Level and pressure instrumentation for metal production

Application examples and products

Looking Forward VEGA

Measurement technology for metal production

This brochure presents examples of applied level and pressure measurement technology. Here, you'll learn which sensors fit which measuring tasks.

Crusher	Level measurement
Ore storage silo	Level measurement and point level detection
Conveyor belt	Throughput measurement
Coke oven	Pressure measurement
Sintering plant	Level measurement
Blast furnace	Level measurement
Torpedo car	Level measurement
Alumina powder stirring tank	Level measurement
Ore thickener	Density measurement
Alumina powder silo	Level measurement and point level detection
Additive silos	Level measurement
Storage tanks for additives	Level measurement and point level detection

All applications can be found at

www.vega.com/metal-production

All sensors at a glance

Continuous level measurement

Instrument type		Measuring range	Process fitting	Process temperature	Process pressure
VEGAPULS 62 Radar sensor for continuous level measurement of liquids		up to 35 m	Thread from G1½, 1½ NPT, flanges from DN 50, 2"	-196 … +450 °C	-1 … +160 bar (-100 … +16000 kPa)
VEGAPULS 64 Radar sensor for continuous level measurement of liquids		up to 30 m	Thread from G¾, ¾ NPT, flanges from DN 50, 2", mounting strap	-40 … +200 °C	-1 … +20 bar (-100 … +2000 kPa)
VEGAPULS 68 Radar sensor for continuous level measurement of bulk solids		up to 75 m	Thread from G1½, 1½ NPT, flanges from DN 50, 2"	-196 … +450 °C	-1 … +160 bar (-100 … +16000 kPa)
VEGAPULS 69 Radar sensor for continuous level measurement of bulk solids		up to 120 m	Mounting strap, compression flange from DN 80, 3", flanges from DN 80, 3", adapter flanges from DN 100, 4"	-40 … +200 °C	-1 … +3 bar (-100 … +300 kPa)
WEIGHTRAC 31 Radiation-based sensor for mass flow determination		up to 2.80 m	Mounting through supplied measuring frame	any	any

Point level detection

Instrument type		Measuring range	Process fitting	Process temperature	Process pressure
VEGACAP 65 Capacitive cable electrode for level detection		up to 32 m	Thread from G1, 1 NPT, flanges from DN 50, 2"	-50 … +200 °C	-1 … +64 bar (-100 … +6400 kPa)
VEGASWING 63 Vibrating level switch with tube extension for liquids		up to 6 m	Thread from G¾, ¾ NPT, flanges from DN 25, 1"	-50 … +250 °C	-1 … +64 bar (-100 … +6400 kPa)
VEGAWAVE 62 Vibrating level switch with suspension cable for powders		Bulk solids from 8 g/l	Thread G1½, 1½ NPT, flanges from DN 50, 2"	-40 … +150 °C	-1 … +6 bar (-100 … +600 kPa)
MINITRAC 31 Radiation-based sensor for density measurement		Density measurement	Mounting from outside on pipeline or on vessel	any	any

Pressure measurement

Instrument type		Deviation	Process fitting	Process temperature	Measuring range
VEGABAR 82 Pressure transmitter with ceramic measuring cell		0.2 % 0.1 % 0.05 %	Thread G½, ½ NPT, flanges from DN 15, 1½"	-40 … +150 °C	-1 … +100 bar (-100 … +10000 kPa)

Metal production

Robust measurement technology

For decades, the robust measurement technology from VEGA has proven itself in all areas of metal production. From ore processing to the blast furnace: VEGA instruments are designed to meet the application conditions expected. Special versions of the sensors can resist process temperatures up to 1400 °C.

Quality pays off

In order to withstand the harsh operating conditions common in metal production, the sensors have to be of the highest quality. Their robust design ensures a long service life and high investment payback.

Simple handling

VEGA sensors are quick and easy to install and put into operation. In the last 10 years, plics® has revolutionized setup and commissioning, making it as simple as child's play – and it will now be even easier with Bluetooth and an app for smartphones.

More information

plics® – easy is better

Instrument platform plics®

The plics® idea is simple: Each instrument is assembled from prefabricated components once the order is received. This modular design allows full flexibility when selecting the required sensor features. You receive your customised, user-friendly instrument within an amazingly short time. The best part: these instruments are more cost-effective and advantageous in every way – throughout their entire life cycle.

