

D-Rad[®] Online measurement

Flowmeter for Bulk Solids

- Non-contact measurement
- High-precision
- Pressure resistant up to 64 bar
- Independent from product properties





Highlights System

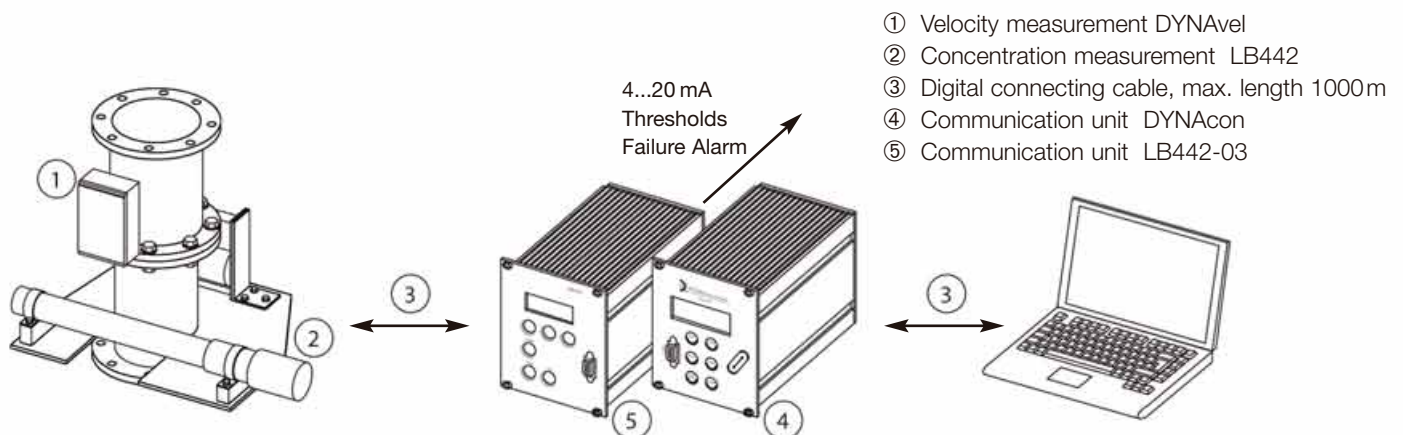
- Free product flow – non intrusive installation
- Independent from product properties and conveying conditions
- Gentle non-contact measurement method
- Low-wear
- For high mass flow rates
- Pressure resistant up to 64 bar

HIGH-PRECISION ROBUST MEASUREMENT SYSTEM INDEPENDENT FROM PRODUCT PROPERTIES

To determine the mass flow rate in pneumatic conveyors and free-fall applications the measurement system **D-rad** combines the measured values of a velocity measurement (**D-vel**) and a radiometric concentration measurement (LB442). The simultaneous determination of these two values makes this flow measurement independent from variable product properties (density, grain size, humidity, friction properties) or process conditions (pressure, conveying velocity, temperature...).

Once the system is calibrated in the process it is not necessary to recalibrate it, while it guarantees a very good repeatability of the results.

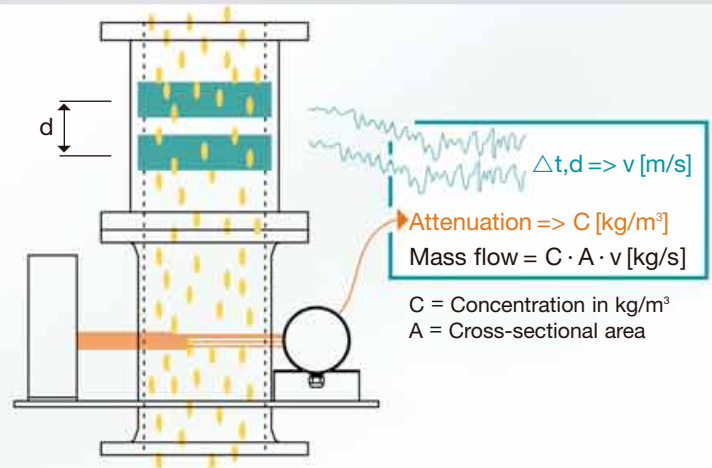
D-rad operates contact-less and does not have any moving parts. In this way the possible wear is reduced to a minimum. For the concentration measurement we are using instruments of our long-term partner Berthold Technologies in Bad Wildbad, Germany.





D-rad

Function



PROVEN AND EFFICIENT SYSTEM FOR MASS FLOW MEASUREMENT OF BULK MATERIALS

Velocity measurement

The measurement principle is based on the capture of electrical charges of the solid material which needs to be measured. Generally the charging is created by the friction during the conveying process. For a runtime measurement two sensors in the instrument (*refer to the fig. above*) record signals which are evaluated with the most modern microprocessor technology and automatically kept at an evaluable level. It is not necessary to adapt to changing product properties. The time Δt which the product needs for the distance from sensor 1 to sensor 2 is calculated by means of the two signals using a correlation calculation. Since this is an absolute measured value, a calibration is not required.

Concentration measurement

The radiometric concentration measurement is based on the principle of the gamma transmission. When irradiating the pipeline the gamma radiation is attenuated. This radiation attenuation is detected by a scintillation counter. The attenuation is proportional to the concentration of the measured material. The measurement is not affected by temperature, pressure, viscosity, colour or chemical properties of the product. Velocity and concentration are allocated in a communication unit for mass flow and output as analogue signal.

