Metal processing

VEGA

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VEGA sets the standard in the area of metal processing

VEGA is a world-leading expert in the field of level, pressure and switching instrumentation.

For applications typical of the metal processing industry, VEGA has a vast array of specific measurement solutions.

VEGA's measuring instruments deliver reliable data on volume, level and pressure of practically any product, from fine-grained to course solids, from adhesive to extremely abrasive materials as well as liquids. Level measurement with radar technology or guided microwave is unaffected by strong dust generation, noise and high product temperatures. Moreover VEGAPULS 67 and VEGAPULS 68 radar sensors are a real alternative to ultrasonic instruments and measuring principles getting in contact with the medium.

At center stage of VEGA's measurement technology is plics®, the modular system that allows individual combinations of performance features. With plics®, VEGA can meet very cost-effectively any technical demand of this sector. The examples on pages 10 to 19 illustrate optimum solutions for typical, real-life applications in the metal processing.

Measurement technology for a demanding industry

Under arduous conditions

The metal processing sets high demands on housing, electronics and sensor technology. No problem for VEGA, because all components can be adapted to the required process conditions. The rugged housings are characterised by their high mechanical stability. Depending on the model, the sensors and antennas are able to withstand the most extreme conditions imaginable, including temperatures up to 1400 °C (2552 °F). VEGA offers contacting as well as non-contacting measurement technologies.

Security and certainty from VEGA

- housing versions in plastic, aluminium and stainless steel
- all sensors are available in EEx ia or EEx d versions
- dust Ex Zone 20 approval 1 D, 1/2 D according to ATEX II
- type approved sensors according to company standards
- VEGA instruments are suitable for SIL rated applications

Connections to suit your process

From threaded or flanged connections to complex special solutions, such as for boom mounting or sensor alignment, VEGA instruments adapt themselves well to any situation. Whether in tanks or silos, or mounted over conveyor belts or roller grates, VEGA ensures reliability in every mounting situation.

Products may change but security stays

In many applications in the area of metal processing, the properties of the processed or created products – density, granulation, moisture content and dielectric constant – often change. Vessels are alternatingly filled with products of different characteristics. For every application, VEGA offers a solution that ensures dependable and accurate measurement data.

Individual signal processing

VEGA is able to offer all current and emerging standards of signal processing. For continuous level and pressure measurement, 4 … 20 mA/HART in 2-wire loop powered or 4-wire technology, Profibus PA or Foundation Fieldbus are available. For point level detection and switching a non-contact output, a relay or transistor output, the NAMUR signal or current signal can be chosen from. VEGA's measuring instruments can always match your installation needs.

plics® – the idea with a future

Easy is better

plics® makes everything easier – from selecting to ordering, right through to set-up, maintenance and service. In this modular system, you combine exactly the performance features you need to solve the measurement problem – both technically and economically. Whoever has once worked with plics® can apply the set-up, wiring and adjustment concept to any other application, and even to other measuring principles. Because of the broad range of the technology and the “easy choose – easy use” concept, plics® brings an element of security and dependability to every application.

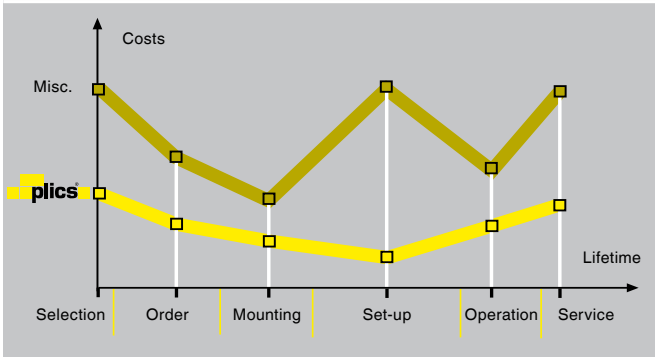
plics® – a sure foundation, right from the ground up

Safety and economy, as well as uninterrupted availability, are important for every plant. The more demanding the measurement task, the more VEGA’s competence is needed and the more important plics becomes. Because plics offers the best prerequisites for maximum product quality by delivering reliable and accurate measuring results.

Easier for user and planner

plics® offers individual selection and combination of sensors, process fittings, electronics and housings. For the engineering department, this translates into easy, straightforward planning and instrument selection. For the plant builder, it means short delivery time, uncomplicated connection and quick set-up, and for the user, operational reliability, simplified maintenance and reduced inventory costs.

Continuously low costs for a lifetime



Indicating and adjustment module

PLICSCOM

Housings

Plastic

Stainless steel

Aluminium

Aluminium (2 chamber)

