

# Level and pressure instrumentation for the offshore industry



Application examples and products



## Measurement technology for offshore applications

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

■ <b>Storage tank for liquid raw materials</b>	Level measurement and point level detection	■ <b>Primary desalter</b>	Interface and density measurement
■ <b>Storage tank for solid raw materials</b>	Level measurement and point level detection	■ <b>Gas separators (scrubbers)</b>	Pressure, level and interface measurement
■ <b>Mud tank level</b>	Level measurement	■ <b>Flare knockout drum</b>	Level measurement
■ <b>Trip tank</b>	Level measurement	■ <b>Wave and draught height</b>	Wave height measurement
■ <b>Shaker</b>	Level measurement and point level detection	■ <b>Ballast tanks</b>	Level measurement and point level detection
■ <b>Oil separators</b>	Pressure, level and interface measurement	■ <b>Wastewater sump (open drain)</b>	Level measurement

All applications can be found at

**[www.vega.com/en/offshore](http://www.vega.com/en/offshore)**

Continuous level measurement					
Instrument type		Measuring range	Process fitting	Process temperature	Process pressure
<b>VEGAFLEX 81</b> TDR sensor for continuous level and interface measurement of liquids		up to 75 m	Thread from G¾, ¼ NPT, flanges from DN 25, 1"	-60 ... +200 °C	-1 ... +40 bar (-100 ... +4000 kPa)
<b>VEGAFLEX 86</b> TDR sensor for continuous level and interface measurement of liquids		up to 75 m	Thread from G¾, ¼ NPT, flanges from DN 25, 1"	-196 ... +450 °C	-1 ... +400 bar (-100 ... +40000 kPa)
<b>VEGAPULS 61</b> Radar sensor for continuous level measurement of liquids		up to 35 m	Thread from G1½, 1½ NPT, flanges from DN 80, 3", mounting strap	-40 ... +80 °C	-1 ... +3 bar (-100 ... +300 kPa)
<b>VEGAPULS 62</b> 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)
<b>VEGAPULS 64</b> Radar sensor for continuous level measurement of liquids		up to 30 m	Thread from G¾, ¼ NPT, flanges from DN 50, 2", mounting strap	-40 ... +200 °C	-1 ... +20 bar (-100 ... +2000 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>SOLITRAC 31</b> Radiation-based sensor for continuous level measurement		up to 3 m	Mounting from outside on the vessel	any (with optional cooling)	any
Point level detection					
Instrument type		Measuring range	Process fitting	Process temperature	Process pressure
<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>VEGASWING 61/63</b> Vibrating level switch for liquids		up to 6 m	Thread from G¾, ¼ NPT, flanges from DN 25, 1"	-50 ... +250 °C	-1 ... +64 bar (-100 ... +6400 kPa)
<b>MINITRAC 31</b> Radiation-based sensor for density measurement		Density measurement	Mounting from outside on pipeline or on vessel	any (with optional cooling)	any
Pressure measurement					
Instrument type		Deviation	Process fitting	Process temperature	Measuring range
<b>VEGABAR 81</b> Pressure transmitter with chemical seal		0.2 %	Thread from G½, ½ NPT, flanges from DN 25, 1"	-90 ... +400 °C	-1 ... +1000 bar (-100 ... +100000 kPa)
<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)
<b>VEGAWELL 52</b> Submersible pressure transmitter with ceramic measuring cell		0.1 % 0.2 %	Straining clamp, thread, suspension cable, threaded fitting of 316L, PVDF, Duplex, Titanium	-20 ... +80 °C	0 ... +60 bar (0 ... +6000 kPa)



## Offshore



### Reliable under harsh conditions

Offshore platforms and FPSO ships place heavy demands on measurement technology. The instrumentation out on deck is exposed to extreme mechanical and climatic stresses. Wind, storm and saltwater assault the sensors outside, whereas inside the process, very high process temperatures and pressures are the challenge. The plics® instrument generation meets these challenges through the use of both sensor and housing technology optimally adapted to the application. Of course, they are also compliant with the requirements of NACE and Norsok, as well as all established marine classification societies.



