

Metering/Dosing pump accessories and installation guidelines

Pump Installation Guidelines

These guidelines are intended for those planning metering pump installations. They do not replace the instruction manual which should be read and understood before installation and commissioning.

Location

Site pump with protection from elements, preferably in a building. It should be on a level plinth or floor close to the supply tank with an adequate space for maintenance, especially dismantling of the pump head.

A containment bund should be provided with a capacity at least 110% of the volume of the tank.

In extreme climatic conditions a hood or cover should be considered for the pump and associated pipework and fittings.

Mounting the pump above the containment flood level will minimize damage in the event of a chemical leak.

Pipework General

Suction and discharge pipework should be short and direct. Avoid use of short elbow fittings, unnecessary bends and loops. Pipework must not impose strain on pump connections. Always flush pipework to remove dirt etc. before initial start-up. All pipework must be of adequate size, long runs may require larger bores.

Suction

For accurate results, variations in suction conditions should be kept to a minimum. Where possible use solution vessels having a larger diameter and minimum change in contents level. Termination should always be 100-200mm (4-8") from the bottom to prevent sediment being drawn into the pump.

Filters should be sized to have an area of at least five times that of the cross section of the pipe they are protecting.

Diaphragm valves should be avoided. Flooded suction is preferable to suction lift, but up to 1 meter (3' 3") of lift is acceptable for free flowing liquids on pumps of adequate capacity. Where conditions demand, use suction demand valve or pulse dampener (see overleaf).

Discharge

Ensure that the difference between delivery and suction pressure is not less than 0.7 bar (10 psi). If normal conditions would not produce this, use a back pressure valve (see sketch overleaf). Discharge lines must never be closed during operation.

Where a blockage in the pipework is a possibility (e.g. a closed valve), a relief valve should be installed with the relief pipework connected back to the Chemical Supply Tank. Motor overload cut-outs on larger pumps can give additional protection whilst a flow switch will allow remote indication/alarm on pump failure. Pulsation Dampeners or accumulators, fitted close to the pump discharge, will smooth line pulsations.

Slurry Handling

Size pipework to give a velocity between 0.2 and 2.0m/s (0.65 and 6.5ft/s). Avoid sharp bends and restrictions. Use of transparent flexible pipe will help in getting a smooth run and also assist in removing blockages should they occur. A flushing water line should be installed just downstream of the valve adjacent to the solution container so that on shutdown slurry particles can be washed out. Automatic flushing should be considered for unmanned or automatic sites.