Electronics

4 ... 20 mA/ HART

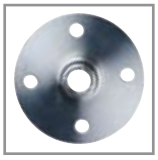
Profibus

Foundation Fieldbus

Level switch

Process fittings

Thread



Flange

Sanitary

Sensor types

Level measurement

Radar

Ultrasonic

Guided microwave

Switching

Vibration

Vibration

Capacitive

Pressure

Process pressure

Hydrostatic

Approvals / Certifications

SIL, overfill protection

Hygienic approvals

Ship approvals

Explosion protection

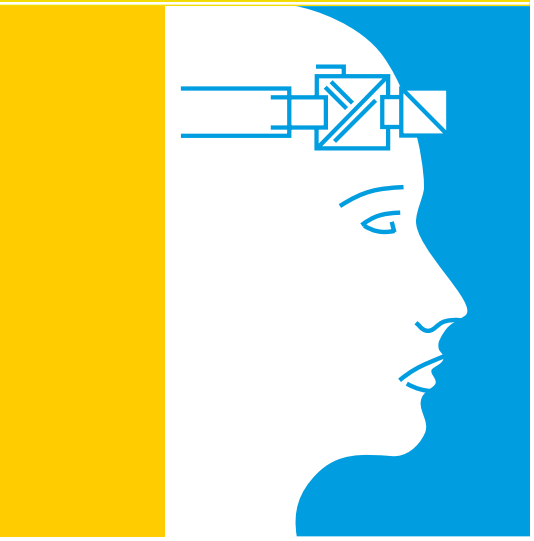
PLICSCOM and PACTware

Set-up and indication with PLICSCOM

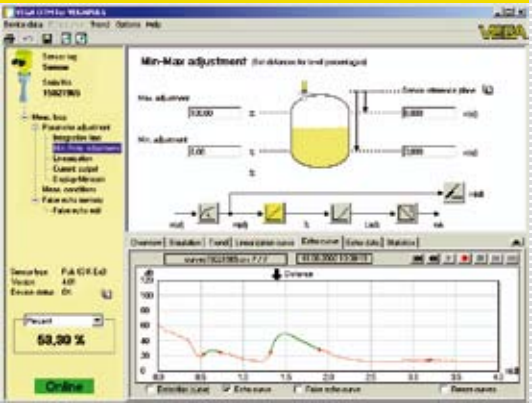
PLICSCOM, with its entirely new adjustment philosophy, offers extensive practical convenience. To allow easy use from any position, it can be mounted in the housing in four positions 90° apart. Indication and adjustment are carried out via four plastic foil keys and a large, concise, graphics-capable and illuminated dot matrix display. The adjustment menu with selectable language is clearly structured and allows playfully easy set-up. After set-up, PLICSCOM serves as indicating instrument: level and pressure values are viewed directly through the screw-on lid with glass insert in the desired unit and presentation style.

Diagnosis and service with PLICSCOM

In the unlikely event of failure, the cause is displayed on the PLICSCOM. In addition, instrument data such as measuring range, process connection, seal material as well as recorded process data of level, pressure and temperature can be called up. In conjunction with suitable instruments, PLICSCOM can also display echo curves. When a sensor is replaced, PLICSCOM ensures that the measuring loop is quickly up and running again – all sensor data are saved with a quick keystroke and transferred later to the replacement sensor.



PACTware™



Configuration and parameter adjustment with PACTware

PACTware is the innovative configuration software for all field instruments, from mobile computer to process control center. As a free-of-charge, manufacturer-independent software, PACTware constitutes the Fieldbus-independent interface for data exchange between all current protocols of communication-capable field devices, e.g. HART and Fieldbus. In practice this means: all plics® instruments can be set-up and operated via one single program with an all-encompassing user interface – from blast furnace to storage silo.

Asset-Management in the metal processing

Because of PACTware's plant-wide failure recognition and evaluation capability, it is an ideal decision platform for maintenance measures. It makes the data of all communication components and field devices comprehensively and centrally available. After the status of field instruments and other plant components has been recognised and evaluated, proactive maintenance, for example, can be carried out. This in turn increases plant availability and ensures smooth, trouble-free production.

Mining of ore

Storage of ores in the silo

The mined ore is transported with conveyor systems and stored in large aboveground or underground silos until it is sent on to the next processing stages. Large amounts of dust and noise are generated in the storage silos. The different particle sizes and constantly changing repose angles must not influence the accuracy of the level measurement. Contactless measurement is ideal for determining the contents of a silo.

Level measurement with VEGAPULS 68

VEGAPULS 68 is predestined for level measurement of bulk solids under extreme conditions. Due to its high sensitivity it is able to deliver reliable measurement data from bulk materials silos up to 70 m (230 ft) high. Excellent focusing is achieved through the implementation of very high sensor frequencies and antennas specially optimised for bulk solids. Internal vessel installations, struts and buildup on the vessel walls thus do not interfere. Neither the repose angle of the bulk solid nor strong dust generation can influence the measuring result. Thanks to the contactless measurement with microwaves, the sensor is subjected to no wear whatsoever.

Overfill protection with VEGACAP 65

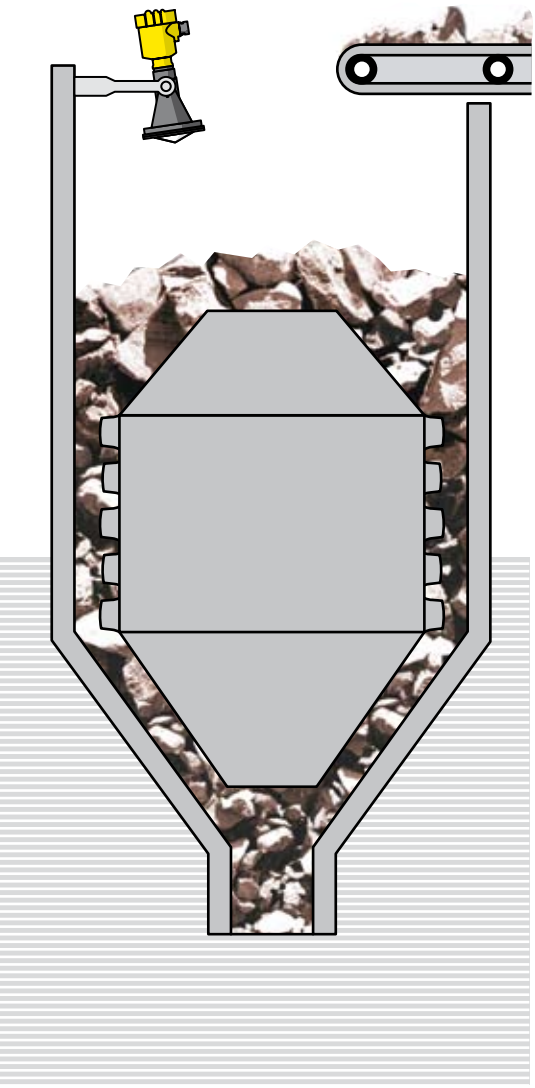
In addition to the continuous level measurement, a second independent sensor is applied for overfill protection. The capacitive measuring technique is the right choice for bulk materials silos with such high requirements on measurement stability. Extreme ruggedness and easy set-up are distinguishing features of the VEGACAP 65 capacitive level switch. The switching state of VEGACAP 65 is displayed on a bicolour LED and is easily visible on the outside of the plastic housing.