### Reliable measurement in all media

In the offshore business, widely different media have to be reliably measured. Whether in mud, additives, oil/water mixtures or gas atmospheres – the properties of the measured media can be very different in consistency, density and electrical properties. From coarse, fine, caking or abrasive bulk solids to highly viscous, sticky, aggressive or ultra-pure liquids or cold and hot gases: VEGA provides customized, individual solutions that guarantee reliable measurement data.

### Classification

VEGA sensors are certified according to all major ship classifications such as ABS, BV, CCS, DNV, GL, LR and Rina.



Det Norske Veritas



Germanischer Lloyd



Bureau Veritas



Registro Italiano  
Navale



China Classification  
Society



Lloyd's Register of  
Shipping



American Bureau of  
Shipping



## 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.





## Storage tank for liquid raw materials

### Reliable

Reliable measurement, independent of product characteristics

### Cost effective

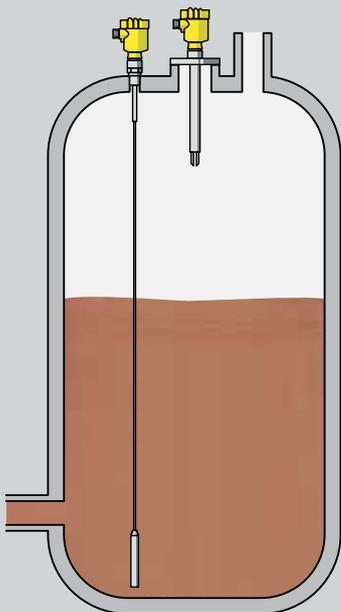
Maintenance-free operation

### User friendly

Simple setup and commissioning

### Level measurement and point level detection of liquid raw materials in storage tanks

Oils and alkaline solutions are among the liquid raw materials for the mud mixtures. These additives are stored on the drilling platform in special storage tanks. To ensure the continuous production of drilling mud, the level of raw materials in the storage tanks must be exactly monitored.



### VEGAFLEX 81

Level measurement with guided radar in storage tanks for liquid raw materials

- Simple project planning enabled by shortenable rod and cable probes
- Long service life thanks to highly resistant materials
- Non-sensitive to buildup and foam



### VEGASWING 63

Level switch for detecting the maximum level in the storage tank for liquid raw materials

- Reliable measurement, independent of mud characteristics
- Robust construction ensures a long service life
- Simple setup without adjustment



## Storage tank for solid raw materials

### Reliable

Reliable measurement under rough conditions

### Cost effective

Maintenance-free operation despite the presence of abrasive and adhesive products

### User friendly

Simple installation and setup

### Level measurement and point level detection in the storage tank for solid raw materials

The solid raw materials such as gravel, clay, barite, cement and binders are essential for creating the different properties of the drilling mud.

These materials are stored for mud production in storage tanks.

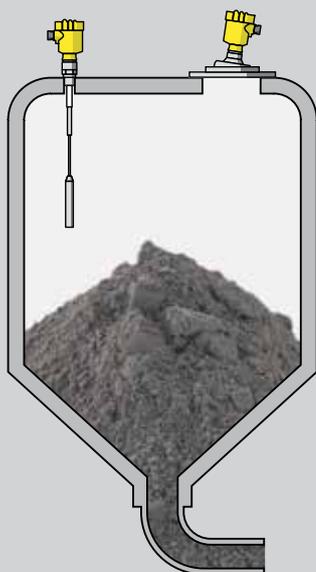
To ensure optimal storage, reliable level measurement and point level detection are required.