Technical data D-rad

Measurement methods	Velocity measurement: non-contact electrostatic / capacitive Concentration measurement: non-contact radiometric
Size	DN 100...DN 400 DIN flange, ANSI flange...
Measuring range	Velocity: 2...30 m/s Concentration: 50...1000 kg/m^3 Flow rate: bis 500 t/h
Accuracy	typically 1% of the end value
Measuring material	Bulk materials of any kind

Type of conveying	Pneumatic conveying, free-fall
Installation position	Any
Materials	Housing: Steel, galvanized, coated or stainless steel Sensor pipe velocity measurement: glass fibre reinforced epoxy (standard)
Temperature	Environment: -20...70°C Process: -20...120°C Storage: -20...80°C
Pressure	up to 64 bar
Protection class	IP 67



D-con/LB442

System controller



COMFORTABLE AND EASY OPERATION

FOR SETTING, CALCULATION AND OUTPUT

The **D-con** serves to set the velocity measurement to output and monitor measured values. Data backup of all settings and of the last system messages is performed in the flash memory without the battery.

As a complement of the communication unit it is possible to make settings and parameter backup using the software Dyna Pro visual on a notebook. With the evaluation unit LB442 the concentration

measurement is parameterized and the mass flow is calculated and output.

A bidirectional digital connection cable between the velocity sensor and the system controller provides a high degree of interference resistance at a maximum length of 1000 metres and low cabling efforts for several measuring positions since it allows to connect up to ten systems in line.

Technical data D-con

Designation	D-con II 21/C... to calculate the mass flow with an analogue input for a concentration measurement	Temperature	Environment 0...50°C Storage -10...50°C
Housing	19" slide-in module, closed, 3 height unit, 21 sub-unit	Display	LCD, 4 x 20 digits, illuminated
Dimensions	107 x 128 x 173 mm	Interface	CAN-Bus, Ethernet
Weight	1.4 kg	Output voltage	24 VDC, 10 W to supply the DYNavel
Protection class	IP 20	Input	Current input 4...20 mA
Supply voltage	2 versions: 230 VAC or 24 VDC	Output	2 x current output 4...20 mA 2 x threshold relays 1 x alarm relay



Application Solutions

- Process control
- Production monitoring
- Truck loading
- Measurement under extreme conditions

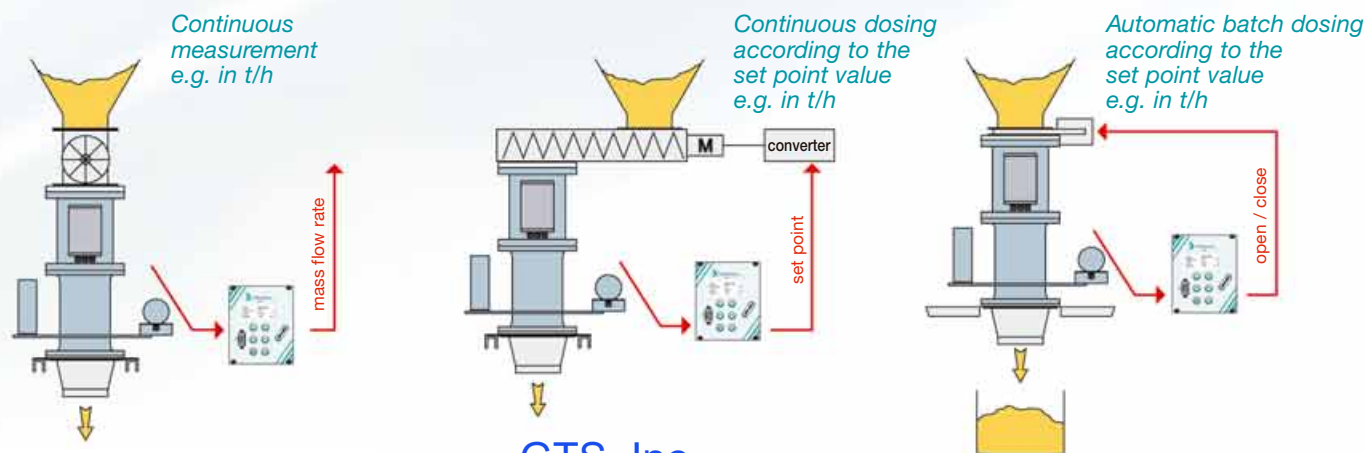
MASS FLOW MEASUREMENT OF BULK MATERIALS

MASS FLOW OF UP TO 500 t/h

If it is necessary to measure high throughput in rough environments then the **D-rad** system can be considered as a reliable and well-proven solution. Finest powders, granulates or coarse products — the measurement system is suitable for bulk materials of any kind. Application examples range from truck loading control under silos, flow recording in processes, control of moistening of fly ash in coal-fired power

plants up to the flow measurement in the dense phase conveying of coal gasification plants at pressures of up to 64 bar.

The little installation height allows an easy integration even in existing plants. All common flange connections are available. Due to the closed construction of the system **D-rad** contributes to the dust reduction in the plant.



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