VEGAPULS 68

- non-contact measurement
- set-up without filling
- insensitive to dust
- wear-free

VEGACAP 65

- very robust construction
- easy set-up
- insensitive to build-up
- cable can be shortened



Primary and secondary stone crushers in ore mining

To transport and mine the largest possible amount of ore in the plant, the ore must be composed of pieces of the right size. The ore is broken down into the optimal grain size in two steps in the primary and secondary stone crushers. The crusher silo as well as the crusher rollers are subject to heavy wear that depends directly on the amount of material in the crusher. When the crusher is too full, the pressure on the breaker rollers and the resulting wear are very high. If the filling volume is too low, however, capacity utilisation and thus the overall plant output will also be too low.

Level monitoring with VEGAPULS 67

The radar sensor VEGAPULS 67 feels really comfortable even in the most difficult process conditions, such as dust generation and intense filling noise. Due to its high emission frequency and antenna system optimised for bulk solids, VEGAPULS 67 has a very narrow emission beam. This makes measurement possible directly in the throat of the stone crusher. All sensor settings, such as basic adjustment and fine tuning to the application, can be carried out during normal operation. The universal installation fittings enable easy adaptation to existing equipment.

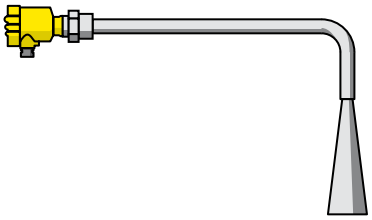
VEGAPULS 67

- non-contact measurement
- insensitive to dust
- easy mounting
- wear- and maintenance-free

Steel production

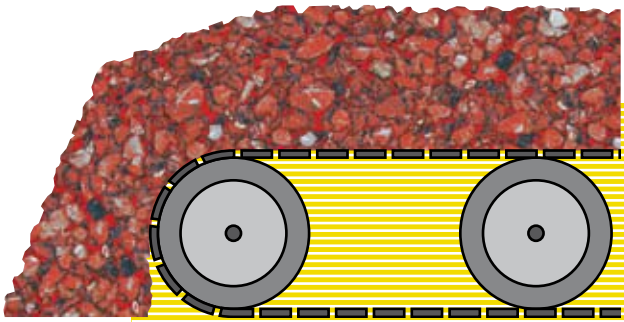
Limestone, coke and sinter – raw materials for steelmaking

Beside iron ore, limestone, coke and different additives are also necessary for the production of raw iron. To make use of the generated by-products, sinter and coke are produced and stored directly in the smelting works. The sometimes very hot products place heavy demands on the implemented sensors.



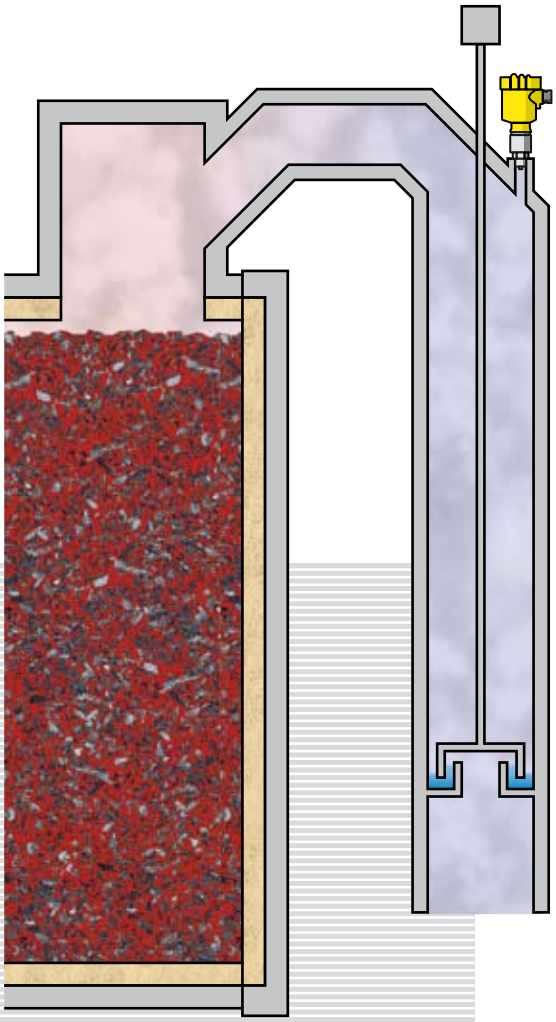
VEGAPULS 68 for monitoring the optimal height of the sinter bed

To achieve a better gas exchange in the blast furnace, the iron ore and the additives are baked together during the sintering process. This is where VEGAPULS 68 shows its prowess. The sensor reliably measures the level without being affected by the high temperatures. To protect the sensor electronics from the high temperatures, the antenna is mounted separate from the sensor with an angled antenna extension and additionally cooled with air. The application range of the sensors extends from level measurement in the charging bunker of the sinter cooler to height measurement on the sinter cooler or even on the sinter belt conveyor.



