



Flowering Plants Ltd

'Irrigation Systems and Solutions'



Acid Dosage for "Hard" Water

Most nurseries consider acid dosage because they want their irrigation systems to work without the inaccuracies and foliage marking caused by limescale. Many are also aware that acid dosage can bring substantial improvements in crop quality, lower costs and better prices. We started our work on acid dosage in 1969/70. We built on work, which had been done in Poland before the war, and a little bit on recommendations from the old Volmatic company.

Why Proportional Dosage?

Our approach to "hard" water uses selected equipment, designed to tackle 5 problems on an appropriate scale – carbonates, bicarbonates, sulphates, chlorides, and related conductivity problems.

Proportional dosage is simple and inexpensive, subject to just 4 routine checks.

- a. Is the dosage pump working?
- b. Is there acid in the carboy?
- c. Does the treated water remain clear for 24 hours? i.e. Is it stable?
- d. Is the pH of the treated water high enough? i.e. Has it been over-dosed?

The safety margin over normal dosage should be pre-determined. The chemistry of some water supplies varies significantly from time to time. In these cases we can do tests to check that proportional dosage is suitable, and define the safety equipment needed. We supply test kits. Ask for our pamphlet 03.05.00.

Proportional dosage can be injected either into a break tank or "in-line". Typical preliminary reaction time is 3 seconds. Longer reaction times give substantial benefits.

Safety, Reliability, Economy, Consistency and Low Costs

Our systems are designed to work with 59/60% nitric acid. They draw this directly from the stock tank. Growers do not need to dilute strong acids on site. We know of no other manufacturer of horticultural systems who engineers for this. We rarely use glass probes, as these can drift or break.

59/60% nitric acid is the standard commercial grade and therefore usually cheapest per unit of active ingredient.

The amount of nitrogen added by proportional dosage is constant. There is thus less chance of soft growth, inhibited flowering, variable foliage characteristics and winter-kill than with pH-based systems.

Proportional dosage has provided better buffering of nutrients, and therefore made it possible to use ammonium to manipulate sugar/acid balance within plants and fruit.

Although large water meters (over 2500 gph) and their equipment are quite expensive, most users find that proportional dosage systems costs from £ 500 – £ 1600 less than pH-controlling systems. Spare parts cost about £8 per annum.

“Hard Water” & Calcifuge Crops

Growers of crops such as Camellias, Blue Hydrangeas, Azaleas and Droseras need to have a range of trace elements available to their crops. “Hard water” locks these up. Dosage with nitric acid usually converts this “hardness” to a form which cannot lock up trace elements.

For these crops, proportional dosage is usually appropriate. The advantages set out above apply here too. Those with some knowledge of chemistry should consider the relative importance of unsaturated bicarbonate hardness, pH, total dissolved solids and contact time in the context of a strong acid such as HNO₃. For those who are interested, we can provide a suite of chemical equations. A test or demonstration can be provided on site where appropriate.

If hardness increases and other dissolved salts become problematic, we use other acids and also other methods.

Unstable Water Supplies: Blended Water Supplies Drawn from Uncovered Reservoirs: Mine Water Contamination

In these circumstances it may be necessary to resort to direct measurement of pH. However, final pH (and thus N level) is partly a function of contact time. In our experience this precludes the use of recirculating tank dosage systems. Other safety checks are often required, particularly where mine water is a problem. Careful consideration of all factors on site is essential. We have years of experience of the necessary work.

“Hard Water” with High Sodium Levels

It is frequently possible to deal with both these at the same time, so that the sodium is either permanently locked up, or safely leached. This is relevant in Guernsey, Malta, the Canary Islands and areas of East Anglia and Yorkshire. Laboratory tests are essential.

“Hard Water” with Calcium Sulphate

It has proved possible either to precipitate the sulphate, or to render it soluble, and then to deal with the hardness. Again, laboratory tests are essential.

Health & Safety

Wrongly used or installed, acids and the equipment for handling them can injure staff, damage crops and equipment, and wipe out your working capital. If you decide to install dosage equipment, please do it properly. Set up appropriate operating routines and check that they work. If in doubt, do not hesitate to ask for guidance.

Legal Requirements

We supply our customers with full documentation about the safe operation of our systems. Ensure that staff have copies of these and read them, and sign for them.

QUALITY HARDWARE

The Pumps

All our pumps and associated equipment are built to work with 59/60% commercial grade nitric acid. The use of weaker materials compels the customer either to buy weaker acid, which is more expensive per unit of “bite,” or to decant strong acid on site.

The Meters

Our water meters are capable of running for short periods at 100% over rated speed, and can thus be built on to existing systems using slow-closing solenoid valves. If operated at 2% of rated flow they under-dose by 5%.

In-Line pH Systems

Because a broken probe could wipe out a crop, and thus your working capital, we use robust industrial probes and supporting equipment, rated at 8 Bar or 120 psi. They are widely used in industry, and have lasted – so far – for many years.

The monitor/controllers for these systems are microprocessor-based, and offer a host of features. The probes are designed for automatic monitoring by the controllers, and withstand the shock loads imposed by most solenoid valves. Nowadays, such systems have become remarkably affordable.

SUPPORTING SERVICES

Practical Chemistry

We work with experienced consulting chemists. However, users of mains water supplies in the U.K. can obtain much useful information free of charge from water suppliers. Although the type of treatment or the level of dosage can often be predicted, tests on site are essential. Our experience can make this simple.

Planning for a crowded world.

If you think that your water supplies pose special problems, please ask for our pamphlets 03.02.04. “Strategies for difficult waters” and 11.02.01. “Water recycling systems.” If you need to collect surface water, ask about “Water Balance equations.”

Buffering Nutrients.

We have experience of work on achieving this without carbonates in various countries.

Trouble-shooting.

We can usually show customers how to prevent fouling of their irrigation systems, and how to clean them if routines are overlooked. We have also acquired experience of dealing with “chemical excursions,” frequently where entire crops would otherwise have been lost.

For detailed guidance please fill in the questionnaire attached. We should then be able to submit budgets for appropriate options.

WATER QUALITY ENQUIRY

Name	
Company	
Address 1	
2	
3	
Postcode	
Contact Phone	
Fax	
Email	

Water Sources:

1. A well, feet / meters deep. YES/NO
If YES, can you please give the Ordnance Survey Map reference?
2. Public supply. YES/NO
If YES, has your water supplier given you their
"Typical Analysis" for this supply? YES/NO
If not, please give your account number and their contact 'phone number.
3. Roofs River Hard surfaces Field drains,
(Give areas in square metres if possible.)
If YES, can you please give the Ordnance Survey Map reference?

Water Storage:

What:- Lined tank or tanks; Reservoir - lined; Reservoir – unlined; Other.
Capacity, M³

Irrigation System:

Maximum pump output, approximately, (Or make and model number.)
Minimum flow actually used.
Present equipment for fertilizer injection

The present problem:

(Please delete those not applicable)

Hard water / acid water / iron in water / sulphates / gross organic matter / slime in systems / high conductivities / algal blooms / very fine sand.
(Please see FPL pamphlet 03.02.04. for further possibilities.)

Water samples enclosed? Please give details below. Please ensure that sample bottles are completely filled. Entrained air can unbalance some analytical results.



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