



Transport, Storage and Metering Granules

FERROGRANUL 20 Free-flowing ferrous sulfate FERROGRANUL 30 Ferrous sulfate monohydrate

The handling of granulated precipitants and flocculants is the same as for conventional bulk materials. Transport, storage and metering are largely accomplished using standard systems for free-flowing solid materials. Only the dissolution technique is a product-specific process.

1. Transport

The material is supplied either in packaged form or in silo trucks. The batch size is approx. 25 t, resulting in volumes of approx. 15 to 31 m³, depending on bulk density. Purchases of less than 15 t should be avoided as the proportion of transport costs otherwise becomes too high.

Unloading is achieved by tipping the truck and blowing the material out with the aid of the vehicle's compressed air. It must be ensured that the conveying air is not too hot and that it is free from condensation water.

2. Storage

The material is stored in silos with an operating volume of at least 30 m³. As precipitant granules are non-corrosive when dry, the material primarily used is unprotected steel. The following equipment turns the silo into a complete storage installation (Fig. 1):

- Filling line, DN 80, with 2" connection
- Dust trap, preferably designed as a filter unit which can be cleaned by vibration and is installed on the silo top
- Sun screen, preferably in the form of a light-coloured jacket with free air circulation (only necessary for FERROGRANUL 20 as the product tends to form lumps at temperatures of approx. 40 °C or more)
- Discharge aid (bridge breaker) in the form of a rapper or intermittent vibrator (particularly recommended for the very fine granules of FERROGRANUL 20 to guarantee a steady flow. A steep silo discharge cone with an angle of at least 60° should be selected for the same reason).
- Level indicator
- Cutoff valve

3. Metering

3.1 Withdrawal from the silo

The granules are withdrawn from the storage silo by means of single or double metering screws. With granules, the necessary metering rate is defined volumetrically, i.e. at the point of dry material addition at the outlet of the silo. The delivered quantity (= metering volume) can be varied via the screw speed. This can be done either manually or automatically via programmable logic controllers (PLCs) and the measured-value inputs of continuous measuring instruments.

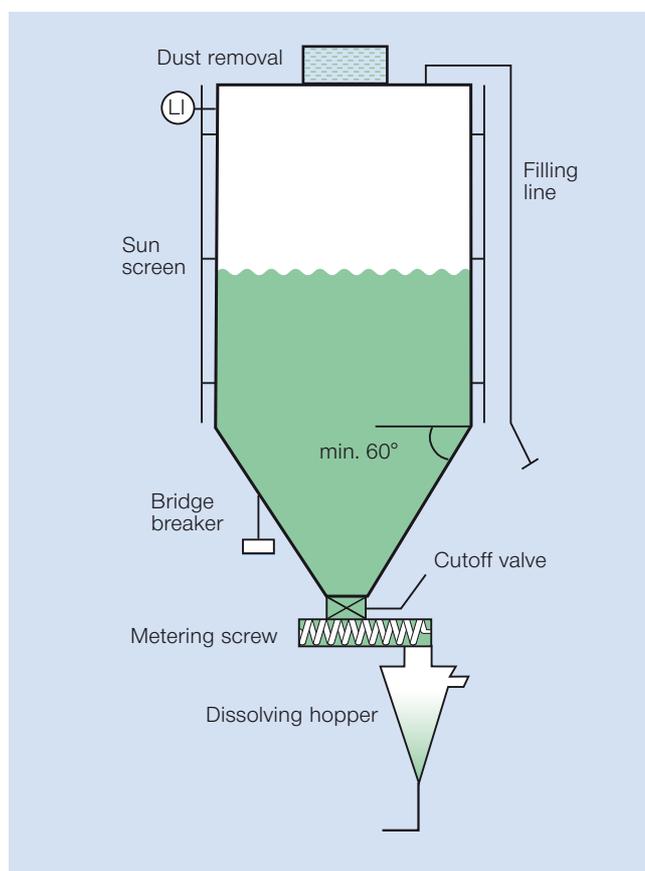


Figure 1: Diagram of a silo installation for granules

The quantity of granules discharged per screw turn must be determined by weighing. A controllable star valve can be used instead of the metering screw to promote discharge.

