pHairway® Water Treatment Amendment

pHairway® Water Treatment Amendment is a turf grass management tool that lowers alkalinity and improves water penetration. By releasing nutrients tied up by high pH soils, pHairway increases fertilizer performance. It also increases the effectiveness of alkaline sensitive pesticides, and improves soil quality.

pHairway® is MCDS (Monocarbamide dihydrogen sulfate). pHairway® is a safe, non-regulated, non-hazardous material, and is the only water treatment amendment that is guaranteed for use in golf course irrigation systems. Its unique chemistry consists of an acid group and a base group held together by an oxygen molecule. The breakdown of pHairway® allows for the release of free oxygen into the water and soil thus reducing the incidence of Black Layer.

The injection of pHairway® into the water source starts a complex series of reactions, first with the contained minerals in the water source and then with the soil, where the treated water is applied. This assumes that the water source and soil to be treated contain some, and often too much, of the wrong kinds of dissolved salts. Cases where the water contains too few salts will be addressed separately.

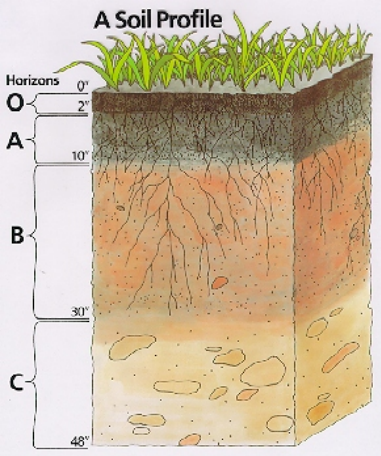
In The Water: As pHairway® is diluted after injection, the contained acidity reacts with the minerals in the water primarily the bicarbonates. It is important to understand that of all the mineral constituents (dissolved salts), bicarbonates are usually the most important, in terms of their potential for damaging the irrigation equipment, soil and plants being watered. This is because bicarbonates react with other contained minerals, especially calcium, to form insoluble salts, specifically limestone ($CaCO_3$). This causes several problems:

1. **It causes a white precipitate to form on irrigation equipment, which can lead to corrosion and plugging.**

2. **This white precipitate leaves a white residue on plants and structures (fences, buildings, etc.)**

3. **Bicarbonates remove soluble calcium from the water, which is needed to maintain open soil pore spaces and good long-term soil structure and water penetration.**

Some of the active ingredients in pHairway® react with the bicarbonates in the water and produce harmless constituents—carbon dioxide and water. This reduces the potential for forming lime deposits. In place of the bicarbonates and lime, the water becomes a diluted solution of calcium sulfate or gypsum, which is a well-known soil amendment.



In The Soil: As the pHairway® treated water reaches the soil, several additional reactions take place. The diluted solution of calcium sulfate (gypsum) will increase the soil aggregation. This happens when soluble calcium reacts with soil particle surfaces, causing them to release unwanted salts such as sodium, while acting as a chemical adhesive to build soil structure. This produces several related benefits:

1. **Sodium is associated with alkalinity or high pH. Alkalinity is undesirable because it causes many of the necessary soil contained nutrient minerals to be unavailable for plant uptake and use.**
2. **Sodium causes soil particles to breakdown. This physical breakdown of the soil structure prevents water penetration and proper aeration. The results are the plant roots do not get enough water or enough oxygen, and the accumulated salts do not get leached down and out of the root zone.**
3. **At the same time, much of the applied water runs off because it cannot penetrate the soil. The addition of pHairway® can solve these problems by providing soluble calcium to reform or maintain the soil structure for good water penetration and aeration, while removing the sodium and the associated alkalinity and excess salts.**

Additional ingredients in pHairway® act as a timed-release source of acidity. The availability of this acidity is dependent upon the rate of biological processes in the soil. The release of the "in place" acidity is important in inhibiting the formation of alkali layers below the soil surface, and maintaining readily available mineral nutrients. Ultimately, all of the contained ingredients in pHairway are utilized as plant nutrients.

For more information on pHairway®, please contact you local pHairway® representative.

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