VEGAPULS 68

- non-contact measurement
- unaffected by temperature changes
- antennas with purging air connection



Coke – as important as the iron ore itself

Coke delivers the necessary process heat and serves as a reducing agent and supporting matrix in the blast furnace. Coke is produced in the coking plant by heating coal under the exclusion of air.

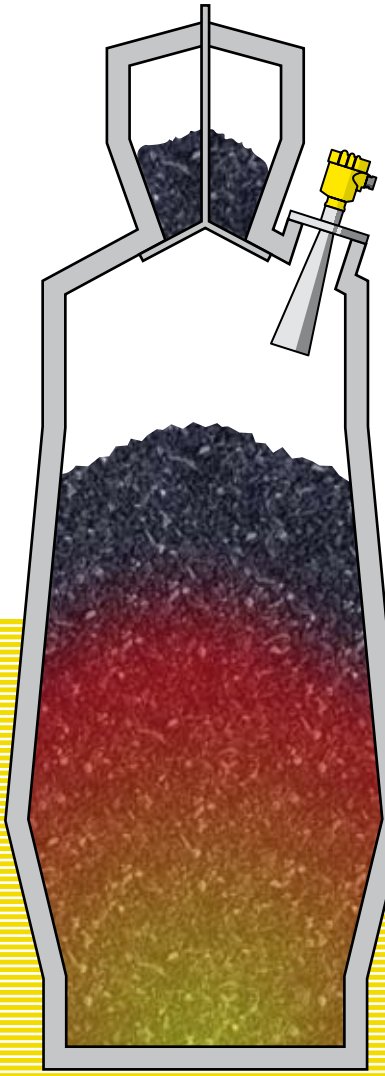
Coke production is monitored at all process stages

To reach the most optimal operating conditions, oven pressure is regulated separately in the individual ovens of modern coking plants. Due to the very small pressure ranges, a highly sensitive sensor with a measuring range of only +/- 5 mbar is required for the pressure measurement. VEGABAR 52 performs beautifully here. Its ceramic capacitive measuring cell of highly purified ceramic ensures excellent stability and delivers exceptionally high accuracy. Light nitrogen rinsing in the pressure line also protects the measuring cell from aggressive gases.

VEGABAR 52

- highly resistant measuring cell
- high accuracy
- optimal long-term stability
- small measuring range available

Blast furnace



Monitoring the charging of the blast furnace

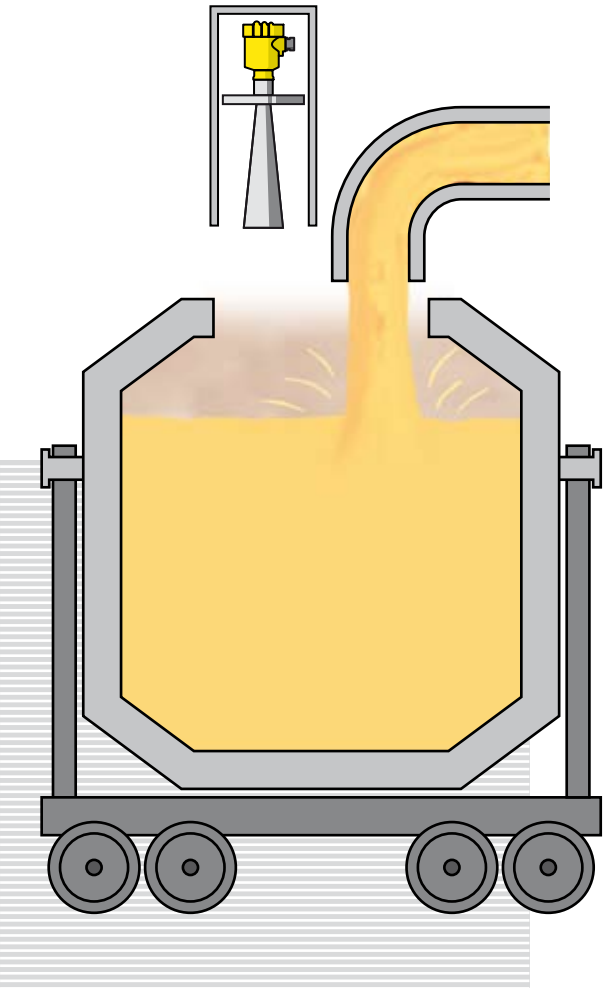
To make sure the batch and the coke layer are distributed as optimally as possible, a measurement of the level is required. Because of the extremely harsh operating conditions in the blast furnace, heavy mechanical plumb line systems were often used previously. These had massive weights on chains that were lowered down onto the filling surface, thus measuring the distance. Modern radar sensors like VEGAPULS 68 solve this measurement problem much more elegantly.

