



Transport, Storage and Metering Solutions

FERROFLOC
ferrous chloride solution
KRONOFLOC
ferrous chloride solution
FERRIFLOC
ferric chloride sulfate solution

Precipitants and flocculants based on iron salts are available both in solid form and as solutions. Regardless of the form in which a product is supplied, it is always added in solution.

Liquid precipitants are supplied ready for use, thus eliminating the need for preparation processes, so that they can be used easily and reliably.

1. Transport

1.1 Delivery

The solutions are delivered in rubber-lined road tankers, rail tanks and large containers. The delivery batches weigh between 24 and 27 t, corresponding to approx. 16 to 20 m³. Purchases of less than 15 t should be avoided as the proportion of transport costs otherwise becomes too high.

Small batches and packaged material are available from chemical dealers.

1.2 Unloading

The tanks are unloaded by gravity or by the pressure of the vehicle's compressed air. Unloading takes approx. 25 minutes with a maximum unloading pressure of 2 bar. Owing to their acid nature, the precipitant solutions are classified as hazardous substances. The relevant regulations must be observed in connection with transport, handling and storage (refer to the Safety Data Sheets of the products).

For unloading operations, this means:

- Protective clothing must be worn, including safety goggles
- The unloading area must be impermeable to liquids
- If necessary, road tankers with an operator presence button with emergency off function ("ANA" function, dead man's switch) should be used.

The safety of the unloading process is compromised if the filling nozzle of the storage tank is more than 10 meters from the road tanker.

2. Storage

Since all precipitants are substances that are slightly hazardous to water, the respective national regulations must be taken into account with regard to storage and handling.

Metal components are not permissible.

2.1 Storage tanks

In accordance with the information on the size of the delivery batches, as given in Section 1.1, the tank should have an operating volume of no less than 20 m³ (better 25 m³). If large quantities are required, the tank volume should be sufficient to hold enough for about six days, so as to ensure reliable coverage of public holidays and/or bans on lorry traffic.

The tanks can be of horizontal or vertical design and may be installed in the open or indoors. The diagram of the storage facility on page 2 shows a flat-bottom tank (Fig. 1).

The following materials are suitable:

PE-HD for flat-bottom tanks

GF-UP with chemical protection layer or PVC liner

Rubber-lined steel

The containers must have an approval for the filled medium. In some countries there is the possibility of approval based on a media list so that the container is approved for different media.

Alternatively, the liquid precipitants can be stored in buried tanks (e. g. soaking tanks), provided that the leakproof lining also has a test mark and no metallic materials are used. We recommend annual rinsing of the storage tank.

We recommend having the storage container inspected at the prescribed interval, but performing a visual inspection at significantly shorter intervals (at least once a year).

2.2 Leak protection

Protecting a storage tank against uncontrolled leakage is mandatory and can be achieved by taking various measures:

- Integrated catch basin with mark of technical approval (see Figure 1)
- Coated catch basin constructed by the customer (coating with mark of technical approval)
- Double-walled tank with leak detection system. A leak detection system is expedient in all cases and must be installed.

2.3 Equipment

The following equipment is required for filling and operating the storage tank:

- Overfilling safety device with visual/audible indication (subject to compulsory test marking)
- Level indicator with opto-mechanical function and, possibly, limit contact-switch
- Filling line, preferably DN 80, with angled filling nozzle (45°) with drain connection. Perforated flange connection; to be installed at knee height
- Vent line and/or aeration line, preferably DN 125
- Discharge line (suction line) with strainer and foot valve.

2.4 Filling area

The surface of the ground between tank connection and tank truck connection must be designed so that any escaping precipitant can be collected.

The design usually consists of an impermeable, acid-resistant concrete surface sloping down to a sewer inlet shaft with cutoff valve. The inlet shaft must be of corrosion-resistant design and closed only during unloading.

Opinions vary as to the size of the filling area. We recommend consulting the regulations of local approval authorities.

