

# Level and pressure instrumentation for the aggregates and mining industry



Application examples and products

Looking Forward

**VEGA**



## Measurement technology for the aggregates and mining industry

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





■ <b>Crusher</b>	Level measurement and point level detection	■ <b>Lime powder silo</b>	Level measurement and point level detection
■ <b>Bulk solids stockpile</b>	Level measurement	■ <b>Bitumen tank</b>	Level measurement and point level detection
■ <b>Conveyor belt transfer station</b>	Level measurement and point level detection	■ <b>Silo for ready mixed asphalt</b>	Level measurement and point level detection
■ <b>Buffer and production silos</b>	Level measurement	■ <b>Styrofoam silo</b>	Level measurement and point level detection
■ <b>Mobile silos</b>	Level measurement	■ <b>Mixing tower</b>	Level measurement and point level detection
■ <b>Lime kiln</b>	Level measurement	■ <b>Conveyor belt</b>	Mass flow measurement

All applications can be found at





[www.vega.com/aggregates-and-mining](http://www.vega.com/aggregates-and-mining)

# All sensors at a glance

## Continuous level measurement

Instrument type		Measuring range	Process fitting	Process temperature	Process pressure
<b>VEGAFLEX 82</b> TDR sensor for continuous level measurement of bulk solids		up to 75 m	Thread from G¾, ¾ NPT, flanges from DN 25, 1"	-40 ... +200 °C	-1 ... +40 bar (-100 ... +4000 kPa)
<b>VEGAPULS 68</b> 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)
<b>VEGAPULS 69</b> 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)
<b>WEIGHTRAC 31</b> 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
<b>VEGACAP 64</b> Capacitive rod electrode for level detection of adhesive products		up to 4 m	Thread from G¾, ¾ NPT, flanges from DN 25, 1"	-50 ... +200 °C	-1 ... +64 bar (-100 ... +6400 kPa)
<b>VEGACAP 65</b> 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)
<b>VEGAMIP 61</b> Microwave barrier for level detection in bulk solids and liquids		up to 100 m	Thread from G1½, 1½ NPT, flanges, clamp, mounting strap	-40 ... +80 °C, +450 °C with mounting adapter	-1 ... +4 bar (-100 ... +400 kPa)
<b>VEGAWAVE 62</b> Vibrating level switch with suspension cable for powders		Bulk solids from 8 g/l	Thread from G1½, 1½ NPT, flanges from DN 50, 2"	-40 ... +150 °C	-1 ... +6 bar (-100 ... +600 kPa)

## Pressure measurement

Instrument type		Deviation	Process fitting	Process temperature	Measuring range
<b>VEGABAR 83</b> Pressure transmitter with metallic measuring cell		0.2 % 0.1 % 0.075 %	Thread from G½, ½ NPT, flanges from DN 25, 1"	-40 ... +200 °C	-1 ... +1000 bar (-100 ... +100000 kPa)

## Signal processing

Instrument type		Technology	Input	Output	Voltage supply
<b>PLICSMOBILE T61</b> External radio unit for plics® sensors		GSM/GPRS	1 x plics® sensor	VEGA Inventory System, e-mail, SMS	9.6 ... 32 V DC



## Aggregates and mining

### **Robust measurement technology**

For many years the robust measurement technology from VEGA has proven itself in all areas of mining and processing of building materials. From rocks to fine gypsum to asphalt: VEGA sensors reliably measure the contents of silos, enabling optimal production.

### **Quality pays off**

In order to withstand the harsh operating conditions common in building materials production, the instruments have to be of the highest quality. The robust sensor design ensures a long service life and an excellent payback on investment.

### **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 now it is made even easier with Bluetooth and an app for smartphones.





## plics<sup>®</sup> – easy is better

### Instrument platform plics<sup>®</sup>

The plics<sup>®</sup> 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<sup>®</sup> 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 ensured even in noisy environments

### Cost effective

Uninterrupted operation thanks to optimal process feed

### User friendly

Simple installation and setup

### Level measurement and point level detection in rock crushers

The large boulders are extracted from the solid bedrock with blasting. This very first stage in the process is needed to enable these very large rocks to be crushed by smaller, secondary jaw and roller crushers, which create the smaller sizes for screening to produce the basic building materials like gravel, grit or sand. To enable efficient, continuous operation and keep wear on the crusher as low as possible, level measurement and point level detection are required.