### VEGAPULS 69

Level measurement with radar in the storage tank for solid raw materials

- Swivelling holder allows optimal sensor alignment
- High equipment availability, as wear and maintenance-free
- Reliable measurement, unaffected by dust and noise



### VEGACAP 65

Capacitive level switch prevents overflowing in the storage tank for solid raw materials

- Robust design ensures a long service life
- SIL2 qualification increases plant safety
- Easy on-site customization thanks to shortenable cable probe



## Mud tank level

### Reliable

Reliable measurement despite rough conditions

### Cost effective

Maintenance-free operation even in adhesive media

### User friendly

Simple installation thanks to small antenna systems

### Level measurement in mud tanks

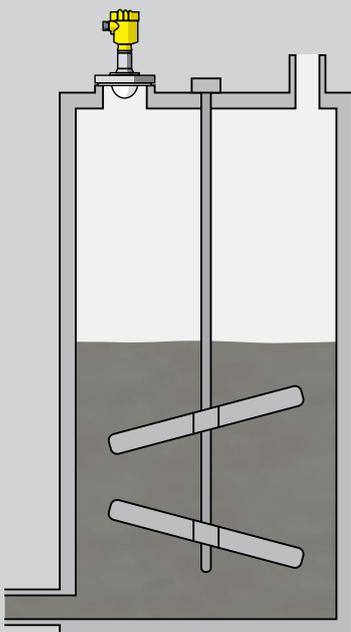
In the mud tanks, agitators or jet nozzles stir and mix the mud to ensure a homogeneous mixture. To enable a continuous process, the level measurement must be reliable and independent of the composition of the drilling mud.



### VEGAPULS 64

Non-contact level measurement with radar in mud tanks

- High measurement accuracy, independent of the properties of the medium
- Strong signal focusing ensures reliable measurement even with an agitator
- Continuous, maintenance-free operation despite heavy soiling





## Trip tank

### Reliable

Reliable measurement, independent of the characteristics of the drilling mud

### Cost effective

Maintenance-free and accurate determination of mud usage

### User friendly

Simple installation and setup

### Level measurement in the trip tank

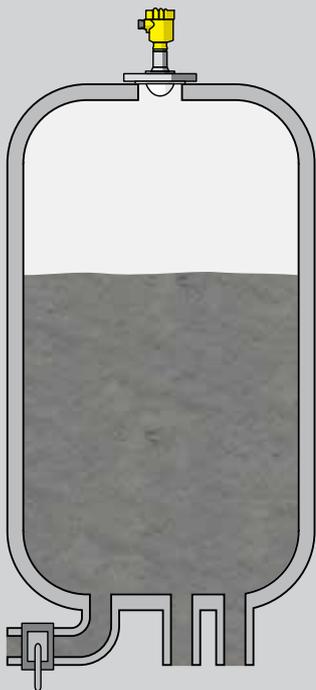
The drilling mud flowing back under high pressure from the drilling well is held and monitored in the trip tank. This drilling mud is contaminated with sea water, rocks and sand. In addition to materials like rocks and sand, residues of oil and gas are also present. The built-in level measuring system provides feedback about down-well conditions, basic data for comparing the quantity of drilling mud fed into the wellbore with that returned, as well as regulating mud production.



### VEGAPULS 64

Level measurement with radar in the trip tank

- Reliable measurement ensured even with varying drilling mud composition
- Exact measuring results, independent of pressure, temperature and gas
- Maintenance-free operation thanks to non-contact measurement method





## Shaker

### Reliable

Reliable measurement, independent of the process conditions

### Cost effective

Ensures effective processing of the drilling mud

### User friendly

Simple installation and setup from above

### Level measurement and point level detection in the shaker

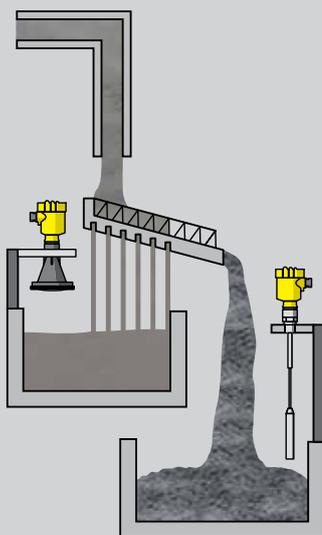
Through the effects of strong vibration in the shaker, the liquid and solid components of the drilling mud returning from the borehole are separated from each other. The drilled rock and the sand are disposed of and the valuable drilling mud is fed back into the continuous drilling process. Level measurement and point level detection are absolutely necessary for effective processing of the drilling mud in the shaker.



