

PHAIRWAY[®]

WATER TREATMENT AMENDMENT

REFERENCE MANUAL



PRIME
TURF

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I N T R O D U C T I O N

**pHAIRWAY®: A
WATER
TREATMENT
AMENDMENT**

Virtually all irrigation water contains some amount of dissolved salts. Many are beneficial, such as calcium, magnesium, sulfate, and nitrate. Others can be harmful to both the growing crop and the soil. Sodium, chloride, and boron, are examples of potentially toxic salt ingredients that must be carefully managed or avoided, if possible. A third group, which interacts with and is usually present with the above salts, consists of carbonate, bicarbonate, and silicates. The addition of liquid phosphate materials such as 10-34-0 can also result in insoluble precipitates that can reduce fertilizer efficiency. The presence of these salts in both irrigation water and soil can cause destruction of soil structure and precipitation of insoluble salts in irrigation equipment. Often the most troublesome of the salt components found in or added to irrigation water is the carbonate-bicarbonate complex and, in many cases, phosphates and their resulting precipitates. Fortunately, these can be controlled with the addition of pHairway to the irrigation water.

Conversely, low salt (snow melt) irrigation sources may also pose problems because the absence of salts such as calcium can also cause soils to seal. For these reasons, surface and sprinkler irrigation water treatment with pHairway has been employed to lower the pH and reduce the problems associated with waters containing bicarbonate.

pHairway is an excellent choice for irrigation water treatment. It contains acid in a safer complex form that provides a way of avoiding the use of dangerous mineral acids. It also makes it possible to effectively use acid in most turf applications while reducing hazards to personnel. Careful attention should be paid when metering pHairway into aluminum, cement, or transite irrigation systems. Any acidic material, including pHairway, can react with these systems if the pH of the treated water falls below 4.5.

I N T R O D U C T I O N

**BENEFITS OF
ADDING pHAIRWAY®
AS A WATER
AMENDMENT**

1. Acidulates irrigation water to improve water quality.
2. Acts as an effective soil anticrusting agent.
3. Destroys bicarbonate to avoid alkalinity.
4. Improves efficiency of low water volume systems (i.e., drip, mini sprinklers, etc.).

CONCLUSION

Successfully solving turf irrigation problems requires some knowledge of a complex system of plant nutrient requirements, water chemistry, and the physical restraints of the system. The diversity of irrigation systems and irrigation water quality requires that each system be evaluated individually.

The following sections are intended to provide the user with a broad array of application, equipment, handling, and safety information. Exacto Inc. will update this manual as additional information becomes available.

Every attempt has been made to thoroughly define all aspects of safety, handling, and application of the product. Should you encounter a specific problem or question not addressed in this manual, contact Exacto Inc. at the telephone number shown below or call Exacto Inc.:

Exacto Inc.
(800)-798-9761

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PATENT NOTICE

pHairway® is a unique product resulting from a carefully controlled manufacturing process that combines urea and sulfuric acid. The resulting product is contaminant-free, and contains additives to control metal corrosion.

The unique nature of pHairway has enabled it to obtain several United States patents covering various uses, compositions, and methods of manufacturing. Some of the specific patents of which all resellers and users of pHairway should be aware are:

Corrosion Inhibitors: U.S. Patents 4,402,852 and 4,404,116 cover the corrosion inhibitor additives contained in pHairway.

Contaminant Free: U.S. Patent 4,445,925 covers Exacto Inc.'s carefully controlled manufacturing method, which results in a product free of impurities and decomposition products.

Irrigation System/Pipeline Cleaning: U.S. Patent 4,673,522 covers use of pHairway to clear irrigation systems, pipelines, etc. of alkaline precipitates and organic obstructions.

The information presented in this manual was developed exclusively for pHairway water treatment. Specific recommendations require consideration based on formulations, quality control, and patents and preclude any use with products other than pHairway. The information presented here cannot be reproduced without the consent of Exacto Inc.

