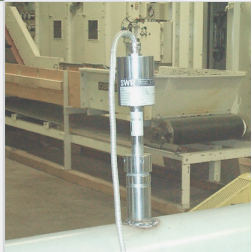


SolidFlow

Monitoring of Solids

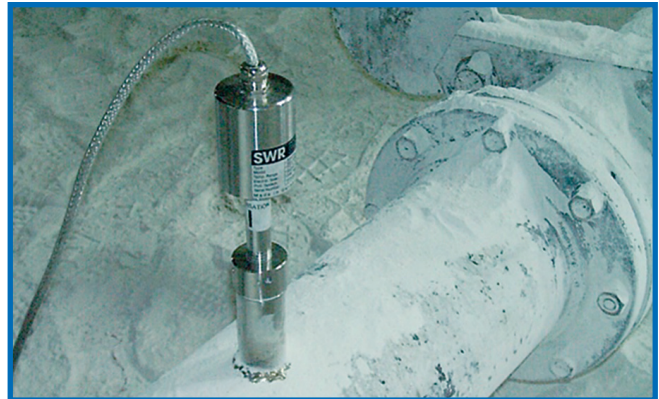


Using

SolidFlow is a sensor especially developed for measuring the flow rate of solids conveyed in metallic ducts. It has successfully been tested for online-measuring of:

- all types of dust, powder and granulates
- grain size between 1 nm and 1 cm
- pneumatically conveyed materials or
- in free fall after mechanical conveying systems

SolidFlow is wear-resistant and the commissioning is very easy.



Function

The sensor is working according to the latest microwave technology. It is exclusively used in metallic ducts.

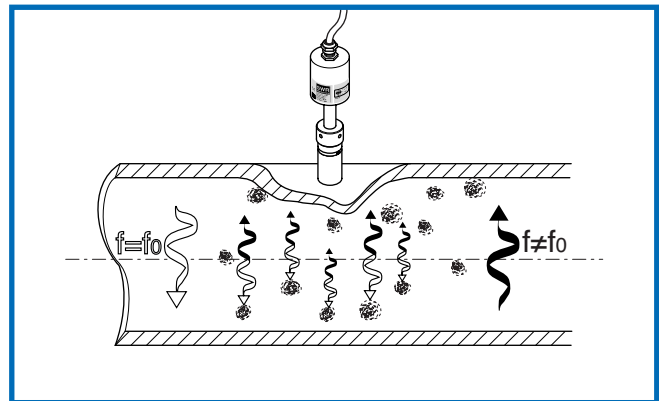
A measuring field is produced by special linking of the microwave together with the duct.

The microwave energy is reflected by the solid particles and received by the sensor. These signals are evaluated in frequency and amplitude.

The sensor works like a particle counter, which counts the quantity of the moving particles per time unit.

Due to the selective frequency evaluation only moving particles are measured and deposits are ignored.

The calibration of the sensor is made in the inserted condition, simply by pushing a button and entering of the reference quantity.



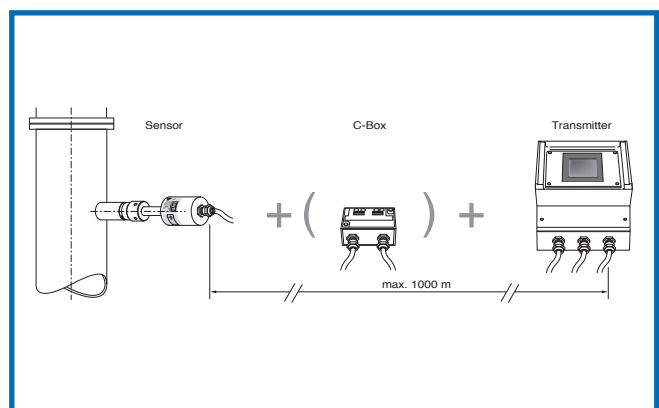
Measuring System

A complete measuring system consists of the following items:

- Socket for mounting the sensor inclusive dummy plug
- Sensor FMS with a connecting cable of 2 meters
- Transmitter FME with totalizer
- C-Box for connecting sensor – transmitter

The C-Box is not implicitly necessary, thus an adequate tool can be used by the customer.