The retention volume is determined on the basis of national regulations

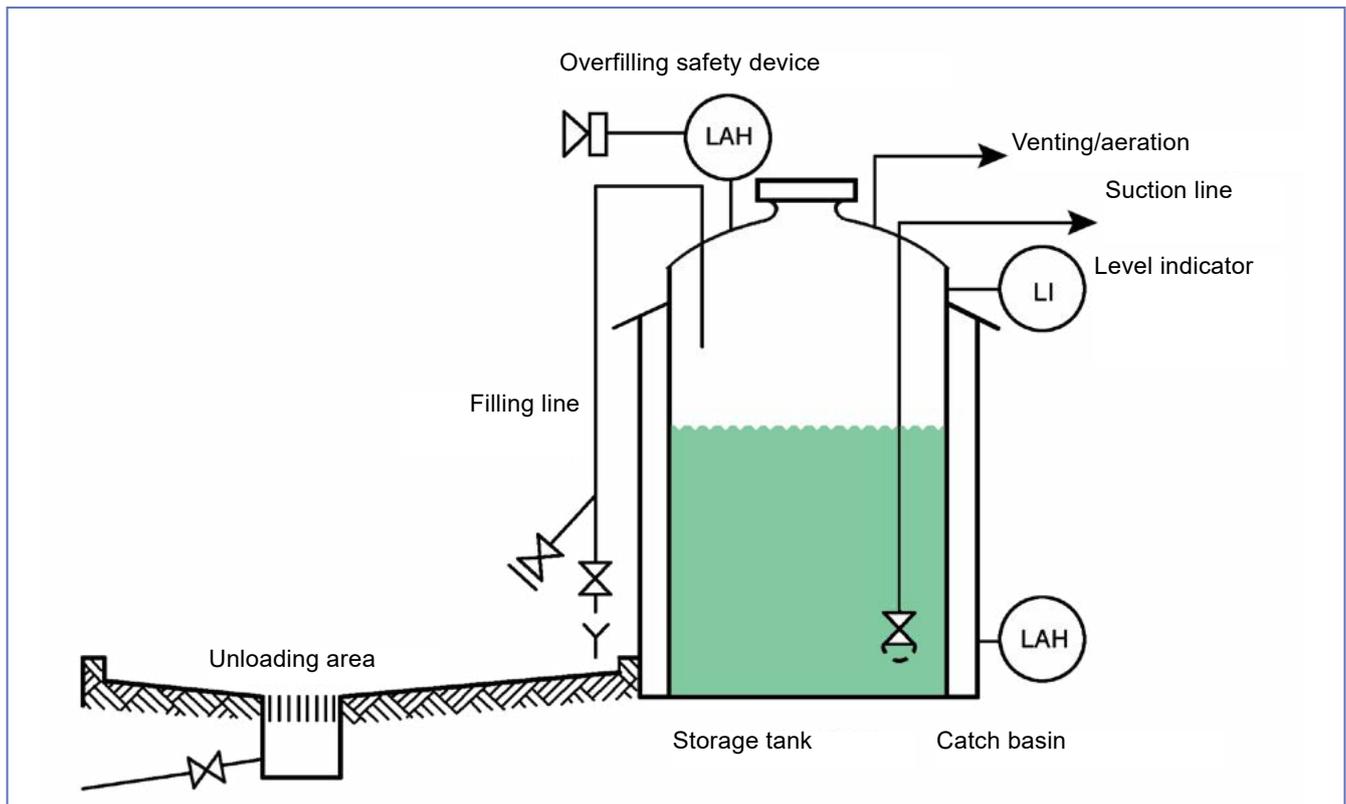


Fig. 1: Storage installation for solutions

3. Metering

Metering diaphragm pumps are best used for withdrawing the solution from the storage tank, metering it and transporting it to the dosing point.

The metering installation (Fig. 2) consists of the following individual components, the material used generally being PVC:

- Suction line from the storage tank.
- Suction-side fittings, comprising: valves, priming aid and dirt trap.
- Diaphragm or piston diaphragm metering pump with plastic head and PTFE-coated diaphragm.
- Pressure-side fittings, comprising: shut-off valve, pressure-maintaining valve, overflow valve, pulsation damper, possibly flowmeter, measurement point and pressure gauge.
- Catch basin with leak sensor below the metering installation.
- Metering line made of fibre-reinforced pressure hoses, installed in protective piping with inspection chambers.
- Possibly a receiver pump with piping and fittings.

The dosing point should be located in such a way that it is accessible and easily visible. Good mixing conditions (turbulence) should also be ensured.

The suction capacity of diaphragm pumps is limited, and their metering capacity varies, depending on the suction level. Furthermore, in the case of low flow velocities and tall storage tanks, the column of liquid may be interrupted by the accumulation of air. A constant metering flow can be achieved by additionally installing a receiver above the pump. This can also be done by feeding the metering pump from the pressure line of a feed pump (Fig. 2, left-hand pump).