### VEGAPULS 64

Non-contact level measurement with radar in the shaker

- Accurate measurement, independent of media properties
- Reliable measurement, unaffected by vibration and buildup
- High equipment availability, as wear and maintenance-free



### VEGACAP 65

Capacitive level switch for point level detection in the shaker

- Long service life thanks to robust mechanical construction
- Reliable switching point ensured by large gravity weight
- Maintenance-free operation, as non-sensitive to soiling



## Oil separators

### Reliable

Measurement results are unaffected by process conditions

### Cost effective

Efficient operation and high oil quality

### User friendly

Maintenance-free operation

### Level and pressure measurement in an oil separator

The separator vessel contains a mixture of crude oil, gas, water and sand extracted from the subsea well. Precise monitoring of these multiple separation interfaces and emulsions play a vital role in ensuring the quality of the oil separator for separation. Exact control of interfaces, level and pressure allows optimum utilization of the oil separator and increases the effectiveness of the entire asset.



#### VEGABAR 83

Pressure transmitter for monitoring pressure in the oil separator

- High plant availability due to high overload resistance
- High resistance of the measuring cell ensures a long service life
- Small process fitting reduces installation costs



#### MINITRAC 31

Radiometric multi-phase interface measurement in the oil separator

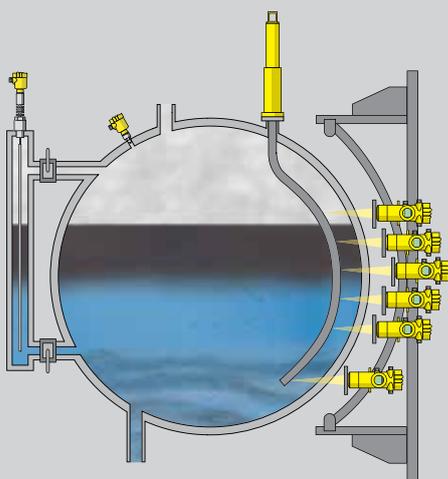
- High process transparency through accurate detection of separation layers
- Ensures continuous operation of the facility through non-contact measuring method
- Measurement unaffected by pressure and temperature because sensor is installed outside of the tank



#### VEGAFLEX 86

Level measurement with guided radar in the oil separator

- Independent of medium density and therefore highly accurate
- Doubly secure thanks to the "Second Line of Defense"
- Shortenable rod probe allows high flexibility during planning





## Primary desalter

### Reliable

High measuring precision,  
independent of process conditions

### Cost effective

External mounting to the vessel,  
easily retrofitted

### User friendly

Simple air and water calibration  
for fast commissioning time

### Interface tracking in the primary desalter

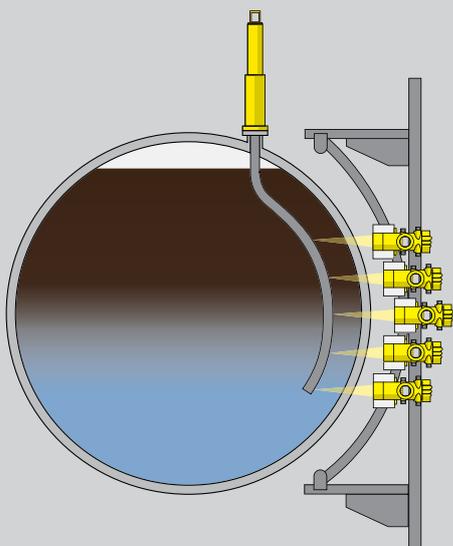
It is important that a desalter unit runs efficiently to prevent corrosion to downstream equipment. When the crude oil mixes with the emulsifying chemicals and water, the resulting emulsion layer makes it difficult for standard level measurement technologies to reliably track the interface. Radiation-based measuring instruments are not affected by this and allow to track the interface even with thick emulsion layers present in the tank to make sure that the desalting process can be controlled efficiently at maximum throughput.



