



INJECTION OF ACID

Growers are frequently advised by consultants to inject acid, in order to overcome an alkaline condition causing a pH problem in their soil, or irrigation water. Practically the only acid that can be injected without trouble through the standard MeaSUREMENTmix injector systems (Options "O", "I", "C", "W", and "F") is Phosphoric Acid. The other common acids known to us cause excessive corrosion, in standard injector system parts. Sulfuric Acid has been used through standard injector systems, and in some concentrations has caused little corrosion. In other concentrations, it causes extreme corrosion. Hydrochloric and Nitric Acids can be extremely corrosive in any concentration.

This is why Phosphoric Acid is recommended. However, *it must be injected separately*. Do not mix this acid with other nutrient chemicals prior to injection, because highly corrosive Hydrochloric, and/or Nitric Acids can be formed by reaction. For example:

PHOSPHORIC ACID + AMMONIUM NITRATE yields NITRIC ACID
PHOSPHORIC ACID + POTASSIUM CHLORIDE yields HYDROCHLORIC ACID

If it is necessary to inject nutrient chemicals at the same time that Phosphoric Acid is injected, use a two-injector option MeaSUREMENTmix and two chemical containers. Mix acid in one container, and mix nutrients in the other container. Put the dip tube (injector suction line) from one injector into the acid mix; put the dip tube from the other injector into the nutrient mix. In this way, the acid cannot come into contact with the nutrients until the chemicals are injected into the main water stream at the discharge side of the MeaSUREMENTmix. As explained in bulletin "AM-7", at this point the chemicals are greatly diluted by the main water stream, and no problem reaction is caused.

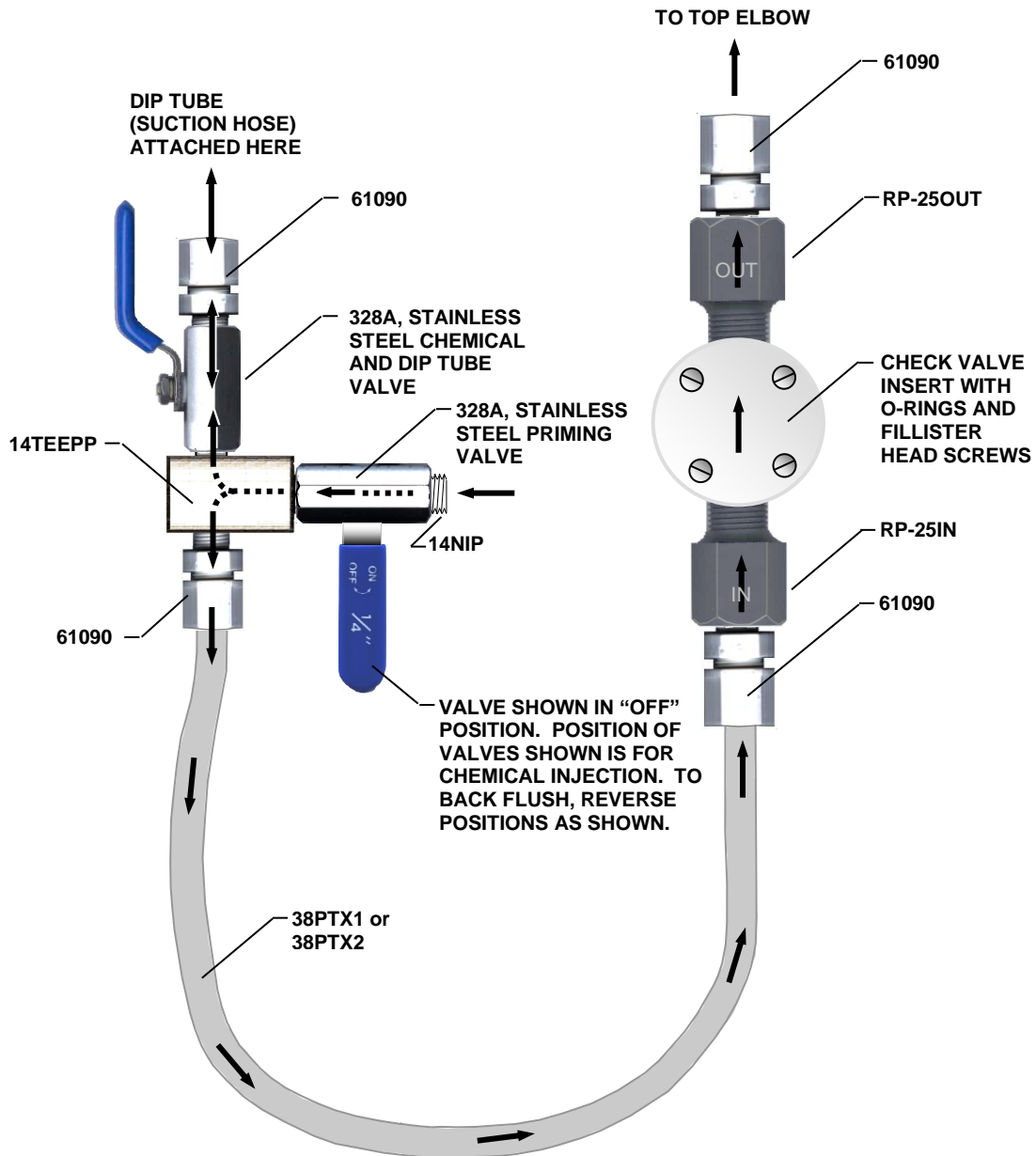
Phosphoric Acid has two advantages: (a) Phosphoric Acid will never corrode standard injector system parts, regardless of its concentration, and (b) Phosphoric Acid contains the element, Phosphorus, which is important to proper plant nutrition. Unfortunately, some soils already have sufficient Phosphorus-containing compounds; in these cases, the use of Phosphoric Acid could increase the Phosphorus concentration in the soil, which would be detrimental to certain plants.

For example, if an analysis were to indicate a problematic, excessively high pH condition with sufficient Phosphates already present in the soil, Phosphoric Acid most probably could not be utilized to remedy the situation. In this instance, since it is not recommendable to use highly corrosive acids, such as Nitric or Hydrochloric, the alternative would be *Sulfuric Acid*.

Option "P" was specifically designed for Sulfuric Acid in any concentration. Over a period of years, Smith Precision Products Company, Inc., worked on designing a specific option of injector system parts which would be chemically compatible with this particular acid. In 1968 the original designs were perfected and integrated into the MeaSUREMENTmix product line as Option "P" (see illustration on back page). The present configuration utilizes the following externally recognizable parts: one small stainless steel chemical and dip tube shut-off valve*, one small stainless steel priming shut-off valve*, and a series of special acid-resistant polymer fittings which include PVC single-ball check valves, plastic compression fittings, 3/8" opaque-white acid-resistant tubing, and a plastic tee. Option "P" o-rings are of a specifically compounded ("Viton®") fluorocarbon elastomer.

*NOTE: As with all the SMITH injector system options, the only purpose of these small hand valves is to "shut-off", or "open", the flow of water, or injected liquids, into the injection system. *They do not control the rate of injection.* They are either left open, or closed during use. Additional information can be found in Manual "CM-2".

EXTERNAL INJECTION SYSTEM CONFIGURATION FOR OPTION "P"



SMITH PRECISION PRODUCTS COMPANY

P.O. Box 276, Newbury Park, CA 91319 USA
 1299 Lawrence Drive, Newbury Park, CA 91320 USA
 Tel.: 805/498-6616 FAX: 805/499-2867

e-mail: info@smithpumps.com web: www.smithpumps.com