Volatile Liquids

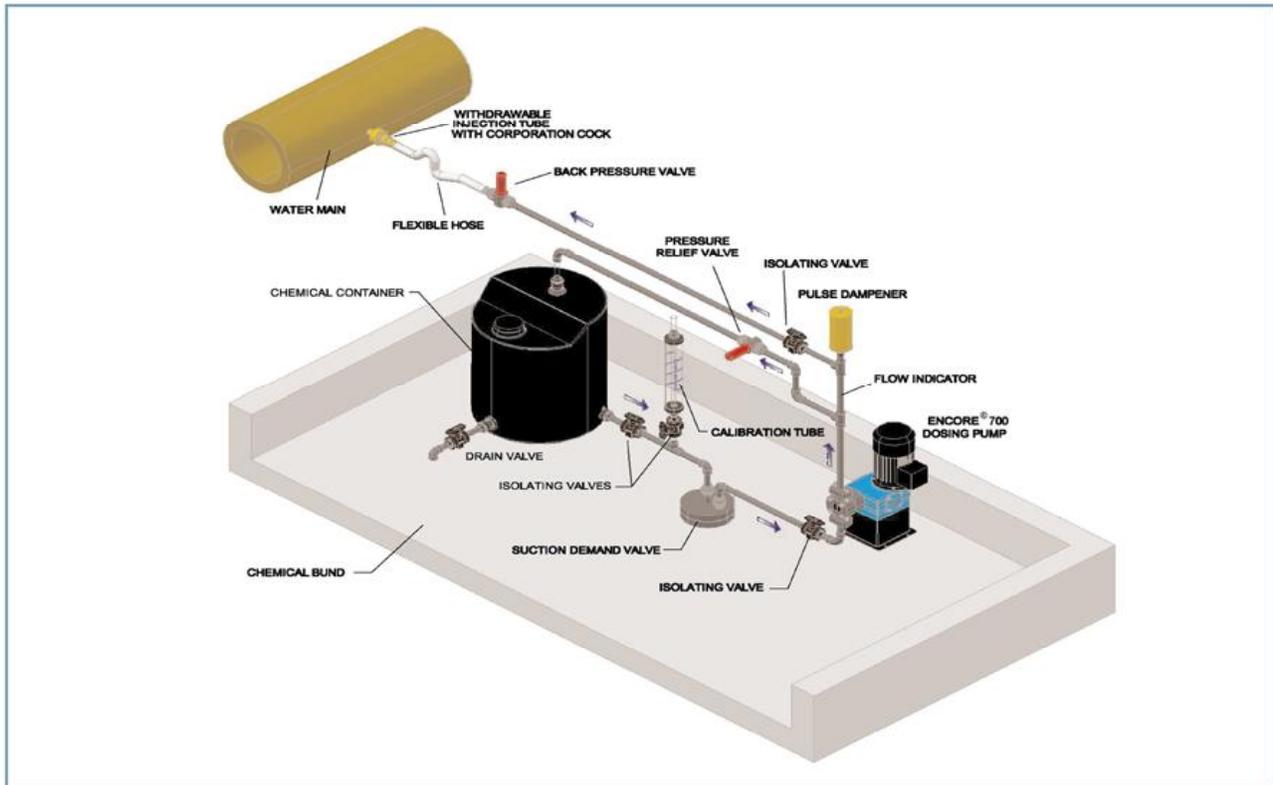
Extra care must be taken to provide sufficient net positive suction head (NPSH) to prevent vaporisation. As a general guide, provide 3m (9' 9") head above vapour pressure.

Temperature

The effect of temperature on construction materials and liquids should be assessed during system planning. Where ambient or process liquid temperatures below 5°C (41°F) or above 50°C (122°F) are expected, UGSI Chemical Feed, Inc. should be consulted.

Sodium Hypochlorite

Special consideration should be given to sodium hypochlorite metering installations; please contact UGSI Chemical Feed, Inc. for further information.



Pump Accessories

Pump accessories are required for two main reasons:-

1. To alleviate problems which might occur when site conditions prevent an ideal installation.
2. Where additional facilities are required over and above a basic dosing pump installation.

In this product sheet we set out the benefits of each accessory and indicate under what conditions they should be employed.

An effective dosing pump system is reliant on correct selection of appropriate accessories.

Suction Demand Valve (SDV)

Benefits:

1. Minimizes effect of variation in liquid level in the storage tank to produce better accuracy and repeatability.
2. Prevents contents of storage tank passing the SDV when pump is not running thus removing a potential leak hazard.
3. Simplifies installation - eliminates need for a breaktank.

Use When:

1. There is a difference between the maximum and minimum liquid levels in the storage tank of more than 1.5m (4' 9") for standard pumping systems and more than 3m (9' 9") where the dosing pump forms part of a closed loop control system.
2. Hazardous liquid is involved.

Materials of Construction:

RPVC, PTFE, Viton® & glass or tungsten.

Note:

1. When an SDV is employed, a back pressure/antisiphon valve is not required provided there is about 1m (3' 3") head of pressure on the discharge side of the pump.
2. Recommended maximum storage tank head on the SDV is 15m (50').
3. When calibration chamber is installed, SDV must be on the upstream side.
4. Output reduced by an average of 12% when SDV is used.

Calibration Chamber

Benefits:

Provides means of precise site calibration and checking of pump output.

Use when:

Greater accuracy and long term repeatability are essential.

Note:

Allow minimum of 11/2 minutes for operation e.g. 30 liter (8 US gal) chamber for flows up to 120l/h (32 US gal/h).

Associated valves are provided.

Pulsation Dampener

Benefits:

Smooths out the pulsating output of reciprocating pumps.