CONDITIONS OF PRODUCT USE

Exacto Inc. warrants that pHairway® conforms to the chemical descriptions on its label and are reasonably fit for the purpose stated when used in accordance with the use directions under normal conditions. Exacto Inc. neither makes, nor authorizes any agent or representative to make, any other warranty of FITNESS or of MERCHANTABILITY, guarantee or representation, express or implied, concerning this material.

Critical and unforeseeable factors beyond Exacto Inc.'s control prevent it from eliminating all risks in connection with the use of material. Such risks include, but are not limited to, damage caused by drift to other plants or crops. Such risks occur even though the product is reasonably fit for the uses stated herein and even though use directions are followed. Buyer and user acknowledge and assume all risks and liability resulting from the handling, storage, and use of this material (except those assumed by Exacto Inc. in the paragraph above). Exacto Inc. shall not be liable for incidental or consequential damages.

P R O D U C T S P E C I F I C A T I O N S

PHYSICAL & CHEMICAL PROPERTIES

PRODUCT: pHairway®
COMMON NAME: Monocarbamide dihydrogensulfate (MCDS) solution

PHYSICAL PROPERTIES⁽¹⁾:

Weight per gallon: 12.7
Crystallization temperature⁽²⁾: 42±3
Viscosity, cps: 49
Specific gravity: 1.52
Gallons per ton: 158
Color: Orange

NOTES:

- (1) Unless otherwise stated, values are at 68°F (20°C) and 1 atm (760 mm Hg).
- (2) This product readily supercools and may not immediately crystallize at lower temperatures.

S A F E T Y I N F O R M A T I O N

SAFE HANDLING

Careful attention to the following recommendations and thoughtful use of the information provided herein will minimize hazards associated with the use and application of pHairway®. Dealers should review their specific conditions and provide any additional safe practices appropriate to the specific facility or location. See the Material Safety Data Sheet (MSDS) and the Handling and Equipment section of this manual for more specific information.

Safety and identification signs should be located at valves and connections of each storage and transport tank. For proper shipping information, see the Handling and Equipment section of this manual.

EXPOSURE PREVENTION/ PROTECTION EQUIPMENT

The use of suitable protective equipment to prevent physical contact with the product or its mist will reduce the risk of exposure. Each employee or individual should be provided with appropriate safety equipment, and should be trained to use the equipment properly using safe handling practices. **Protective eyewear must be worn.** Suitable protective equipment, such as synthetic rubber or non-nylon plastic apron, gloves, pants, and boots, must be worn to protect skin.

SAFETY EQUIPMENT

pHairway will damage clothing made of nylon, cotton, leather, or natural rubber. A safety shower and eyewash should be available near the transfer site and employees should wear appropriate gloves and eye protection, as well as impervious clothing. Shoes and contaminated clothing should be washed prior to reuse.

FIRE HAZARD

pHairway® is not flammable. However, if the material is heated to a temperature above 230° F it will rapidly break down and evolve CO₂ gas. This reaction may be uncontrollable. Since this condition could develop during a fire, pHairway storage tanks should not be located close to flammable materials such as fuels or fumigants.

Extreme care should be taken when cutting or welding. Lines and tankage should be emptied, so that localized high temperatures cannot start a reaction.

In the event of a fire, every attempt should be made to keep the tank from overheating. Water sprayed on the exposed surface of the tank is best. Unlike sulfuric acid, the heat of reaction when water is added to pHairway is negligible.

SKIN CONTACT

Contact with skin or clothing should be avoided. Contact with cuts or scratches will sting. Prolonged or repeated contact may cause redness, swelling, burns, or skin damage. Sensitive skin and mucous membranes are more easily irritated.

Synthetic rubber or impermeable gloves and boots should be used when handling pHairway to avoid skin contact. Absorbent clothing that can cause prolonged contact should be avoided. pHairway will damage many clothing materials, including cotton, nylon, and leather.