Level measurement with VEGAPULS 68

Unaffected by dust, material compositions and high temperatures, VEGAPULS 68 delivers important information on the charging process in the blast furnace. Depending on the size of the sensor antenna, either broad areas or limited spots on the surface can be covered. Through the use of several sensors, the surface profile in the blast furnace can be systematically analysed. The radar instruments do not affect one another in the process. Thanks to its robust construction VEGAPULS 68 easily withstands the tough requiremens of the blast furnace environment. Moreover, by mounting the sensor on a suitable slide valve, it can be separated from the process anytime during operation.

VEGAPULS 68

- non-contact measurement
- easy set-up
- wear- and maintenance-free
- process temperatures up to +200 °C (+392 °F)



Tapping the blast furnace

After the blast furnace has been tapped, the raw iron flows into pan or torpedo cars and is taken to the foundry or to the converter for further processing. Measuring the contents of the steel pans certainly belongs to the most difficult measurement tasks in the steelworks. The very high temperatures of over 1400 °C (2552 °F) and the extreme dust and steam generation during the filling process place heavy demands on the sensors. Understandably, only a contactless measuring technique can perform this task.

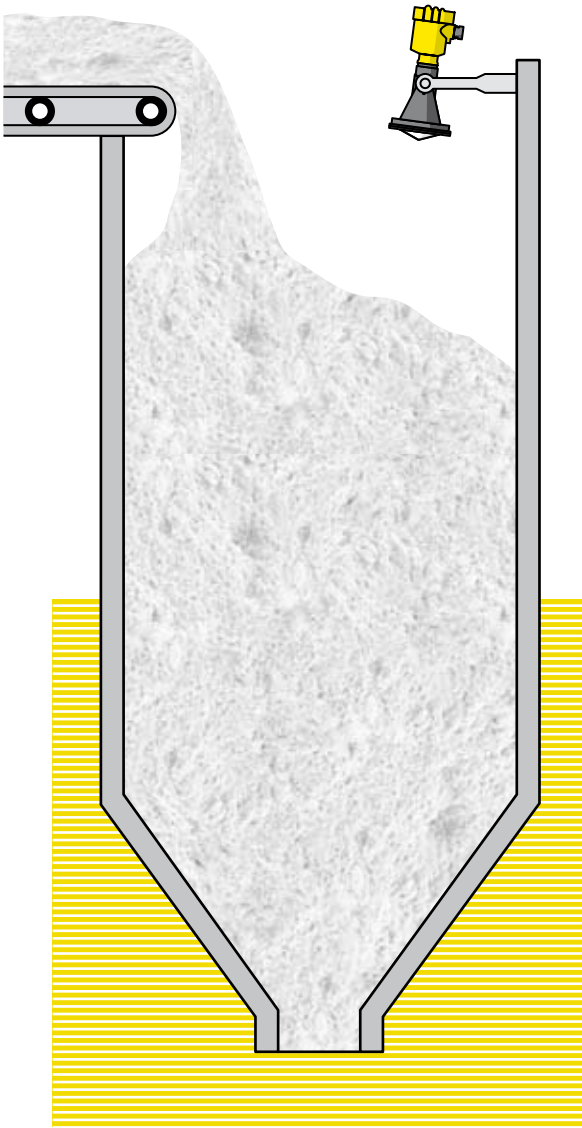
Level measurement in the steel pan with VEGAPULS 62

Since microwaves are not impaired by extremely high temperatures, VEGAPULS 62 is particularly well suited for this measurement task. Due to its high measuring rate and precision, it measures the contents of the steel pans with absolute certainty. The very good focusing of the radar signals allows measurement to take place even through the relatively small openings in the torpedo car, even during filling. A rinsing air connection makes sure that the antenna system stays clean during the intense shower of sparks and generation of dust that occurs when the pan is filled. Under cramped conditions, angled antenna extensions allow the sensors to be optimally located and the electronics mounted in protected surroundings.

VEGAPULS 62

- non-contact measurement
- high accuracy
- fast measuring rate
- wear- and maintenance-free

Additives



Additives determine the quality of the metals

Depending on the production process and the type of metal, different additives are required in the manufacturing process. The products are stored in silos or concrete bunkers and are normally fed in via conveyor belts. Strong dust generation during filling and the often abrasive media severely limit the repertory of measuring principles suitable for this level measurement.

Continuous level measurement in the silo

Because of its small size and universal mounting concept, the compact radar sensor VEGAPULS 67 can be easily adapted to existing equipment. The plastic-encapsulated antenna system ensures reliable functioning even under extremely dusty conditions. The contactless measuring method is the perfect solution for this measurement task, especially when rough and abrasive media are involved.