Use When:

1. A smoother flow pattern is essential at the injection point.
2. It would enhance the operation of an inline device in the discharge pipework (e.g. flowmeter or relief valve).
3. Pipe runs are abnormally long or hydraulic shock is likely.

Materials of Construction:

RPVC and various (according to manufacture).

Note:

Pulsation dampeners cover a variety of types (known by various names e.g. air vessel, accumulator, alleviator), from the simple reservoir chamber with a small volume of air to absorb the discharge stroke energy to a rather more complex cylinder with a gas liquid separation system. Under certain conditions a pulsation dampener should be installed on the suction side of the pump. Consult UGSI Chemical Feed, Inc. for recommendation on most suitable pulsation dampener for any application. Any pulsation dampener should be located within 1 meter (3' 3") of pump.

Pressure Relief Valve (PRV)

Benefits:

Relieves excess pressure in the pump discharge line, thus protecting the pumphead and pipework and reducing the chances of leakage.

Use when:

1. Possibility of discharge pipework blockage.
2. Handling hazardous liquid.

Back Pressure Valve (BPV)

Benefits:

Produces a positive head on discharge of pump to assist accurate metering.

Use When:

Pressure differential between suction and discharge side of pump is less than 0.7 bar (10 psi).

Sizes available:

To suit pump range.

Materials of Construction:

RPVC or 316 stainless steel, Viton® or PTFE filmed diaphragm.

Note:

1. Back pressure valve not normally required if suction demand valve is employed.
2. For slurry applications a special air operated pinch valve is employed.

Injection Fittings

To provide the means of connecting the pump discharge pipe/hose into the flow stream in an enclosed main and promote chemical mixing.

Withdrawable and non-withdrawable types are available. The advantage of the withdrawable type is that it can be disconnected from a main under pressure without allowing the contents of the main to discharge.

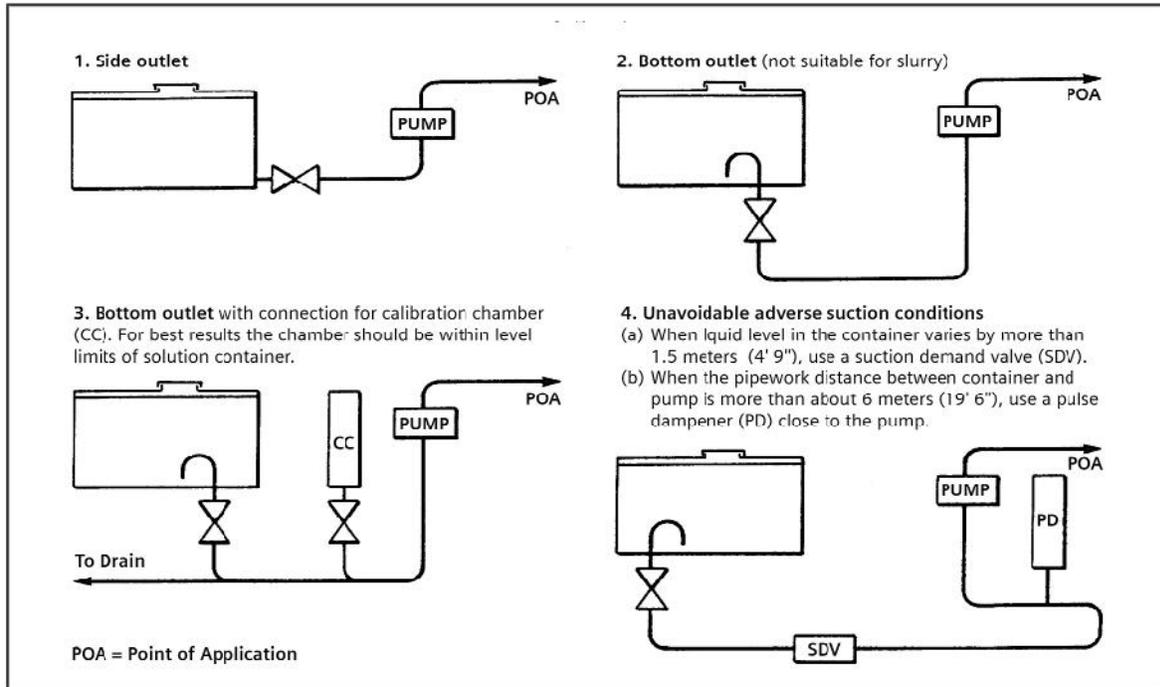
Hose

A variety of flexible hoses are available to suit most applications. When ordering please specify the length required. Rigid pipework is normally supplied and installed by the client.

