

Truck loading - quick and precise!



Application

“It's a bit over - is that OK?”

While the butcher of your choice might ask you for a little latitude, this is certainly “not OK” when it comes to loading trucks!

Up to the max. payload - quickly and precisely!

To lighten after loading is extremely time-consuming and to load less than the allowed amount is inefficient.

RWE - Germany's second largest electricity supplier had to increase the capacity of the fly-ash truck loading station under the silos in their power plant “Gersteinwerk” near Dortmund in Germany. An additional truck loading station with an online mass flow rate measurement was necessary.

Facts

Product: Coal fly-ash
Location: Coal fired power plant, truck loading station, vertical pipeline, free fall, DN200 (~8”), in front of a FLUIDCON conveying system

Mass flow rate: Max. 150 t/h
Velocity (solid): 5-7 m/s (1000-1500 ft/min.)
Material: 5-7 m/s (1000-1500 ft/min.)

Solution

The well-known plant engineering company Claudius Peters Projects was appointed by RWE as the general contractor. For the online mass flow rate measurement Claudius Peters Projects implemented the DYNArad system of DYNA Instruments and Berthold Technologies. The system is a combination of an electrostatic velocity-measurement and a radiometric density-measurement.

The System

Velocity-measurement:

The measurement principle is based on the detection of electrical charges on the solid particles to be measured. Electrical charge occurs naturally through friction in the flow process.

To measure the running time, signals are recorded at two sensors which are installed in a given distance (see picture on page 2). The signals are constantly analyzed using state-of-the-art microprocessor technology and automatically maintained at an analyzable level. This simplifies the operation, because it is not necessary to adapt any possible changes of the solids properties. The time which the solids need to flow from sensor 1 to sensor 2 is determined by using the two signals in a correlation calculation.

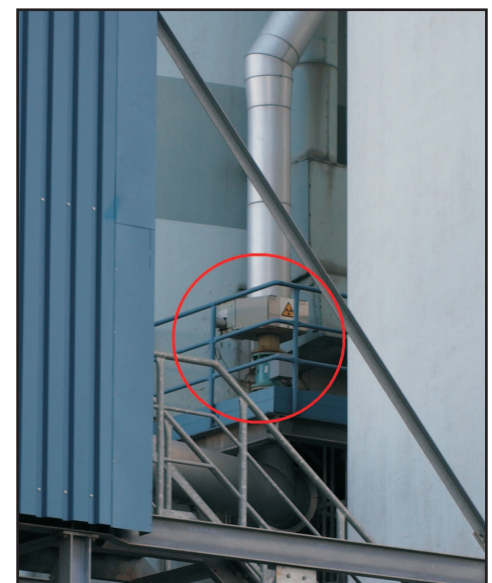
A calibration of the velocity measurement is not necessary, because the calculation works with absolute measuring values.



RWE Gersteinwerk, Germany



New Truck Loading Station



DYNArad in Vertical Pipeline

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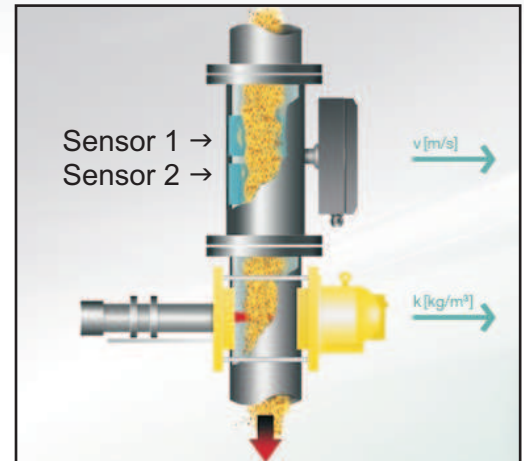
CLAUDIUS PETERS

Density measurement:

The radiometric density measurement is based on the Gamma transmission principle. The radiation, emitted from a shielded source is directed through the pipeline towards a scintillation detector at the opposite side. When irradiating the pipeline, the radiation is attenuated. The extent to which it is attenuated is directly proportional to the density of the measured material, since the type of radiation and the measuring geometry are constant.

Moreover the measurement is not affected by temperature, pressure, viscosity, color or chemical properties of the measured material.

An evaluation unit calculates the mass flow rate by using the velocity and the density: The value is output as an analogue signal.

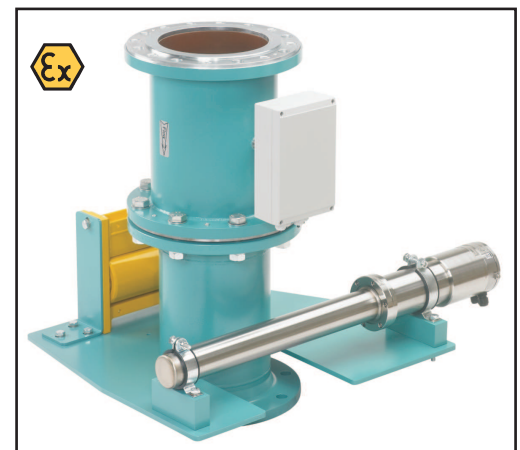


Flowmeter DYNArad schematic
(with point-source and point-detector)

Benefits

The truck loading is automatically stopped when the entered payload is reached. A coarse / fine control was implemented to slowly reduce the mass flow rate at the end of the loading. The comparison of the target value and the actual value shows an accuracy of 1.4% of the actual value.

- Automatic stop when payload / target value is reached
- Accuracy 1.4% of the actual value
- Independent from changing product properties
- Independent from silo filling level (changing velocity)
- Contactless measurement
- Wear-free
- Minimum operating cost
- Maintenance-free
- Robust and proven measuring technology
- Made in Germany



Flowmeter DYNArad
(with point-source and rod-detector)

**MADE
IN
GERMANY**

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