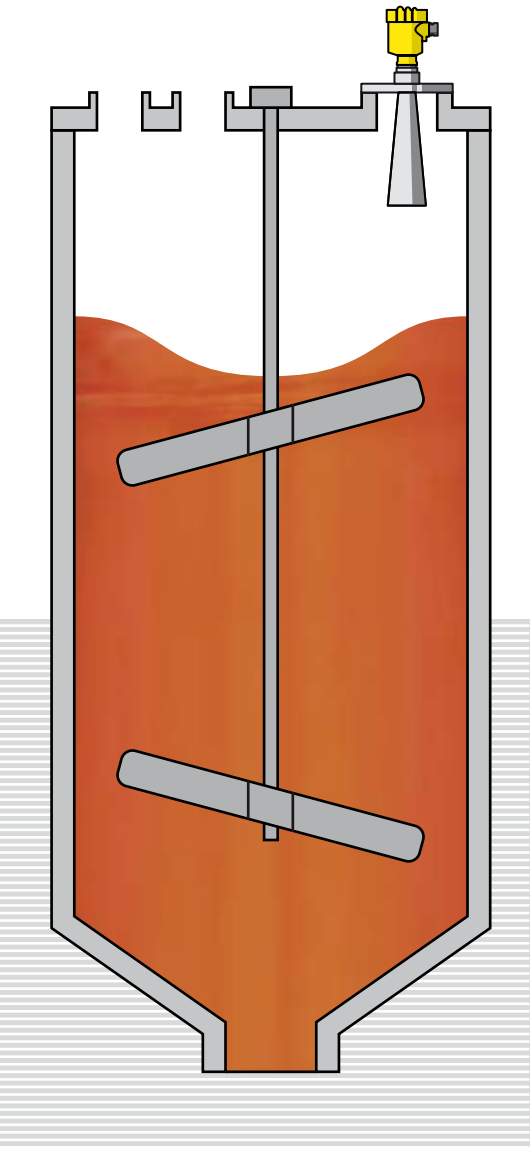
For continuous measurement of powdery additives in silos up to approx. 10 m (33 ft) high, VEGAFLEX 61 is an interesting alternative. Due to the guided microwave (TDR) measuring principle, an additional adjustment after sensor installation is not necessary in most cases. The measuring range of the sensor corresponds to the length of the cable and is already calibrated ex factory. The measuring result is influenced neither by product changes nor strong dust generation nor different material repose angles.

VEGAPULS 67

- non-contact measurement
- easy set-up
- process temperatures up to +80 °C (+176 °F)
- maintenance-free
- two-wire technology

VEGAFLEX 61

- set-up without adjustment
- insensitive to dust and build-up
- cable can be shortened up to 32 m (105 ft)



Production of aluminium oxide powder

Mixer and agitators

After oxygen and silicon, aluminium, coming in at around 7.5 %, is the third most common element in the earth's crust. It is extracted from natural deposits of bauxite in a series of laborious processes. Aluminium's versatility makes it indispensable in almost all areas of life and manufacturing. In the Bayer method, the bauxite is first mixed with caustic soda, processed in an autoclave and then dehydrated into a fine white powder, aluminium oxide (Al_2O_3), in a calcinating kiln. In this process approx. two tons of aluminium oxide are obtained from four tons of bauxite.

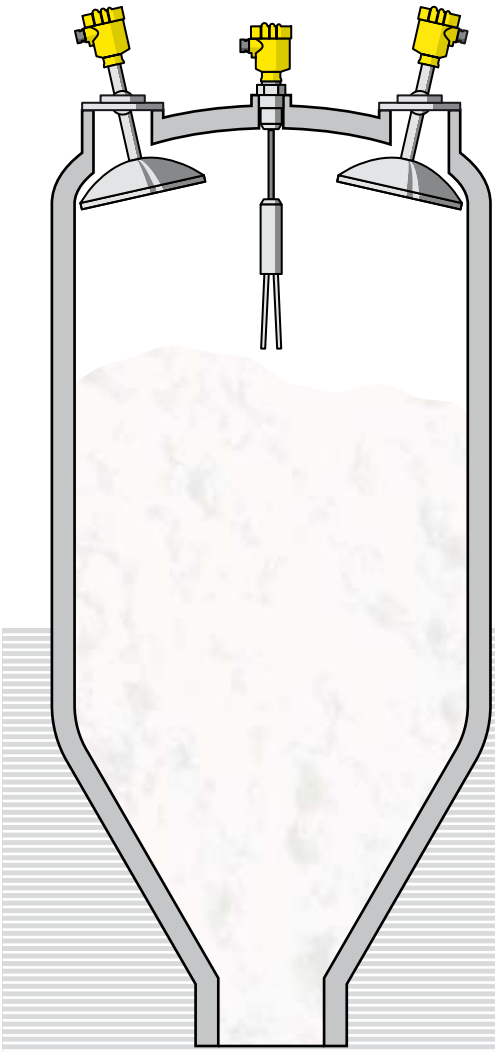
Continuous measurement with VEGAPULS 62 in the digester and in the decanter

The bauxite is decomposed by adding thinned caustic soda and mixing it throroughly with the bauxite in the digester. To achieve an optimal utilisation of the process, it is important to regulate the filling level in a fixed range. Contactless radar technology has all the right prerequisites for this measurement task. The VEGAPULS 62 radar sensor records the current level and passes it on to the control system. Even the rotating agitator blades do not disrupt the measurement. Also in the decanter, which immediately follows the digester, VEGAPULS 62 reliably performs its service in temperatures up to 200 °C (473 °F) and pressures up to 40 bar (580 psig). The steam atmosphere prevailing in the vessel does not affect the measurement either.

VEGAPULS 62

- non-contact measurement
- high accuracy
- insensitive to vapour, pressure and temperature

Smelting of aluminium



Storage of aluminium oxide powder

Two tons of aluminium oxide (Al_2O_3) yield approx. one ton of aluminium. Before aluminium oxide is converted into liquid aluminium at 950 °C (1223 °F) in the electrolytic smelting process, the white powder must be temporarily stored in storage silos or day silos. Silo heights of up to 60 meters (ø up to 30 m) are not uncommon.