3.2 Dissolution

The granules must be dissolved for waste water treatment, preferably in a continuous process. This is usually done in a dissolving hopper operating on the countercurrent principle (Fig. 2). The granules flowing in from above hit the water flowing up from below. The resultant solution flows out via the hopper overflow. The size of the dissolving hopper and the necessary amount of water are governed by the metered quantity and the nature of the granules. Make sure that the solutions are not diluted excessively, since flocculation will otherwise occur as a result of hydrolysis.

To prevent dust from escaping, the free-fall distance between metering screw and dissolving hopper should be kept as short as possible and preferably be of encapsulated design.

The granules can also be dissolved very effectively by stirring.

Suitable materials include special steel (Mat. No. 1.4571) and plastics.

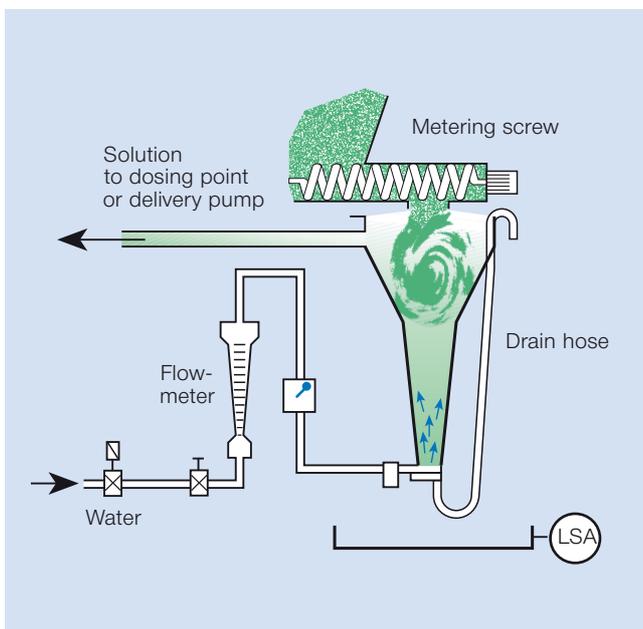


Figure 2: Diagram of a dissolving hopper for granules

3.3 Transport to the dosing point

At best, the dissolved granules should be transported to the dosing point by gravity. If this is impossible, the solution can be conveyed by pumps, like a liquid precipitant. It is best to use open centrifugal pumps or self-priming diaphragm pumps, for example.

The dissolved granules do not have the form of clear solutions, but are slightly similar to suspensions. The insoluble or undissolved components may form deposits in the metering lines. In order to minimise this problem, the lines must be flushed regularly and the pipe diameter should be selected so as to ensure that the solution flows at sufficient speed. The following figures can be taken as a dimensioning guideline:

DN 10	no less than	250 l/h
DN 15	no less than	350 l/h
DN 20	no less than	500 l/h
DN 25	no less than	700 l/h
DN 32	no less than	1000 l/h
DN 40	no less than	1500 l/h

4. List of suppliers

Storage silo, metering, control, dissolving and conveying equipment usually form a single unit and are supplied and installed as complete systems.

On request, we can provide a list of suitable specialist firms with the requisite know-how in the field of precipitant granules.

5. Safety

Like all precipitants, precipitant granules constitute a water hazard (Water Hazard Class 1). While no special guidelines or safety precautions have to be observed for transport and storage, the solution is subject to the restrictions of Section 19 of the German Water Resources Management Act (WHG). See also Technical Information 2.03 – Solutions.

For this purpose, the dissolving and conveying equipment of the metering installation must be protected by a leakage collection basin with leakage sensor. The metering lines must be installed in protective pipes with inspection chambers. Attention must also be paid to frost-proof installation.

Before using our products, please consult our Safety Data Sheets.

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.

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