In case of a wrong connection the C-Box ensures the protection of the sensor.



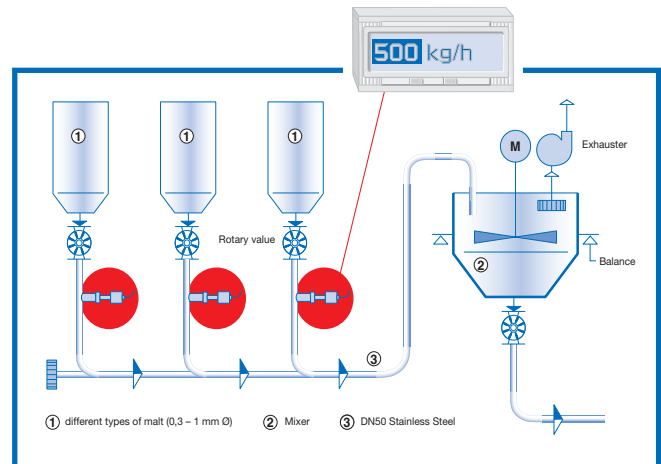
Applications – Practical Examples

■ Proportioning System

The mixtures are created with a weighing hopper in a sandwich-like manner. There are problems with the dosage of the small quantities of the additional ingredients. For the weighing of the small quantities, the balance is not laid out, so that the proportioned quantities are not reproducible.

Benefit:

By using SolidFlow the dosage of the additional ingredients becomes reproducible and a better balance of the used quantities is possible.

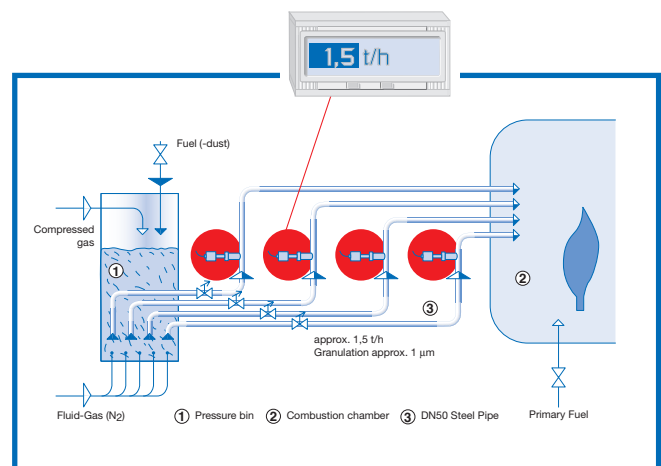


■ Secondary Fuel Output

At a boiler types of dust are conveyed into the combustion chamber as secondary fuel. As no information is available about the distribution of the fuel quantity in the different feeding pipes, there is not always an optimal adjustment of the combustion possible.

Benefit:

Each feeding pipe is monitored by a SolidFlow and the supply of the fuel quantity in each individual feeding pipe is regulated. Thereby an exact uniform distribution of the fuel quantities is guaranteed, which is an essential condition for optimal combustion.

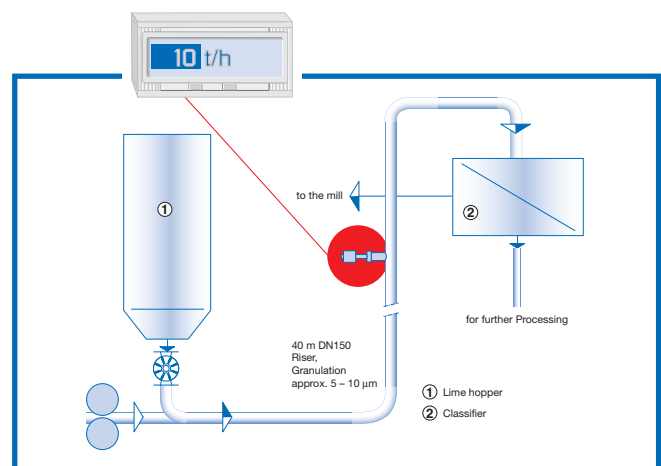


■ Totalizing

The material supply from the silo to the separator is subject to strong fluctuations.