### MINITRAC 31

Multi-point density array for multi-phase interface  
and emulsion control

- Reliably tracks emulsion layer to keep the process stream efficient
- Optimises use of emulsifiers and other treatment chemicals
- Remains online even when replacing a detector to eliminate downtime
- Allows operator to maintain high throughput even when switching between light to heavy feedstock





## Gas separators (scrubbers)

### Reliable

Reliable measurement, independent of process conditions

### Cost effective

Ensures an effective gas drying process, and thus high quality gas

### User friendly

Maintenance-free operation

### Level and pressure measurement in the gas separator

Extracted natural gas and gas residues from oil production are contaminated with water and are therefore collected in gas separators (scrubbers) for separation. Pressures of up to +150 bar keep the gas in the liquid state. Exact pressure and level measurement enable optimal utilization of the gas separator and effective control of the gas drying process. The separation of gas from water is carried out by chemically binding the water to glycol and separating it mechanically. Accurate measurement of the gas/water interface determines the quality of the gas.



### VEGAPULS 62

Level measurement with radar in the gas separator

- Exact measuring results, independent of pressure, temperature and gas
- Maintenance-free operation thanks to non-contact measurement method
- Easy to install in the tank

### VEGABAR 81

Pressure transmitter for monitoring pressure in the gas separator

- Reliable measurement despite high pressure and large temperature ranges
- Wear and maintenance-free thanks to highly resistant diaphragm materials

### VEGAFLEX 86

Interface measurement with guided radar in the gas separator

- Reliable measurement, independent of medium composition
- Doubly secure thanks to "Second Line of Defense"
- Maintenance-free, as non-contact measurement method



## Flare knockout drum

### Reliable

Reliable measurement, independent of process conditions

### Cost effective

Ensures effective operation of the equipment

### User friendly

Maintenance-free operation

### Level measurement in the flare knockout drum

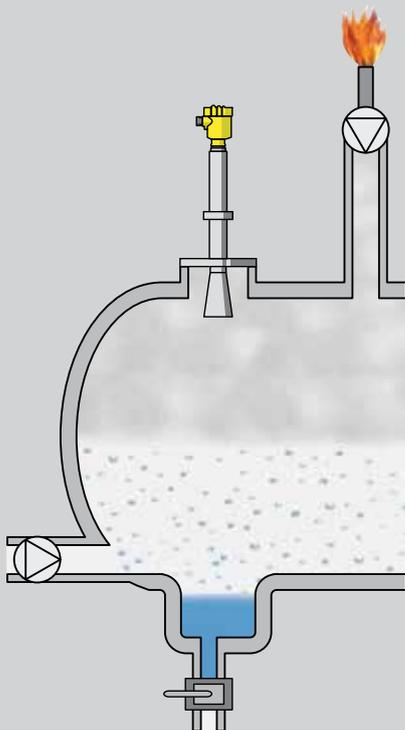
The unrecoverable residues of oil and gas production are collected in the flare knockout drum and liquefied at high pressure. The recovered liquid, the condensate, collects at the bottom of the vessel and is disposed of. The non-liquefied gases are decompressed and burned in the flare system. To ensure efficient and safe operation of the vessel, the level inside must be very reliably measured.



### VEGAPULS 62

Level measurement with radar in the flare knockout drum

- Exact measurement, independent of process conditions
- Maintenance-free thanks to non-contact measuring method
- Pressure and temperature stable antenna system of metal and ceramic with graphite seal





