazardous material. Properly worded bills-of-lading for empty containers are available through your technical sales representative or Baker Petrolite Corporation's Bakersfield, CA office. Trucks transporting empty containers must be placarded. It is the responsibility of the shipper to provide necessary placards.

## APPENDIX A

### Toxicity, Environmental Fate, and Crop Tolerance Information

Results of representative studies are summarized below:

#### A. Toxicity

Numerous studies have been conducted on MAGNACIDE H Herbicide to support the registration of this product. The testing has been conducted according to government testing protocols using good laboratory practices (GLP) techniques. Testing of products normally begins with short term studies and progresses to longer term or lifetime studies. Acute (or short term exposure at relatively high doses) testing reveals the immediate hazards of a product while chronic (or long term exposure at lower doses) toxicity testing reveals the potential long term hazards of a product. For MAGNACIDE H Herbicide, the acute oral toxicity (LD<sub>50</sub>) for rats is approximately 29 mg/kg. The acute dermal LD<sub>50</sub> (24 hour exposure) of undiluted MAGNACIDE H Herbicide in rabbits is 231.4 mg/kg. In a study investigating skin irritation (rabbits, 4 hour exposure) at 15 ppm aqueous solution of MAGNACIDE H Herbicide, there were no signs of irritation at the concentration tested.

Data on vapor toxicity show that MAGNACIDE H Herbicide vapor exerts its main action on the eyes and mucous membranes of the respiratory tract; severe (acute) exposure may produce serious injury to the lungs. The odor threshold for acrolein will vary among humans, depending upon the olfactory sensitivity and acuteness. Detection threshold will vary between 0.05 and 0.4 ppm.

Adverse health effects have been shown to occur in humans at concentrations as low as 0.09 ppm. Serious irreversible health effects may occur in humans at concentrations as low as 0.4 ppm for 10 minutes. OSHA does not allow workers to be exposed to concentrations over 0.3 ppm for longer than 15 minutes. Additionally, the 8-hour workplace standard is 0.1 ppm and the IDLH is 2.0 ppm.

MAGNACIDE H Herbicide has been investigated for its potential to cause carcinogenic tumors or lesions. A series of studies were conducted including a 12-month chronic toxicity test in dogs, where the highest dose (2 mg/kg) tested resulted in changes in blood chemistry, but no compound-related tumors or lesions. An 18-month oncogenicity study in mice 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 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.

MAGNACIDE H Herbicide has been tested for developmental and reproductive health effects. Results from developmental studies indicated MAGNACIDE H Herbicide did not cause teratogenic effects on rats or rabbits at doses that caused maternal toxicity. A two-generation reproductive study in rats did not reveal any evidence of reproductive toxicity in either sex at any treatment level (maximum dose = 7.2 mg/kg).

#### Reducing the Potential to Wildlife Exposures

On an acute exposure basis, MAGNACIDE H Herbicide is very highly toxic to freshwater fish and invertebrates, estuarine/marine invertebrates and it is highly toxic to estuarine/marine fish. Chronic exposure to MAGNACIDE H Herbicide has resulted in reduced growth and survival in fish and reduced survival in aquatic invertebrates. MAGNACIDE H Herbicide will kill fish at levels significantly lower than levels required for treating aquatic weeds.

It is imperative that you minimize the potential impact on non-target aquatic organisms. Some ways to reduce the potential risk are:

- Do not use MAGNACIDE H Herbicide where fish are considered a resource
- Eliminate entrance of fish to canals with fish screens or other barriers
- In the event of inadvertently exposed organisms, prevent release from the irrigation system
- Do not allow dead fish back into rivers or other natural waterways

- Limit the possible contamination of natural fish-bearing waters through the potential release of acrolein-treated canal water, by adhering to the following label statement:

*"Water treated with MAGNACIDE H Herbicide must be used for the irrigation of fields, either crop-bearing, fallow or pasture, where the treated water remains on the field OR must be held for 6 days before being released into fish bearing waters or where it will drain into them."*

and utilize the following examples to ensure product degradation before release:

- Irrigate the treated water directly onto crops,
- Hold the treated water in the canal, or
- Recirculate the treated water through the irrigation system (if system is so designed)

## B. Environmental Fate

A field study was conducted (Kern County, California, U.S.) to directly measure levels of MAGNACIDE H Herbicide during application and subsequent irrigation of treated water across various fields utilizing different irrigation methods. Two test sites were selected, one utilizing furrow irrigation and the other flood irrigation. MAGNACIDE H Herbicide residuals were monitored from the initial time of application until the point of dissipation across the irrigated field. In both cases, active acrolein levels dropped below detectable levels within several hundred feet when treated water was used to irrigate dry ground. This was true for both furrow and flood-irrigated fields.