Continuous measurement of aluminium oxide powder

With a measuring range up to 70 m (230 ft) VEGAPULS 68 is simply unbeatable in the aluminium oxide silo. Level measuring techniques that physically touch the medium are subject to very high mechanical stresses and strains, which is why contactless measurement is an absolute must here. Neither dust nor filling noise can disturb VEGAPULS 68. In a silo with several filling zones, a number of radar sensors working together can create a surface profile.

Silo heights up to 35 m (115 ft) can also be measured with the guided microwave principle. VEGAFLEX 62 offers all the advantages of radar measurement. Dust, noise, buildup and repose angles do not play a role in the measurement. No adjustments are required to put the instrument into operation.

VEGAWAVE 62 as maximum detector in the aluminium oxide silo

The set-up and commissioning of VEGAWAVE 62 requires no special adjustments. Its length, which can be up to 20 m (66 ft), determines the exact location of the switching point. Its extensive function monitoring reports any overfilling safely and reliably.

VEGAPULS 68

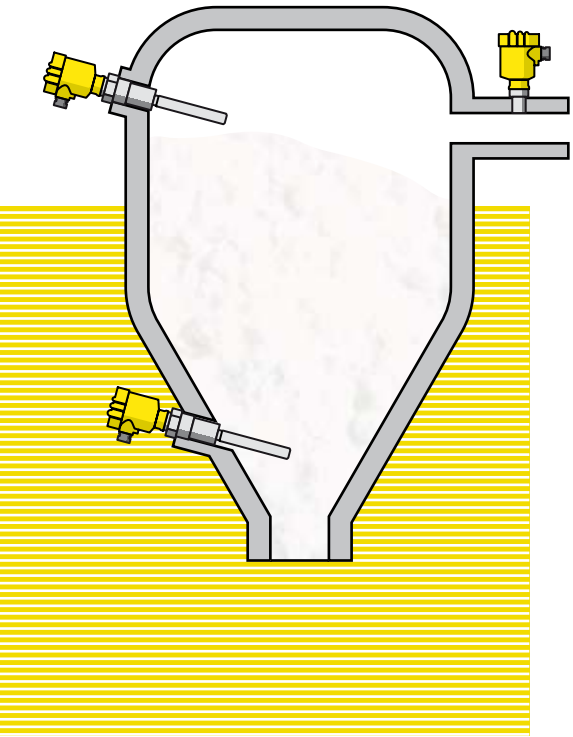
- non-contact measurement
- insensitive to dust, noise and process conditions
- measurement up to 70 m (230 ft)

VEGAFLEX 62

- easy set-up
- insensitive to dust and build-up
- cable can be shortened
- unaffected by product characteristics

VEGAWAVE 62

- set-up requires no adjustment
- robust sensor construction
- insensitive to build-up
- high operational reliability (SIL 2)



Dispensing powder into the electrolytic cell

Directly above the electrolytic smelting cell are smaller, approx. 1 m ... 1.5 m (3 ... 4.9 ft) high buffer containers which are charged pneumatically via pipelines. Small quantities of aluminium oxide powder are discharged from them into the molten mass.

Full and empty detector in the buffer container

VEGAWAVE 61 is installed on the side or at the top of the container and detects the maximum or minimum filling level very reliably. No adjustment is required for set-up. It is not bothered by the dust and the strong prevailing magnetic fields. If absolutely dry air is not used in the charging process, heavy build-up can form, possibly blocking the vibrating fork. In this case, VEGACAP 62 is the right limit switch. Thick build-up does not disturb its function.

Monitoring the feed pressure with VEGABAR 54

The conveyor pipes are the arteries of the aluminium smelter. Constrictions or blockages can lead to production downtime. VEGABAR 54 is the ideal, reliable pressure transmitter for monitoring the conveyor pipes and the pressure conveyor vessel. Due to its front-flush ceramic diaphragm, it dependably resists abrasion and build-up.

VEGAWAVE 61

- set-up requires no adjustment
- robust sensor construction
- insensitive to build-up
- high operational reliability (SIL 2)

VEGACAP 62

- easy set-up
- robust construction
- insensitive to build-up
- high operational reliability (SIL 2)

VEGABAR 54

- robust sensor construction
- easy set-up
- front-flush ceramic measuring cell
- high operational reliability (SIL 2)

Instrument overview

VEGAPULS 62

plics

Radar sensor for continuous level measurement of liquids in K-band technology

- application e.g. in the bauxite mixer
- independent of product temperature
- independent of product characteristics
- very small minimum distance
- measuring accuracy +/-3 mm

Process temperature:	-40 ... +200 °C (-40 ... +392 °F)
Process pressure:	-1 ... 40 bar (-14.5 ... 580 psig)
Process fitting:	flange from DN 50 resp. ANSI 2" thread from G 1½ A resp. 1½ NPT
Measuring range:	up to 35 m (115 ft)

SIL

VEGAPULS 67

plics

Radar sensors for continuous level measurement of solids in K-band technology

- ideal solution for measurement of bulk solids in medium-sized vessels
- unaffected by dust generation, air flow and filling noise
- measuring accuracy +/-15 mm
- easy installation and set-up

Process temperature:	-40 ... +80 °C (-40 … +176 °F)
Process pressure:	-1 ... 2 bar (-14.5 ... +29 psig)
Process fitting:	flange from DN 80 resp. ANSI 3" or mounting strap
Measuring range:	up to 15 m (49 ft)

VEGAPULS 68

plics

Radar sensor for continuous level measurement of solids in K-band technology

- ideal solution for measurement of bulks solids in large silos and bunkers
- unaffected by dust generation, air flow and filling noise
- measuring accuracy +/-15 mm
- easy installation due to small process fitting