## Wave and draught height

### Reliable

Reliable measurement for protection of personnel and equipment

### Cost effective

Long service life thanks to the use of non-contact measurement method

### User friendly

Simple mounting

### Wave height measurement for a drilling and production platform

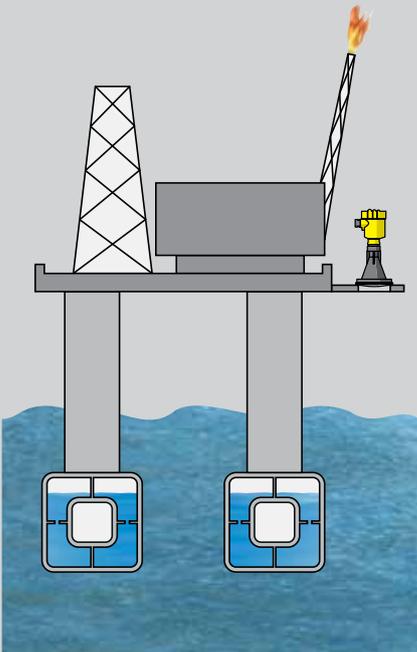
The height of floating drilling or pumping assets like platforms or FPSOs must be precisely maintained, even in the roughest seas with waves up to 30 m high. Environmental influences such as wind and waves must be measured quickly and accurately, then evaluated with GPS navigation data. Furthermore, quick and exact measurement of wave heights is needed should there be an evacuation, where “freefall lifeboats” need to be released to meet waves at their highest point.



### VEGAPULS 64

Measuring wave heights with non-contact radar

- Reliable measurement, independent of wind, temperature and fog
- Focussed 80 GHz beam and fast reaction for precision measurement
- Simple installation thanks to low weight of the sensors





## Ballast tanks

### Reliable

High platform stability through reliable measurement

### Cost effective

Long service life thanks to resistant materials

### User friendly

Simple installation and maintenance-free operation

### Level measurement and point level detection in the ballast tanks

Floating drilling or pumping assets such as platforms or FPSOs are stabilized by filling or emptying ballast tanks with seawater. This enables operators to critically and safely manage the ballast and trim of a vessel according to operational needs, deck loading and sea conditions. For trouble-free operation of the ballast system and the safety of personnel and equipment on board, reliable level measurement and point level detection are absolutely essential.



#### VEGAWELL 52

Hydrostatic pressure transmitter for level measurement in the ballast tanks

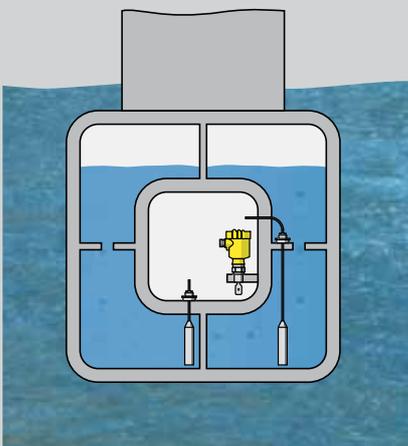
- High measuring accuracy increases safety on board
- Reliable and durable measurement ensured through robust, seawater resistant construction of sensor
- Simple installation from above



#### VEGASWING 61

Vibrating level switch for leakage detection in the ballast tanks

- High process reliability through SIL2 qualification
- Simple function test from the control room possible
- Maintenance-free operation





## Wastewater sump (open drain)

### Reliable

Reliable measurement,  
independent of weather conditions

### Cost effective

Effective utilization of the  
collecting tank

### User friendly

Simple installation

### Level measurement in rainwater collecting tanks

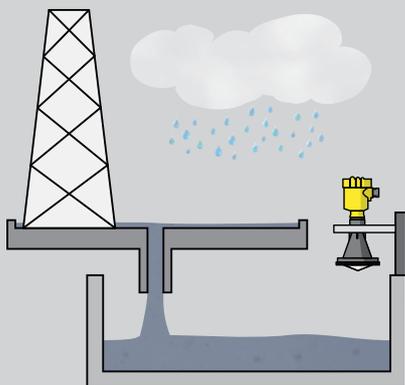
Rain run-off on board of oil platforms and ships is polluted with production residues and contaminants such as oil, sand and dirt. The rainwater with these contaminants must be collected in special tanks and properly disposed of. A reliable level measurement in the tank protects against overflow of the open drain removing the possibility of subsequent marine pollution.



### VEGAPULS 61

Non-contact level measurement with radar  
in the rainwater collection tank

- Reliable measurement, independent of medium composition
- Maintenance-free operation, as sensor is non-sensitive to soiling
- High measuring accuracy despite wind and temperature fluctuations





VEGA Grieshaber KG  
Am Hohenstein 113  
77761 Schiltach  
Germany

Phone +49 7836 50-0  
Fax +49 7836 50-201  
E-mail [info.de@vega.com](mailto:info.de@vega.com)  
[www.vega.com](http://www.vega.com)

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