#### VEGAPULS 69

Non-contact level measurement with radar in rock crushers

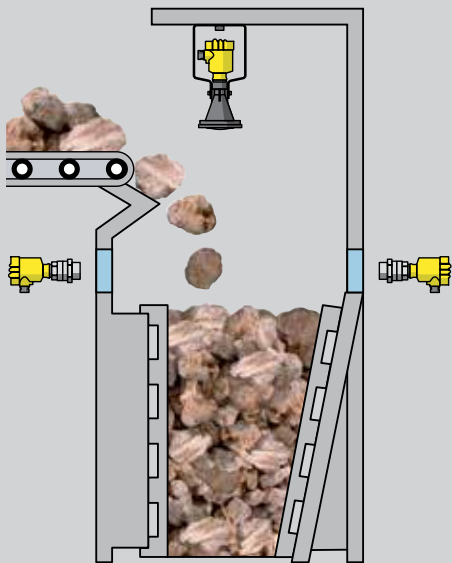
- Reliable measurement and control, independent of extreme dust generation and weather conditions
- Maximum operational reliability through noise insensitivity
- Maintenance-free non-contact measuring method



#### VEGAMIP 61

Microwave barrier for point level detection in rock crushers

- Maintenance-free non-contact measuring method
- High measurement certainty despite dirt and buildup
- Even external measurement via solid plastic or ceramic window





## Bulk solids stockpile

### Reliable

Reliable measurement is ensured in all weather conditions

### Cost effective

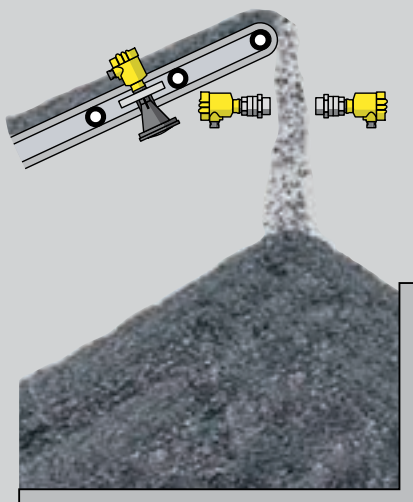
Optimum utilization of stockpile capacity

### User friendly

Maintenance-free operation

### Level measurement of stockpiles

After being crushed, screened and sorted into different grain sizes, the gravel and sand are transported on conveyors and stored in large stockpiles. To automate the stockpiling levels and enable the optimum area to be filled, a reliable level measurement is essential.



### VEGAPULS 69

Non-contact stockpile monitoring with radar

- Reliable stockpile control, unaffected by material flow and weather conditions
- Maintenance-free operation, thanks to non-contact measurement
- Optimal monitoring of the filling process at the stockpile



### VEGAMIP 61

Conveyor belt empty alarm with microwave barrier

- Reliable empty alarm system for conveyor belt
- Long service life, thanks to robust construction
- Unaffected by soiling and buildup



## Conveyor belt transfer station

### Reliable

Reliable monitoring of silo filling

### Cost effective

Optimal utilization of conveyor belt capacity

### User friendly

Maintenance-free operation

### Level measurement and point level detection at the belt transfer point

The transport of coarse and fine bulk solids within a stone processing facility takes place in most cases via conveyor belts. To achieve an even throughput and compensate for volume fluctuations during transport, belt transfer points are integrated in the conveyor line. The incoming bulk material is briefly stored in a buffer silo to prevent belt overfilling. This is the point where the level and the point level must be monitored.



### VEGAPULS 69

Non-contact level measurement with radar at the belt transfer station

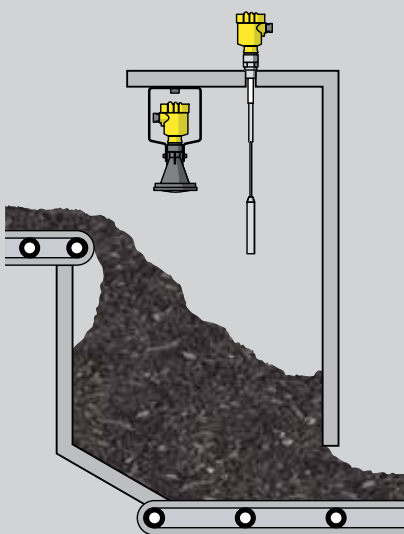
- Highly reliable even in dusty environments
- Maintenance-free non-contact measurement
- Maximum operational reliability due to noise insensitivity