Display and adjustment

The display and adjustment module PLICSCOM is used for measured value indication, adjustment and diagnosis directly on the sensor. Its simple menu structure enables quick setup. Status messages are displayed in plain text. The optional Bluetooth feature allows wireless operation.

Connection

The VEGACONNECT connects your instrument to a PC via the USB interface. PLICSCOM with Bluetooth enables data transfer with wireless technology. The instruments are configured with the tried and trusted adjustment software PACTware and the appropriate DTM or with an app on a smartphone or tablet PC. For EDD-based systems we also offer graphics-driven EDDs.

Asset management and maintenance

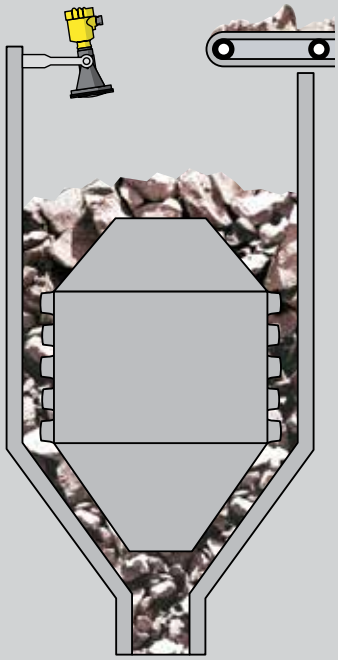
The integrated self-monitoring function of plics® instruments permanently informs the user on the status of the instruments. Status messages allow proactive and cost-effective maintenance. All diagnostic data can be called up easily and quickly in plain text via the built-in memory functions.

Crusher

Reliable
Reliable measurement even during filling

Cost effective
Optimal utilization of the container volume

User friendly
Simple mounting and setup



Level measurement in the crusher

To be able to transport and further process the largest possible production volumes, the ore must have an optimal size. To achieve this, the ore is crushed to the correct size in two stages, in a primary and then a secondary crusher. In order to enable an optimum throughput, and avoid choking or damaging the crusher, a reliable level measurement is required.

VEGAPULS 69

Non-contact level measurement with radar in the crusher

- Reliable measurement despite intense dust generation
- High reliability ensured through noise immunity
- Wear and maintenance-free, as measurement is non-contacting

Ore storage silo

Reliable
Reliable operation under all operating conditions

Cost effective
Maintenance-free operation of the facility

User friendly
Simple mounting and setup

Level measurement and point level detection in ore storage silos

Mined ore is transported via conveyor systems to large above ground or underground silos and stored there until it is used in production. A reliable level measurement is required to determine the contents of the silos.

VEGAPULS 69

Non-contact level measurement with radar in the ore storage silo

- Reliable measurement, unaffected by dust
- Easy alignment of the sensor via integrated swivelling holder and app for smartphone
- High plant availability, because wear and maintenance-free

VEGACAP 65

Capacitive point level detection for overfill protection in the ore storage silo

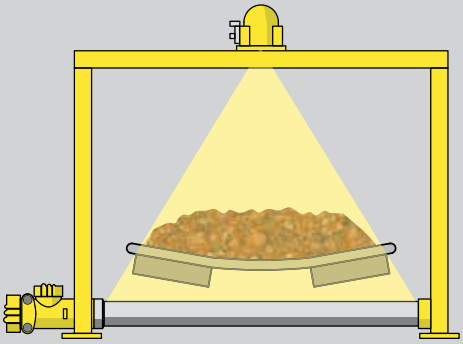
- Reliable measurement despite buildup and dust
- Robust sensor construction for long service life
- Simple mounting and setup

Conveyor belt

Reliable
Reliable measurement despite changing belt tension and vibrations

Cost effective
Optimal mass flow measurement allows exact accounting of bulk solids

User friendly
Maintenance-free operation



Mass flow measurement on conveyor belts

Bulk aggregates are fed into production processes via conveyor belts or screw conveyors. For effective feed control to and from these processes, or inter-production unit billing, the mass flow of the conveyed bulk material must be measured. A reliable belt-weighing scale system and mass flow rate ensures accurate measurement and smooth operation of the plant.