For reasons of operational reliability, the metering pump and pressure-side fittings should be of redundant design. The metering method using recirculation and metering valves is suitable for large quantities and for feeding several dosing points at once. The respective quantities to be metered are taken by opening and closing metering valves controlled via an inductive flowmeter.

4. Control

The metering capacity of diaphragm pumps can be controlled manually via the stroke length. If a frequency converter is connected upstream of the three-phase pump motor, all demands on open or closed-loop control of metering can be fulfilled by varying the speed and/or stroke frequency. The frequency converter can convert either signals from programmable logic controllers (PLCs) or continuous measured-value inputs from online measuring instruments.

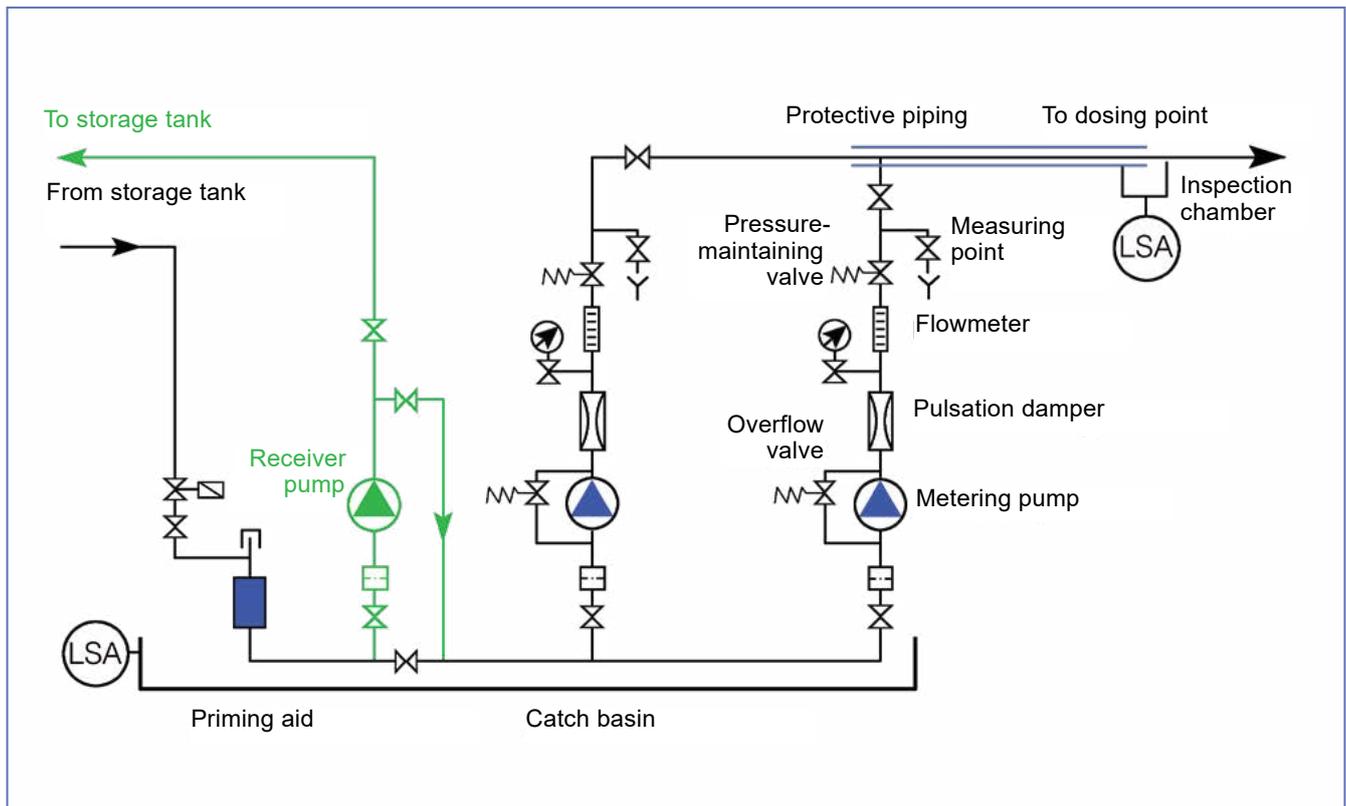


Fig. 2: Metering installation for solutions



Fig. 3: Storage tank and metering facility

The information in this publication is intended to serve as a guide, but is not necessarily complete and is given without warranty. Caution must be exercised to comply with statutory obligations and to avoid infringing rights of third parties.. Before using any of our products, please consult our Safety Data Sheets.

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DS2231EN/621EN