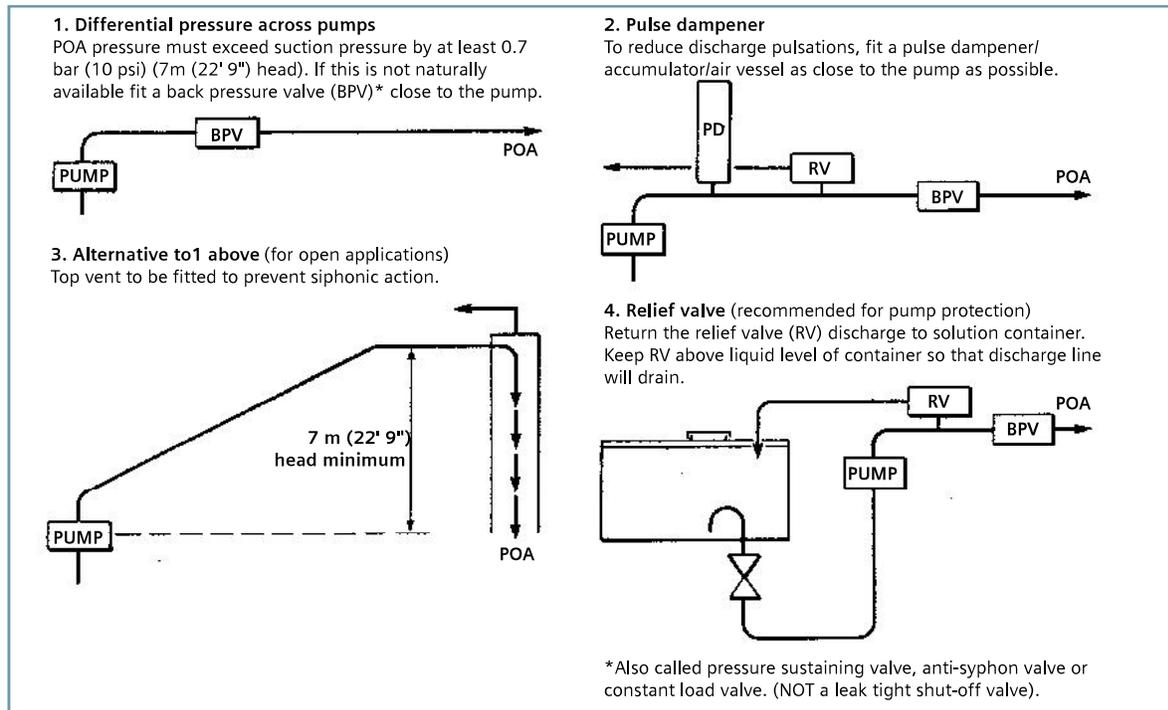
Miscellaneous

1. Foot valves and strainer for use with pumps mounted above the tank.
2. Sight glasses to give visual indication of pump operation.
3. Packaged pump units: mounted on polyethylene tanks of capacities 100, 200 and 500 liters (26, 53 and 132 US gal).
4. Duty/standby change-over panel to effect automatic changeover from duty to standby pump on a signal from external source e.g. timer, controller etc.
5. Chemical dilution systems, both straightforward fixed ratio systems and highly accurate arrangements for specialist application.
6. Prefabricated plastic containments.
7. Complete chemical metering packages, both open frame and fully enclosed.

Typical Suction Pipework



Typical Delivery Pipework



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Literature No. CF.400.000.100.PS.0714

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