WEIGHTRAC 31

Radiometric mass flow measurement of solids on conveyor belts

- Reliable measurement, independent of dust and dirt
- Accurate and repeatable mass flow measurement
- Wear-free, contactless weighing

VEGASOURCE 31

Source holder as receptacle for the radiation capsule

- High operational reliability with pneumatic actuation of the source holder
- Effective shielding allows minimal use of control areas
- Minimal space requirement and simple installation

Coke oven

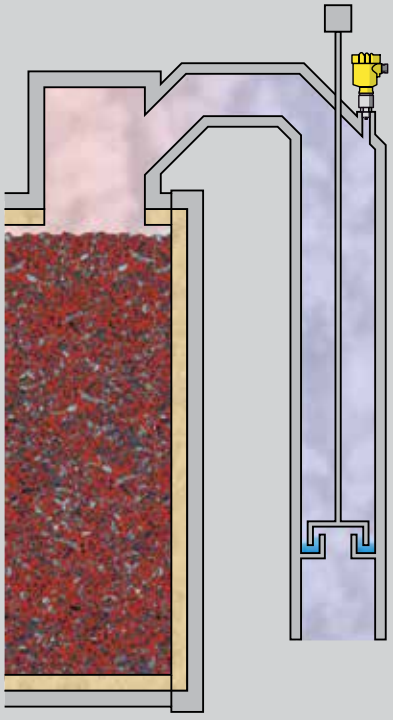
Reliable
Reliable measurement
in corrosive gases

Cost effective
Maintenance-free operation

User friendly
Simple installation and setup

Pressure measurement in the coke oven

Coke provides the necessary process heat, serves as a metal reducing agent and is a supporting matrix in the blast furnace. To achieve a high quality coke, the pressures in each of the separate ovens of a coking plant are individually regulated.



VEGABAR 82

Pressure transmitter for pressure monitoring in coke ovens

- High durability thanks to CERTEC® ceramic measuring cell
- Exact measurement even in very small measuring ranges
- High plant availability through very high overload resistance of measuring cell

Sintering plant

Reliable
Reliable measurement ensures optimal process flow

Cost effective
Maintenance-free measurement despite high temperatures

User friendly
Simple mounting and setup

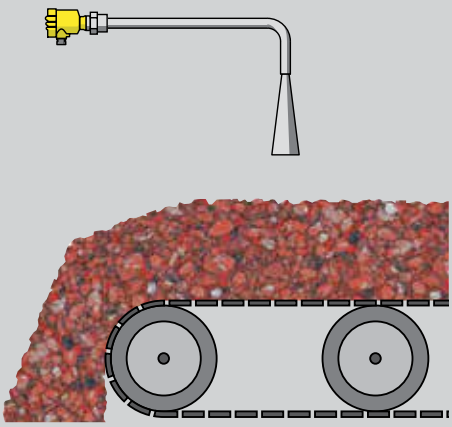
Level measurement in the sintering plant

After sintering, the hot material is cooled down to a temperature of about 150 °C in the sintering cooler. The feed rate of the sintering belt is controlled to ensure that the material is thrown off at the end of the sintering belt. To achieve effective cooling, the thickness of the material on the sintering belt has to be continuously and precisely measured.

VEGAPULS 68

Non-contact radar level measurement on the sintering belt

- Reliable measurement, independent of temperature changes
- Wear and maintenance-free for high plant availability
- Easy antenna cleaning via purging air connection



Blast furnace

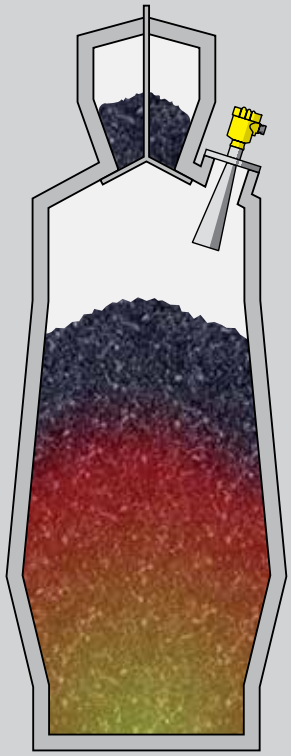
Reliable
Reliable measurement even during filling

Cost effective
Optimal operation of the furnace

User friendly
Simple mounting and setup

Level measurement in the blast furnace

Burden (iron-bearing materials) and coke are transported from the bunker to the top of the blast furnace. The charging of the furnace is done via conveyor belts or small aggregate wagons. To ensure an optimal distribution of the burden and coke layers, exact level measurement is required.