Numerous field dissipation studies have been conducted to determine the half-life and lifetime of MAGNACIDE H Herbicide in irrigation systems. MAGNACIDE H Herbicide dissipates rapidly in irrigation systems and the half-life (time required for the concentration to be reduced by one half) and lifetime (time required for concentration to degrade to levels below detection limits) are determined by factors such as weed density, water temperature and quality, system design, etc. The lifetime of MAGNACIDE H Herbicide has been found to range from 6 to 45 hours. Examples of study results include California canals where MAGNACIDE H Herbicide was applied to aquatic weed infested and weed free canals at initial concentrations of 15 ppm for one hour. The half-life of acrolein was measured to be 7.5 hours in the nonweedy canal and 10 hours in the weed infested canal. In an Arizona field dissipation study, the half-life of acrolein was measured to be approximately 8 hours, and in a Washington study, the half-life of acrolein was measured to be 10.2 hours. Once low concentrations are reached, dissipation is not a linear function; instead an exponential (rapid) decline occurs.

In a field study conducted in Argentina, it was concluded that the use of MAGNACIDE H Herbicide in the CORFO-Rio Colorado irrigation canals was considered to be ecologically acceptable. At recommended treatment concentrations most aquatic populations were depleted; however, even after several reductions recovery mechanisms were observed. These results were not significantly different from effects observed in mechanically cleaned canals.

The aerobic aquatic metabolism of <sup>14</sup>C-acrolein, applied at the maximum treatment rate (15 ppm), was studied using sediment and water. The pattern of decline of acrolein in the water phase indicated that acrolein rapidly degrades in a natural water system. Results of this study indicated that hydration was an early step in acrolein degradation, with the acrolein undergoing rapid hydrolysis and biodegradation in water. The final degradation product was carbon dioxide.

In studies conducted to determine the aerobic soil metabolism for MAGNACIDE H Herbicide, it was determined that the half-life of acrolein was 4.2 hours. The MAGNACIDE H Herbicide irreversibly binds to the organic material in the soil and degrades to carbon dioxide. Baker Petrolite has also conducted metabolism studies in freshwater fish, shellfish, goats, hens, rats, and leaf lettuce all of which indicate MAGNACIDE H Herbicide is rapidly metabolized into naturally occurring products and does not accumulate in the tissues.

The studies mentioned above clearly show that acrolein rapidly degrades in the irrigation canals and

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when applied to fields. The overall dissipation of acrolein in the irrigation canals and fields is caused by reactions with water, aquatic vegetation, suspended matter, soil and microbial metabolism. The results of the aquatic and soil metabolism studies illustrate that acrolein is ultimately metabolized to carbon dioxide and oxalic acid. Acrolein's high reactivity, when combined with the well documented modes of degradation, clearly shows that the product cannot persist in the environment, either in water or soil, and thus cannot reach groundwater. These studies support the experiences of over 40 years of field usage in hundreds of irrigation districts throughout western North America and internationally, wherein there has never been an instance noted of active acrolein residual from an aquatic herbicide application contaminating groundwater.



C. Selected Crop Tolerance Studies

CROP TESTED	CONCENTRATION (ppm)	METHOD OF IRRIGATION	RESULTS
Cotton	80	Flood	No damage; normal harvest.
Cotton	160	Flood	Some damage; below average harvest.
Cotton	240	Flood	Severe damage; below average harvest.
Corn	30, 60, 120	Furrow	No injury.
Potatoes	30, 60, 120	Furrow	No injury at 30, 60; slight at 120.
Beans	30, 60, 120	Furrow	No injury at 30, 60; slight at 120.
Cabbage	30, 60, 120	Furrow	No injury at 30, 60; slight at 120.
Melons	30, 60, 120	Furrow	Slight burn to foliage at 30 when in furrow; serious at 60, 120.
Onions	30, 60, 120	Furrow	No injury at 30; slight bleaching at 60, 120.
Table Beets	30, 60, 120	Furrow	No injury at 30; moderate at 60, 120.
Tomatoes	30, 40, 50, 60, 120	Furrow	No injury at 30, slight at 40, 50; moderate at 60, 120.
Cotton	30, 40, 50, 60, 120	Furrow	No injury at 30, 40, 50; scattered leaf injury at 60, 120.
Peach	10, 20, 30, 60, 90, 120	Flood	No injury to trunk or foliage.
Walnut	10, 20, 30, 60, 90, 120	Flood	No injury to trunk or foliage.
Grapes	10, 20, 30, 60, 90, 120	Flood	No injury to trunk; slight scattered damage to foliage trailing in solution.
Celery (established)	5 - 7 (striking foliage)	Sprinkler	No injury.
Peas (4 - 6")	10 (striking foliage)	Sprinkler	No injury.
Wheat (6 - 8"), Vetch (2 - 4")	8 (striking foliage)	Sprinkler	No injury.
Sugar Beets (3 mo)	8 (striking foliage)	Sprinkler	No injury.
Mustard, Radish (seedlings)	8 (striking foliage)	Sprinkler	No injury.
Wheat	30	Flood	No injury to leaves or roots.
Vetch	30	Flood	Slight scattered burn to leaflets.
Field Corn & Sorghum	55	Furrow	No damage to either.
Pinto Beans (small & large fruit)	55	Furrow	No damage to either.
Hay (Alfalfa & Red Clover)	55	Furrow	No damage to clover; slight bleaching & dropping of alfalfa leaves.
Potatoes (near harvest)	55	Furrow	No damage.
Sugar Beets	55	Furrow	No damage.
Corn, Sugar Beets	60	Furrow	No damage or reduction in yields.
Beans	120	Furrow	No damage or reduction in yields.
(midseason)	180	Furrow	No damage or reduction in yields to corn & beets; slight to beans.
Leaf lettuce	75	Sprinkler	No damage from repeated doses.