Process temperature:	-40 ... +200 °C (-40 ... +392 °F)
Process pressure:	-1 ... 40 bar (-14.5 ... 580 psig)
Process fitting:	flange from DN 50 resp. ANSI 2 thread G 1½ A resp. 1½ NPT
Measuring range:	up to 70 m (230 ft)

SIL

Instrument overview

VEGAPULS 68

plics®

Radar sensor for continuous level measurement of solids in K-band technology with parabolic antenna

- ideal for very large measuring ranges
- for measurement of bulk solids in very large silos and bunkers
- unaffected by dust generation, air flow and filling noise
- optimal focusing by parabolic antenna
- measuring accuracy +/-15 mm

Process temperature:	-40 ... +200 °C (-40 ... +392 °F)
Process pressure:	-1 ... 40 bar (-14.5 ... 580 psig)
Process fitting:	flange from DN 50 resp. ANSI 2 thread G 1½ A resp. 1½ NPT
Measuring range:	up to 70 m (230 ft)

SIL

VEGAFLEX 61

plics®

Level sensor according to the guided microwave (TDR) principle for lightweight solids and liquids

- application e.g. in fillers
- set-up without adjustment
- independent of product characteristics
- unaffected by dust generation and filling noise
- measuring accuracy +/-3 mm

Process temperature:	-40 ... +150 °C (-40 ... +302 °F)
Process pressure:	-1 ... 40 bar (-14.5 ... 580 psig)
Process fitting:	flange from DN 25 resp. ANSI 1" thread from G ¾ A resp. ¾ NPT
Measuring range:	cable up to 32 m (105 ft)

SIL

VEGAFLEX 62

plics®

Level sensor according to the guided microwave (TDR) principle for heavy-duty solids and liquids

- application e.g. in aluminium oxide powder
- set-up without adjustment
- independent of product characteristics
- unaffected by dust generation and filling noise
- measuring accuracy +/-3 mm

Process temperature:	-40 ... +150 °C (-40 ... +302 °F)
Process pressure:	-1 ... 40 bar (-14.5 ... 580 psig)
Process fitting:	flange from DN 50 resp. ANSI 2" thread from G 1½ A resp. 1½ NPT
Measuring range:	cable up to 60 m (197 ft)

SIL

Instrument overview

VEGACAP 62

plics

Partly insulated capacitive rod electrode for level detection

- application e.g. as overfill protection in metering containers
- easy set-up
- easy installation and mounting
- robust and maintenance-free
- electrode can be shortened

Process temperature:	-50 ... +200 °C (-58 ... +392 °F)
Process pressure:	-1 ... 64 bar (-14.5 ... 928 psig)
Material:	316L insulation of PTFE
Measuring range:	up to 6 m (20 ft)

SIL

VEGACAP 65

plics

Capacitive cable electrode for level detection

- application e.g. as overfill protection in storage silos for ores
- easy set-up
- insensitive to build-up
- robust and maintenance-free
- electrode can be shortened

Process temperature:	-50 ... +200 °C (-58 ... +392 °F)
Process pressure:	-1 ... 64 bar (-14.5 ... 928 psig)
Material:	steel or 316L insulation of PTFE or PA
Measuring range:	up to 32 m (105 ft)

SIL

VEGAWAVE 61

plics

Compact vibrating level switch for bulk solids

- application e.g. as overfill protection in buffer containers
- wear- and maintenance-free
- product independent switch point
- easy set-up without adjustment

Process temperature:	-20 ... +80 °C (-40 … +176 °F)
Material:	steel or 1.4435, suspension cable made of PUR
Process fitting:	thread G 1½ A resp. 1½ NPT

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Instrument overview

VEGAWAVE 62

plics®

Compact vibrating level switch for bulk solids with extended cable suspension

- application as overfill protection in aluminium oxide powder
- wear- and maintenance-free
- product-independent switch point
- easy set-up without adjustment

Process temperature:	-20 ... +80 °C (-40 … +176 °F)
Material:	steel or 1.4435, suspension cable made of PUR
Process fitting:	thread G 1½ A resp. 1½ NPT
Electrode length:	up to 20 m (66 ft)

SIL

VEGABAR 52

plics®

Pressure transmitter with inner CERTEC® measuring cell

- use as pressure monitoring for gases
- measurement accuracy 0.1 %
- insensitive to build-up
- highly resistant due to ceramic-capacitive sensor element
- long term stability

Process temperature:	-40 ... +120 °C (-40 … +248 °F)
Process pressure:	-1 ... 200 bar (-14.5 ... 2900 psig)
Process fitting:	G 1½ A manometer connection G 1½ A inside G ¼ A ½ NPT inside ¼ NPT
Measuring range:	-1 … 60 bar (-14.5 ... 870 psig)

SIL

VEGABAR 54

plics®

Pressure transmitter with inner or front-flush CERTEC® measuring cell

- for measurement of liquids
- high abrasion resistance due to ceramic CERTEC® measuring cell
- high overload resistance
- measurement accuracy 0.1 %

Process temperature:	-40.. +120 °C (-40 …+248 °F)
Process pressure:	-1 ... 200 bar (-14.5 ... 2900 psig)
Process fitting:	thread from G 1 A resp. 1 ½ NPT flange from DN 40 resp. ANSI 2"
Measuring range:	-1 … 60 bar (-14.5 ... 870 psig)

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