### VEGACAP 65

Overflow protection with capacitive point level detection at the belt transfer station

- Reliable measuring results, unaffected by buildup
- Dependable switching point ensured by large gravity weight
- Long service life thanks to robust, cut to length cable probe







## Buffer and production silos

### Reliable

Reliable measurement even in dusty and noisy environments

### Cost effective

Optimal storage capacity

### User friendly

Maintenance-free operation of the facility

### Level measurement in buffer and production silos

After crushing and screening, the different aggregates are transported via conveyor belts and distributed among the silos. Before further processing, the stones, gravel or rock flour are stored in buffer and production silos. To ensure optimal material storage, a precise level measurement is required.



### VEGAPULS 69

Non-contact level measurement with radar in buffer and production silos

- Reliable measurement, independent of dust, abrasion and product moisture content
- Maximum operational reliability through insensitivity to noise
- Maintenance-free non-contact measurement





## Mobile silos

### Reliable

Reliable measurement  
of widely different media

### Cost effective

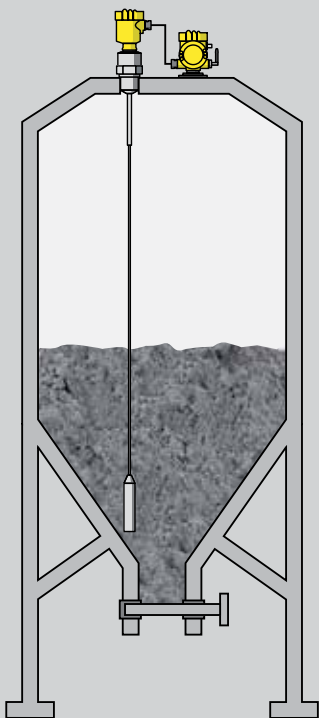
Optimal storage of material

### User friendly

Maintenance-free operation

### Level measurement in mobile silos

In order to distribute building materials such as mortar, stucco or plaster effectively, they are delivered directly to the construction site in mobile silos. In mixer systems, the materials have water added and the building material utilised as required. Level measurement ensures that there is always sufficient material in the silo.



### VEGAFLEX 82

Level measurement with guided radar in mobile silos

- High measurement certainty even with buildup
- High availability ensured, as wear and maintenance-free
- Cut to length sensors allow simple standardization



### PLICSMOBILE T61

Transmitting unit for wireless transmission of measured values

- Transmission of level data via GSM
- Remote diagnosis and maintenance
- Long battery life thanks to integrated power management system



## Lime kiln

### Reliable

Reliable measuring results even at high process temperatures

### Cost effective

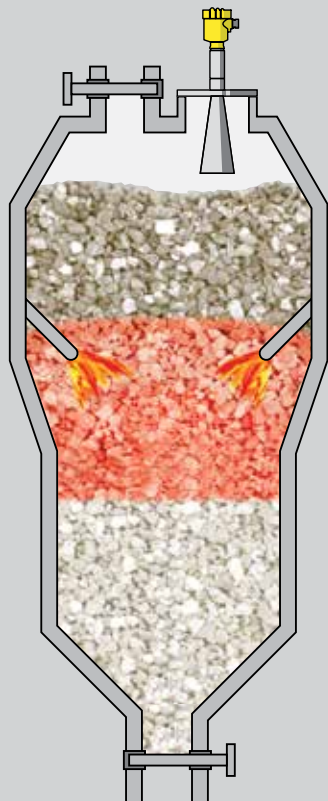
Accurate charging of the lime kiln

### User friendly

Maintenance-free operation

### Level measurement in the lime kiln

A lime kiln is used to produce quicklime through the calcination of limestone. Here the furnace is filled from the top and the calcined limestone (quicklime) is collected at the bottom of the furnace. Accurate level measurement ensures optimal charging and hence efficient operation of the furnace.