VEGAPULS 68

Non-contact level measurement with radar in blast furnaces

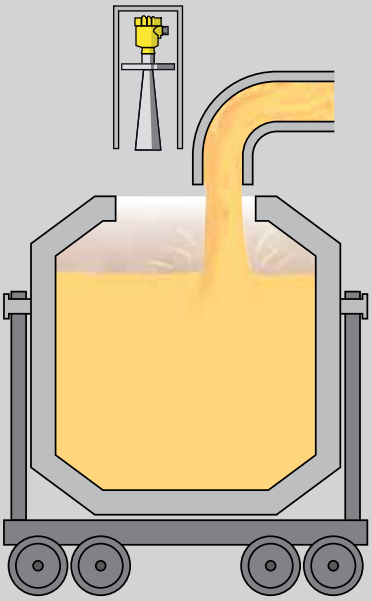
- Reliable measurement, independent of dust, material composition and high temperatures
- High measurement certainty even during filling
- Wear and maintenance-free operation

Torpedo car

Reliable
Operational reliability despite high temperatures

Cost effective
Maintenance-free operation

User friendly
Simple installation, even in existing facilities



Level measurement in torpedo cars

After the blast furnace is tapped, the molten pig iron flows into torpedo cars at a temperature of over 1400 °C, then transported to the foundry or converter for further processing. A reliable level measurement is a must for the safe, reliable filling of these torpedo cars.

VEGAPULS 62

Non-contact level measurement with radar in torpedo cars

- Exact measurement unaffected by high temperatures
- High plant availability, because maintenance-free
- Wear-free thanks to non-contact measurement

Alumina powder stirring tank

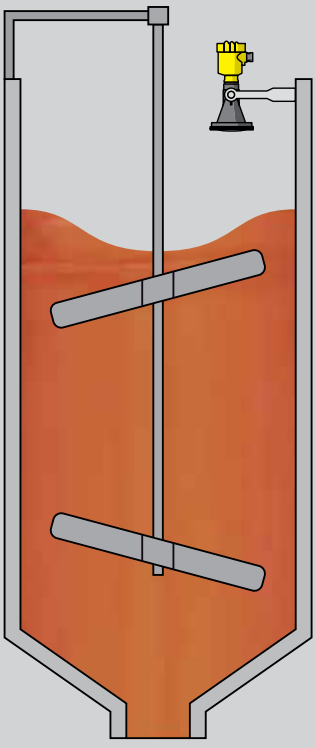
Reliable
Precise measurement in tank with stirrer

Cost effective
Optimal tank volume utilization

User friendly
Simple mounting and setup

Level measurement in the alumina powder stirring tank

The extraction of Aluminium from natural deposits of bauxite requires complex and expensive processes. In the “Bayer process”, the bauxite is first mixed with sodium hydroxide, autoclaved and then stirred. After that, it is fed into the calciner (high temperature kiln), where it dehydrates to a fine white powder, aluminium oxide (Al_2O_3). Level measurement in this tank ensures optimal operation of the process.



VEGAPULS 64

Non-contact level measurement with radar in stirring tanks

- Reliable measurement even with strongly agitated product surface
- High measurement certainty despite heavy condensation formation
- High operational availability, because wear and maintenance-free

Ore thickener

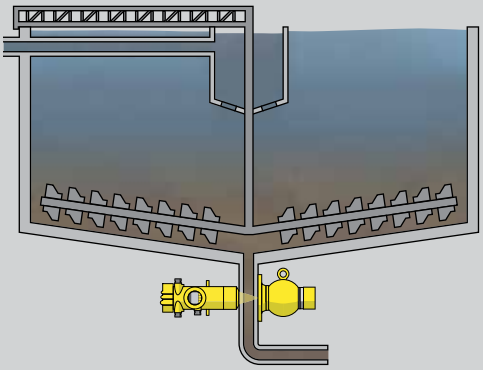
Reliable
Reliable determination of solid content under all operating conditions

Cost effective
Cost savings through optimised flocculent dosage

User friendly
Simple mounting and setup

Density measurement in the ore thickener

Extracted minerals are fed to the thickener as a slurry via a trough. The solids are settled out into the bottom of the tank, in a process accelerated through the addition of flocculants. Precise density measurement of the slurry underflow is necessary for effective control of the ore thickener.