Benefit:

By using SolidFlow the progress of the mass flow is measurable and can be documented. If necessary, a regulation can take place. By the measurement of the coarse grain from the separator to the mill the meal quality can also be monitored in the future.

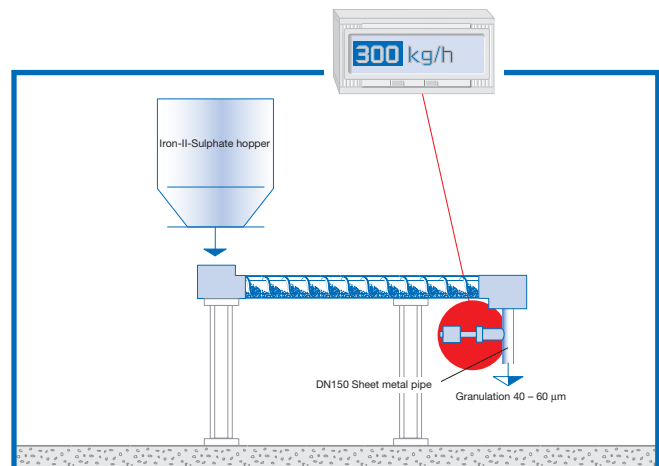


▪ Free Fall Applications

The conveyed cement quantity is measured by a belt weigher. This measured value forms the reference input for the measuring of iron-II-sulphate. This has to be made with a proportion of 0.2...0.3 percentage.

Benefit:

By using SolidFlow the actual value of the measured iron-II-sulphate is measured and regulated by the velocity of the screw feeder. The result is a constant product quality.

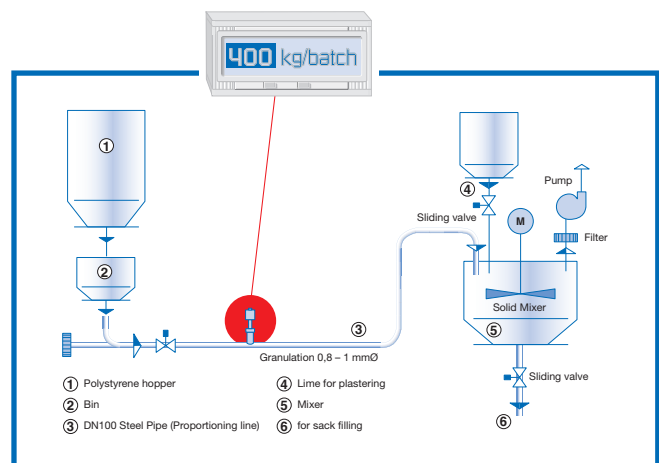


▪ Polystyrene Proportioning System

Small polystyrene pellets are supplemented as additional building material into the solid mixer. The quantity is determined by the measured volume of the bin.

Benefit:

By using SolidFlow the measured quantity of polystyrene pellets can be measured directly. A complicated, intermittent volume regulation is not necessary any longer. By achieving the weight preselection the conveyance is stopped. The result is a substantially improved product quality as well as a substantially improved cost-benefit ratio.