### VEGAPULS 68

Non-contact level measurement with radar in the lime kiln

- Reliable measuring results ensured, even at high temperatures
- No additional cooling system necessary
- Continuous operation of the plant ensured, because wear and maintenance-free



## Lime powder silo

### Reliable

Reliable measurement ensured under all operating conditions

### Cost effective

Optimal storage of the product

### User friendly

Wear and maintenance-free

### Level measurement and point level detection in lime powder silos

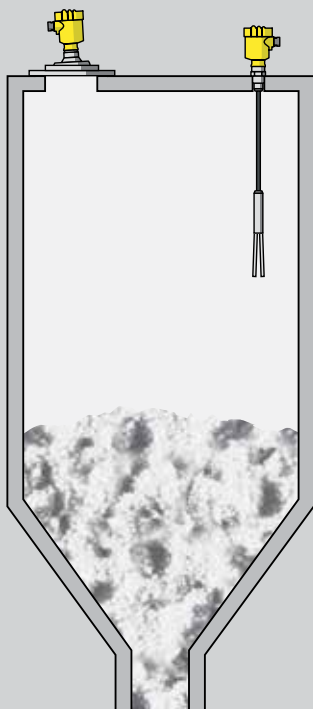
After the calcined lime is cooled, it is sorted into different sizes and stored for further processing. Most of the lime is further processed to lime powder. For optimum production planning, a reliable level measurement is a must.



#### VEGAPULS 69

Non-contact level measurement with radar in lime powder silos

- Reliable measurement despite heavy sensor buildup
- Very good beam focusing enables exact measurement, even with heavy deposits on the silo walls
- Maintenance-free operation thanks to non-contact measuring method



#### VEGAWAVE 62

Overfill protection with vibrating level switch in fine lime silos

- Reliable function thanks to product-independent switching point
- Reliable detection despite adhesive media
- Simple setup and commissioning without calibration
- Wear and maintenance-free



## Bitumen tank

### Reliable

Reliable measurement and detection even at high temperatures

### Cost effective

Optimal utilization of storage capacity

### User friendly

Simple setup and commissioning

### Level measurement and point level detection in bitumen tanks

Bitumen is an important ingredient in asphalt production. It binds stone aggregates together to form the finished asphalt. To enable cost-effective asphalt production, reliable level measurement and overfill protection in the storage tank is required.



### VEGABAR 83

Hydrostatic pressure transmitter for level measurement in bitumen tanks

- Unaffected by foaming
- Simple setup without filling



### VEGACAP 64

Capacitive level switch for high level overfill protection in bitumen tanks

- Reliable switching even with heavy buildup
- Long service life thanks to robust construction
- Simple to set up, low maintenance



## Silo for ready mixed asphalt

### Reliable

Reliable measuring results even at high temperatures

### Cost effective

Optimal utilization of storage capacity

### User friendly

Simple installation

### Level measurement and point level detection in ready mixed asphalt silos

Different qualities are required from the asphalt depending on the usage and climatic conditions, so every asphalt mixture varies depending on the application. Asphalt is always extremely viscous, hot and highly adhesive. Due to these properties and the numerous different asphalt mixtures, reliable level measurement and point level detection methods are essential.



### VEGAPULS 69

Non-contact level measurement with radar in mixed asphalt loading silos

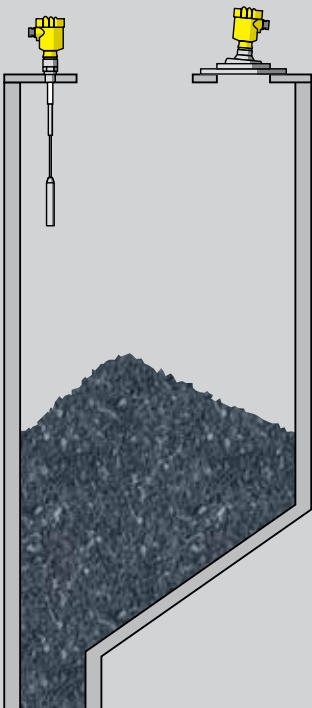
- Reliable measurement, independent of condensation and high temperatures
- Easy alignment of sensor with integrated swivel mount and app for smartphones
- Maintenance-free, as non-contact measuring method



### VEGACAP 65

Capacitive overfill protection in mixed asphalt loading silos

- Long service life, thanks to robust mechanical construction
- Unaffected by buildup, condensate and high temperatures
- Reliable switching point through use of large gravity weight





## Styrofoam silo

### Reliable

Reliable volume measurement of very lightweight media

### Cost effective

Optimal use of storage capacity

### User friendly

Maintenance-free operation

### Level measurement and point level detection in Styrofoam silos

In the manufacture of stucco with special insulating properties, Styrofoam is also added to the traditional sand, lime and cement mixture. With a bulk density of only a few grams per litre, Styrofoam balls are extremely light and therefore very difficult to measure. For cost-effective storage, reliable level measurement and point level detection are required.



