Controlling soil pH allows plant to maintain consistent growth rate

By Tom Lubin

The need to have control of the pH of the soil is very important to the quality of all plant material. Irrigation water is controlled, less total fertilizer may be required to produce the same growth rate and disease may be minimized.

The methods for pH controlling water were associated with the application of large quantities of sulfur or nitrogen fertilizers in a form that would oxidize, produce hydrogen or nitrogen ions in the process. The hydrogen ions produced in these processes can lower the pH of the soils, but it is impossible to precisely control the quantity of these materials to maintain the desired pH.

Even if proper quantities of these materials were added, a change in the weather may cause the oxidation process to speed up or become too slow for proper pH control. If the pH were adjusted to the desired value, irrigation with the high pH water could raise the pH again.

Two more reliable methods of soil pH controls actually alter the soil pH by changing the pH of the irrigation water. Either type of system, the pressurized irrigation line to provide pH control or the injection system to inject an acidic solution directly into the pressurized irrigation line to provide pH control, water the plant with the desired pH and maintain the desired pH.

In conclusion, many water pH control systems have been installed and used safely. Most of these systems have been installed in the southwestern U.S. and other arid and semi-arid areas around the world, but interestingly the first sulfuric acid system was installed on a golf course in Ohio.

These sulfuric acid systems require that the acidification process be accomplished before the water enters the pump station. The acid is metered into the pressurized irrigation line that will stop the metering if the pH becomes lower than the desired value. The pH of the water may be easily maintained at the desired pH+/-0.1 units, but it should be noted that sulfuric acid must never be used as a byproduct in a closed line. Heat is generated when the acid is diluted with water.

The sulfuric acid pH control system treats high pH irrigation water without nitrogen being added. This may be important if reclaimed water with high nitrogen concentration is used for irrigation. A person may apply fertilizers for their nutrient value alone.

In conclusion, many water pH control systems have been installed in areas where the water has a pH as high as 11.0 and EDI for well above 3.0. This water may be made usable for irrigation when the pH is properly controlled.

The result of proper use of either urea-sulfuric acid or sulfuric acid pH control systems can allow the pH of the soil to be maintained at or near the range of 6.5 to 7.2. When the soil is maintained in this range, the plant expends less energy to control its own active transport system.

Who needs third-party pump certification? You do

By David Thrailkill

Since 1971, OSHA has required that pump systems be third-party certified. The pump station as a complete unit must meet all applicable national standards, and must be suitable for its intended purpose. In a typical pump station destined for an irrigation application, certification includes confirmation that a tank is fabricated to ASME standards; a welded steel header and components are manufactured to ANSI standards; AND water pumps are manufactured to Hydraulic Institute standards. OSHA 1929 CFR1910.303/309 contains the federal standards and definitions relating to pump station certification. System specifiers must require pump stations be built of a nationally recognized testing laboratory (NRTL).

It wasn’t until 1988 that OSHA established a program (OSHA 1929 CFR1910.7) to accredit a network of independent NRTL’s that were truly independent of standards setting authorities, manufacturers, fabricators, or designers operating under those standards.

An NRTL performs standards conformity assessments and implements their disciplinary phases of compliance engineering. They assure that a system meets all relevant standards for a given application. Certification encompasses three levels, from levels for component requirements (level 1, i.e. wires, fuses, etc.), to product listing (level 2, electric motors containing basic components) to full system certification (level 3, complete unit composed of level 1 and level 2 components).

There are approximately 10 NRTLs operating in the United States. At least as many laboratories are applying for NRTL accreditation, which OSHA accredits and recognizes for a 5-year period. Among the largest, UL and FM operated initially as both standards-setting authorities and testing laboratories, contrary to the initial OSHA mandate. Their NRTL re-accreditation status remains under review because they were not independent as specified in OSHA’s certification requirements. ETL Testing Laboratories, the largest testing service in the world, has been accredited since OSHA first established ETL certification in 1988. The signing of SyncoFlo in 1992, ETL became the first to provided full inspection, testing and evaluating services to pump system vendors in the irrigation industry.*

The cost of third-party certification for a manufactured system is very little if all components used in a system are already up to standards of good engineering practices, are suitable for the intended purpose, and meet all OSHA and EPA standards for safety. This is especially true if the manufacturer chooses a certified, reliable, injectable, acidic, water treatment additive specifically designed for the irrigation application, certified to meet all applicable national, federal and industry standards and definitions. Their NRTL re-accreditation status remains under review because they were not independent as specified in OSHA’s certification requirements.

However, owners are able to shift much of the responsibility and liability if they can show that designers, installers, and manufacturers can be made easily available and economically viable alternatives, installers, or manufacturers had easily available and economically viable alternatives to third-party certification.

The bottom line benefit of systems certification is the raising of overall pump station safety and quality standards with negligible pass-along cost to the end user.