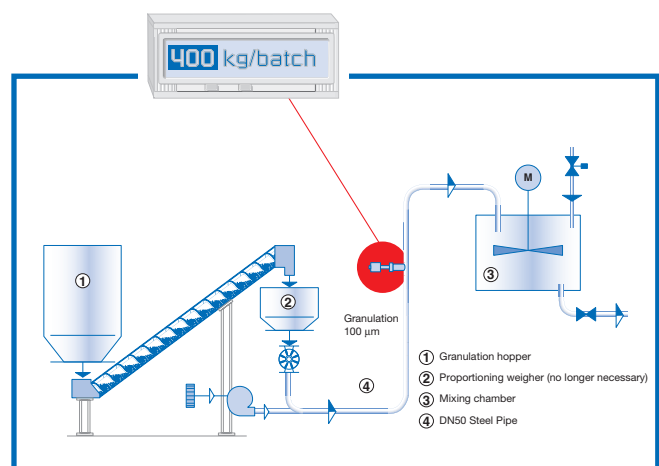


▪ Granulates Proportioning System

The existing proportioning weigher is too inaccurate and permitted only an intermittent operation of the system.

Benefit:

By using SolidFlow the monitoring of the conveyed quantities becomes transparent and the proportioning can be changed to a continuous operation.

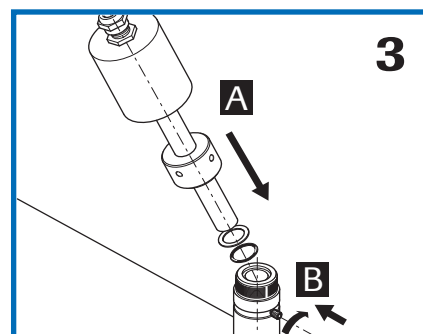
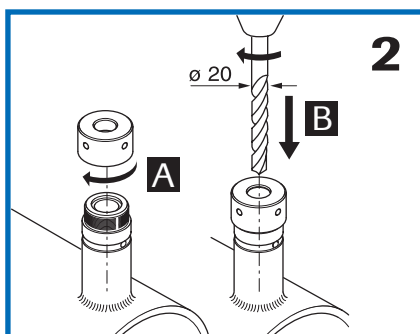
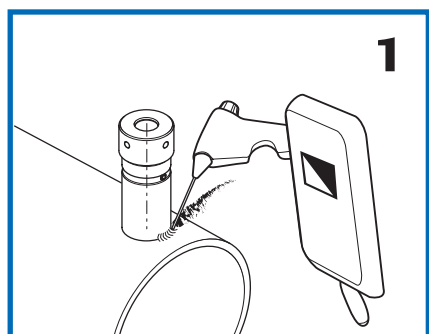
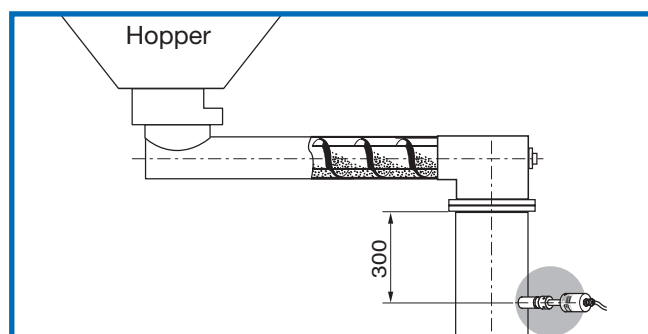
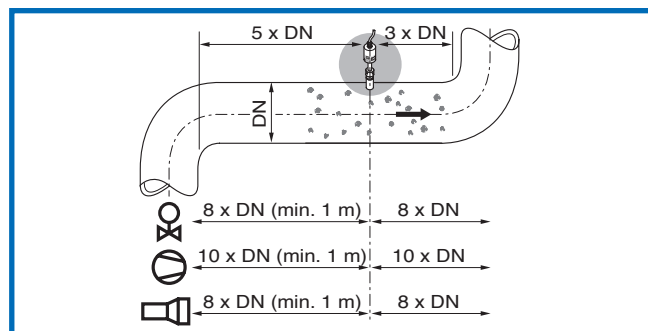


Mounting and Installation

For the mounting of the sensor the fitting position will be determined according the inlet and outlet section. In case of duct diameters greater than $\varnothing 200$ mm one has to install 2 or 3 sensors per measuring unit, which are located 150 mm apart from each other and moved by 90° resp. 120° towards each other. With free fall applications (e. g. after screw feeders or rotary valves) a free fall height of at least 300 mm would be perfect. The sensor accommodation (socket) will be welded on at the fixed position. Subsequently drill a $\varnothing 20$ mm hole into the duct.