#### VEGAPULS 69

Non-contact level measurement with radar in Styrofoam silos

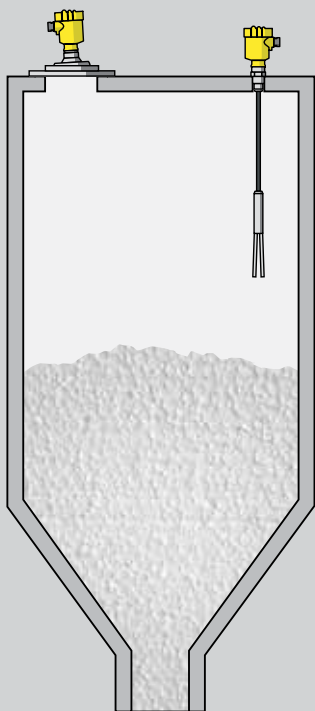
- Easy alignment of measuring instrument thanks to integrated swivel mount and app for smartphones
- Reliable measurement in spite of very lightweight medium
- Maintenance-free operation through use of encapsulated antenna system



#### VEGAWAVE 62

Overfill protection with vibrating level switch in Styrofoam silos

- Reliable function ensured by product-independent switching point
- High sensitivity even with low bulk densities
- Simple setup without calibration





## Mixing tower

### Reliable

Reliable measurement in all types of media

### Cost effective

Optimal material storage

### User friendly

Maintenance-free operation

### Level measurement and point level detection in mixing towers

Materials such as concrete and mortar are needed in widely different compositions depending on the application. The various raw materials are stored in segmented towers, which then blend cement, lime and other aggregates according to specific requirements. In each individual segment, reliable level measurement and point level detection ensure the constant availability of the raw materials and cost-effective operation of the plant.



#### VEGAPULS 69

Radar sensor for non-contact level measurement in mixing towers

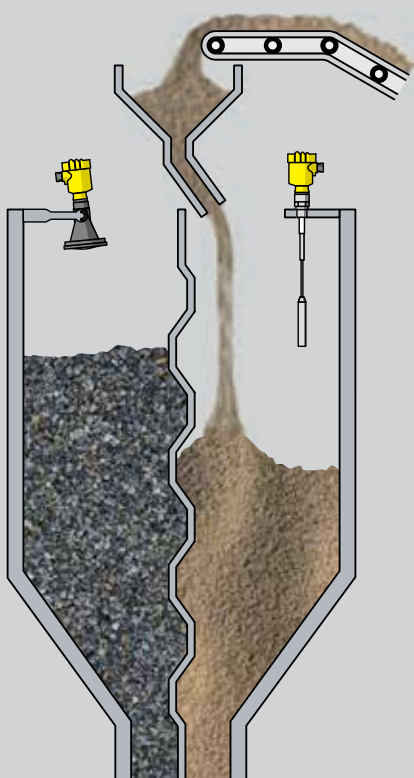
- Easy alignment of the measuring instrument thanks to integrated swivel mount and app for smartphones
- Reliable measurement in spite of dust, noise and internal structures
- Wear and maintenance-free, ensures continuous operation of the plant



#### VEGACAP 65

Point level detection with capacitive probe in mixing towers

- Reliable measurement despite buildup and dust
- Long service life thanks to robust construction
- Simple installation 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

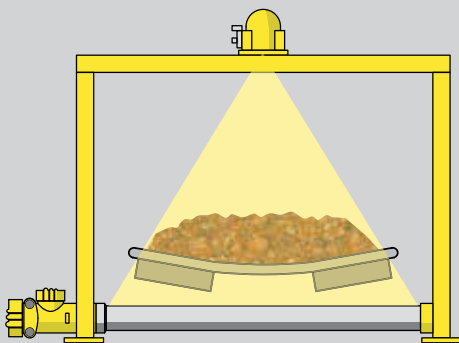
- Reliable measurement, independent of dust and dirt
- Accurate and repeatable mass flow measurement
- Wear-free, contactless weighing



### 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





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