EYE CONTACT

pHairway can cause severe burns to eye tissue. To prevent exposure, splash-shielded goggles and/or a full face shield must be used. Eyewash facilities must be provided as prescribed by regulation and good common sense.

S A F E T Y I N F O R M A T I O N

MIST INHALATION

The spray mist from pHairway® is irritating to the nose and lungs, and should not be breathed. Breathing mist may cause severe irritations and burns of the nose, throat, and respiratory tract. If potential for inhalation exposure exists, a suitable type face mask or a respirator is recommended.

INGESTION

pHairway is toxic if ingested. Ingestion can cause severe burns to sensitive tissue and mucous membranes. Do not use mouth for starting siphon lines or blowing out clogged tubes or nozzles.

H A N D L I N G & E Q U I P M E N T R E C O M M E N D A T I O N S

STORAGE TANKS AND PLUMBING

Tanks and foundations should be designed for material which weighs 13 pounds per gallon. Tanks, pipelines, hoses or pumps that have contained chemicals other than pHairway® should be rinsed thoroughly prior to receiving pHairway.

Polyethylene, polypropylene, and 316 stainless steel, are acceptable materials for construction of storage tanks. PVC pipe may be used for plumbing, but 316 stainless steel is preferred. Safety and identification signs should be located at valves and connections of storage, transport, and field equipment.

EQUIPMENT/FACILITY RINSE

Thorough rinsing is required after using pHairway. Dilute residues are corrosive, so neutralization is an essential part of the clean-up. Recommended clean-up materials include soda ash, baking soda, or NUTRA-SOL™. First rinse equipment with clean water to avoid excessive foaming when neutralizing. Then add neutralizer to the second rinse. Run the pump long enough to clean the lines and nozzles of any pHairway residue. Any remaining neutralization solution should be left until the equipment is used again. Thoroughly rinse the exterior of all equipment that has come in contact with the concentrate or dilute pHairway.

SPILL & LEAK PROCEDURES

See Material Safety Data Sheet or Spill Response Section of this manual.

HANDLING PRECAUTIONS

pHairway should not be mixed with fertilizers containing nitrogen, chlorides, or potash.

H A N D L I N G & E Q U I P M E N T R E C O M M E N D A T I O N S

pHAIRWAY® SHIPPING INFORMATION

PROPER SHIPPING NAME: Corrosive Liquid, N.O.S. (contains monocarbamide dihydrogen sulfate)

HAZARD CLASS: 8

ID#: UN1760

PACKING GROUP: III

PLACARD REQUIREMENT: None

NOTE: Not regulated if transported by motor vehicle or railcar [see 49CFR 173.154(d)]

EQUIPMENT LIST

DEALER STORAGE EQUIPMENT:

	<u>Type & Material</u>	<u>Manufacturers</u>
HOSES	EPDM, Polyethylene, PVC	Gates, Goodyear, Kanaflex, Nalgene, New Age Industries
PIPING AND FITTINGS	CPVC, Kynar, Polyethylene, Polypropylene, PVC	Asahi/America, Banjo, Colonial, Eldon James, LASCO, Spears
	316 Stainless Steel	Various
TANKS	Crosslinked Polyethylene, Heavy Wall	Central California Container, Chem-tainer Industries, Crown Rotational Poly Cal Plastics, Poly Processing, Raven Industries, Snyder Industries, Rotational Molding, Inc.
	316 Stainless Steel	Consult Local Fabricator
VALVES	Polypropylene, PVC	Asahi/American, Banjo, Colonial, Hayward, Plast-O-Matic, Spears
	316 Stainless Steel	Apollo, Worchester, Jamesbury, Crane

INDIVIDUAL MATERIAL OVERVIEW

The following chart refers to materials that come in contact with undiluted pHairway®. In irrigation systems in which the pH of treated water is not lowered below 4.5, most commonly used materials are acceptable.