Then you have to adapt the sensor to the wall thickness and with the help of the union nut fixed.

Ready to measure!



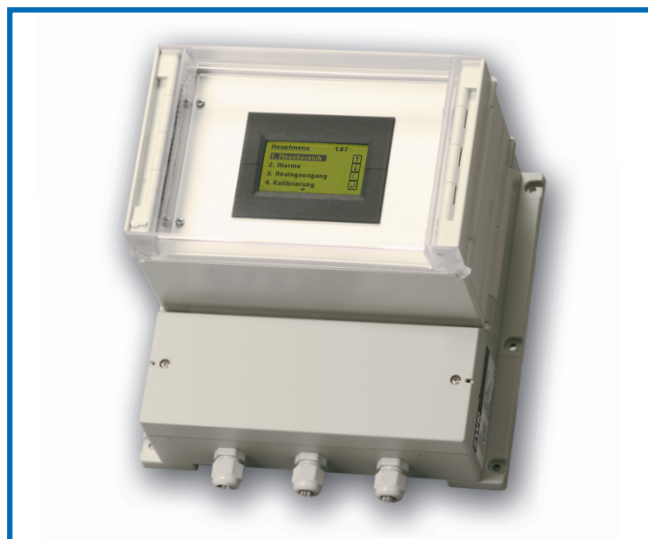
Commissioning

The commissioning of the measurement is made by the transmitter FME. This unit offers a comfortable, menu-guided input of the parameters, e. g. the measuring range, the requested physical unit or measuring signal absorption.

A current or voltage output, 4...20 mA or 2...10 V, are available as exits and also an impulse output (Open-Collector).

A totalizer enables an easy calibration. Furthermore this gives the possibility to check totally conveyed quantity.

The menu language is free-selectable between German, English or French.



Technical Data

Sensor / Sensor accommodation	
Housing	Stainless steel 1.4571
Protection category	IP 65, DustEx 20 or GasEx (option)
Operating temperature	
▪ front end of sensor	-20 ... +80 °C [-4 ... +176 °F]
▪ optional	-20 ... +200 °C [-4 ... +392 °F]
▪ sensor electronic	+0 ... +60 °C [+32 ... +140 °F]
Max. Working pressure	1 bar, optional 10 bar
Working frequency	K-Band 24, 125 GHz, ± 100 MHz
Transmitting power	Max. 5 mW
Weight	1.3 kg
Dimension	$\varnothing 60$, $\varnothing 20$, L 271 mm
Accuracy	$\pm 2 \dots 5$ % in calibrated range

Transmitter	
Supply voltage	110/230 V, 50 Hz (optional 24 V DC)
Power consumption	20 W / 24 VA
Current consumption	Max. 1 A at 24 V
Protection category	IP 65 according to EN 60 529/10.91
Operating temperature	-10 ... +45 °C [+14 ... +113 °F]
Enclosure dimensions	258 x 237 x 174 (W x H x D)
Weight	Approx. 2.5 kg
Interface	RS 485 / RS 232 C (ModBus)
Cable glands	3 x M16 (4.5-10 mm \varnothing)
Screw terminals	0.2-2.5 mm ² [AWG 24-14]
Current output signal	4 ... 20 mA (0 ... 20 mA), load < 500 Ω
Measurement value alarm relay output	Relay with switching contact Max. 250 V AC, 1 A
Data storage	Flash
Pulse output	Open Collector - Max. 30 V, 20 mA

C-Box	
Size	98 x 64 x 35 mm (W x H x D)