MINITRAC 31

Radiometric density measurement in the ore thickener

- Simple retrofitting during ongoing production processes
- High plant availability using non-contact measurement
- Exact measuring results, independent of process conditions

VEGASOURCE 31

Container for radioactive source capsules

- Trustworthy shielding allows use without control areas
- Minimal space requirements and simple mounting
- Operational safety through pneumatic ON/OFF switching

Alumina powder silo

Reliable
Reliable content measurement of alumina

Cost effective
Maintenance-free operation

User friendly
Simple mounting and setup

Level measurement and point level detection in alumina powder silos

The alumina powder is kept ready in storage and day silos for subsequent smelting. Aluminium smelting is carried out in the fused salt electrolysis process, where pure liquid aluminium is extracted from aluminium oxide. Optimal storage is ensured by level measurement and point level detection.

VEGAPULS 69

Non-contact level measurement with radar in storage silos

- Reliable measurement, unaffected by dust
- Easy sensor alignment via aiming flange and alignment app for smartphone
- Maintenance-free operation thanks to encapsulated antenna system

VEGAWAVE 62

Vibrating level switch as overfill protection in storage silos

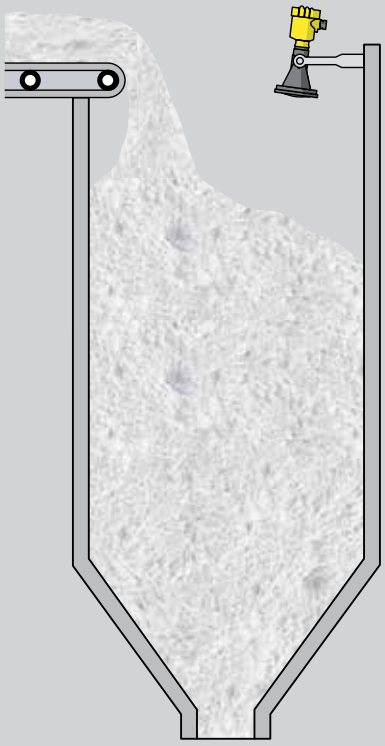
- Reliable function through product-independent switching point
- Immune to buildup
- Simple setup without adjustment

Additive silos

Reliable
High measurement certainty despite varying reflective properties of the medium

Cost effective
Maintenance-free operation

User friendly
Simple mounting and operation



Level measurement in additive silos

Depending on the manufacturing process and the type of metal being produced, various additives such as lime are required. The products are stored in silos or concrete bunkers and usually fed to the process via conveyor belts. For cost-effective storage of these materials, level measurement in the silo contents is essential.

VEGAPULS 69

Non-contact level measurement with radar in the additive silo

- Reliable measurement despite strong dust generation
- Maintenance-free operation through non-contact measurement
- Easy alignment of the measuring instrument via integrated swivelling holder and app for smartphone

Storage tanks for additives

Reliable
High operational reliability through the use of chemically resistant materials

Cost effective
Optimal storage through reliable measurement

User friendly
Simple setup and commissioning

Level measurement and point level detection in storage tanks for additives

For many processes, additives such as sulfuric or hydrochloric acid are required. These are kept ready for use in storage tanks. Level measurement is needed here to ensure availability of the additives.

VEGAPULS 64

Non-contact level measurement with radar in storage tanks

- Exact measuring results, independent of media properties
- Highly corrosion resistant materials ensure a long service life
- Maintenance-free operation through non-contact measuring method

VEGASWING 63

Vibrating level switch as overfill protection in storage tanks

- Product-independent switching point ensures exact detection of limit level
- Simple setup without adjustment
- Test button for easy checking of the measuring instrument during operation

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Looking Forward