**APPENDIX B****MAGNACIDE H Herbicide Monitor**

The MAGNACIDE H Herbicide Monitor is a hand held colorimeter designed to quickly and easily determine the concentration of MAGNACIDE H Herbicide in irrigation waters. The instrument's compact size and easy operating procedures make it a handy tool for measuring MAGNACIDE H Herbicide levels in even the most remote irrigation channels.

A simple test determines the parts per million (ppm) of chemical present in the treated water with an accuracy of 0.1 ppm. The monitor readily measures the concentration of MAGNACIDE H Herbicide in the range of 0.25 to 15.0 ppm. Test results are read directly off the monitor's scale, thus eliminating the need for complicated calculations.

The MAGNACIDE H Herbicide Monitor is furnished in a kit with all necessary equipment to conduct a number of tests. For additional information on the MAGNACIDE H Herbicide Monitor, please contact your technical sales representative

## APPENDIX C

## Water Measurement Equivalents

Discharge or Rate of Flow	The volume of water that passes a particular reference section in a unit of time. Usually designated as cubic feet per second or miner's inches.
1 cfs	1 cubic foot per second (mean depth (ft) x mean width (ft) x linear velocity (ft/sec)).
Miner's Inch	The quantity of water which will flow through an orifice one inch square under a stated head which varies from 4 to 6 1/2 inches in different localities.
Acre Foot	A commonly employed unit of volume defined as that quantity of water required to cover one acre of land to a depth of one foot or 43,560 cubic feet.
1 cfs	450 gallons per minute
1 cfs	50 miner's inches in Idaho, Kansas, Nebraska, New Mexico, North Dakota, South Dakota, Northern California, Washington and Utah.
1 cfs	40 miner's inches in Arizona, Southern California, Montana and Oregon.
1 cfs	38.4 miner's inches in Colorado.
1 cfs Flowing 1 Hour	1 acre inch.
1 cfs in 12 Hours	1 acre foot.
1 cu. ft. of Water at 25°C	62.2 lb., 7.48 gallons.
1 Gallon Water	8.34 lb.
1 Acre Foot of Water	2.7 million lb.
2.7 lb. Product/Acre Ft.	1 ppm MAGNACIDE H Herbicide.
1 lb. Product/Million Gallons	0.12 ppm MAGNACIDE H Herbicide.
1 Acre	43,560 sq. ft., 1/640 square mile.
1 Mile	5,280 feet, 1,760 yards.
1 Kilometer	0.62 miles.
1 Inch	2.54 cm = 25.4 mm.
1 Ounce	28.35 grams.
1 Gram	0.0353 ounces.
1 lb.	453.59 grams.
1 Fluid Ounce	29.57 ml.
1 Pint	473.2 ml.
1 Gallon (U. S.)	0.823 gallon (British)
1 mph	88 ft/min = 1.5 ft/sec.
m <sup>3</sup>	264.2 gallons
1.6 kilometers	1 mile
1 m <sup>3</sup> /sec.	35.3 cubic ft/sec.
1 hectare	2.47 acres
3.79 liters	1 gallon
2.2046 lbs.	1 kilogram
2.2 mega liters/day	1 cubic foot per second/24 hours

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**APPENDIX D**  
**Specimen MAGNACIDE H Herbicide Label**