May Be Used

Ceramic
E.P.D.M.
Kynar
Polyethylene
Polypropylene
P.V.C. and C.P.V.C.
Ryton
316 Stainless Steel
Teflon
Viton

Do Not Use

Aluminum
Brass
Buna-N
Cast Iron
Celcon
Delrin
Epoxy
Fiberglass
Galvanized Steel
Hypalon
Leather
Mild Steel
Natural Rubber
Neoprene
Nylon
Polyester FRP

NOTE: In general, pHairway requires the same equipment for handling as sulfuric acid. Storage, handling, application, and irrigation equipment can be damaged by pHairway if it is not constructed of the proper material. Consult the pHairway reference manual and your Exacto Inc. contact before applying pHairway.

Although the content of this pHairway reference manual and the accompanying recommendations are believed to be consistent with current legal regulations and guidelines relating to the handling and use of pHairway, Exacto Inc. makes no representations or warranties with respect to the accuracy, reliability or completeness of the information. The data is accurate as of the date of publication of this brochure, but Exacto Inc. disclaims any liability for any changes in equipment specifications by the equipment manufacturer.

The user or reader must verify with the equipment manufacturer(s) at the time of purchase whether specific storage and application equipment is compatible with pHairway. The user retains sole responsibility for determining whether procedures and equipment presented are sufficient for its operations.



SPILL RESPONSE AND CLEAN-UP PROCEDURE FOR pHAIRWAY

SPILL RESPONSE PROCEDURE FOR pHAIRWAY®

If the spill or leak occurs on a highway, contact CHEMTREC at 1-800-424-9300.

Provide the following information:

1. Location of the incident.
2. Product name and D.O.T. hazardous material classification.
3. Weather conditions at the scene of the incident.
4. Environment at the scene of the incident (populated, rural, etc.).
5. Availability of water supply.

When a spill or leak occurs at or away from your facility, obtain as much information about the incident as possible.

1. Location of the incident.
2. Who was involved.
3. Who is currently at the scene.
4. Who else has been contacted.
5. Whether any injuries were sustained.
6. Whether the spill was into a body of water or on land.
7. Quantity of material spilled.

When a call is received, provide the clean-up procedure information. If further information is required relevant to the incident, tell the caller you will call them back. Notify medical facilities if required.

S P I L L R E S P O N S E A N D C L E A N - U P P R O C E D U R E F O R p H A I R W A Y

CERCLA REPORTABLE QUANTITY

Spills in which the **unrecoverable** product during a 24-hour period exceeds the value listed below may be reportable to the National Response Center (1-800-424-8802). State and local requirements regarding spill reporting may vary.

No reportable quantity has been established for this material. However, since pHairway® can release sulfuric acid in contact with water, an effective RQ of 2,040 pounds (calculated on the potential to generate a 1,000 pound RQ for sulfuric acid) should be considered in the event of a spill.

CLEAN-UP PROCEDURE FOR pHAIRWAY SPILLS

1. Stay upwind of spill or release. Isolate spill area and keep unauthorized personnel out.
2. Wear appropriate personal protective equipment (rubber boots, rubber gloves, and safety goggles) before entering spill area.
3. Control further spillage or leakage.
4. Dike and prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems, or natural waterways.
5. Recover free-standing product.
6. Dilute unrecoverable product approximately 3 to 1 with water and neutralize with sodium bicarbonate, soda ash (sodium carbonate), or other material suitable for neutralizing acid spills.
7. Spills in which the unrecoverable product exceeds the CERCLA RQ must be reported to the National Response Center (1-800-424-8802).
8. Recovered product that cannot be recycled for commercial use should be analyzed to determine if it meets any hazardous waste criteria (e.g., diluted material may meet the definition of a characteristic corrosive waste) and disposed of in accordance with applicable federal, state, and local regulations. Recovered product not meeting hazardous waste criteria may be applied to agricultural land as fertilizer at normal nitrogen application rates.