Industry Information – Shipbuilding

Measurement technology for innovative shipbuilding

Looking Forward VEGA

Contents

Responsibility for human life and the environment at sea

VEGA's comprehensive offering of products and services for visualisation, measurement of level, switching and pressure is setting the standard in the shipbuilding industry. That's because VEGA systematically combine different physical measuring principles with the latest technologies to meet the demands of modern ship instrumentation. This is also because the company's guiding principle has absolute priority; long-term, fair collaboration based on high esteem for products and people.

Procurement from a single source: A complete line-up of measurement technology

Since the 1990's, VEGA has been the undisputed technological leader in the area of radar level measurement. Additional measuring principles, such as ultrasonic, guided microwave, vibrating level switches and capacitive measurement, round out the company's line-up of level and switching instrumentation. VEGA pressure transmitters measure process and differential pressure as well as hydrostatic pressure.

Modular and cost efficient: The instrument system plics®

plics® is VEGA's unique modular instrument system. It allows a customized combination of sensor, process fitting, electronics and housing for the user, who then gets exactly the measurement technology they really need. Additionally, it puts the instrument quickly into operation through amazingly simple, standardised adjustment procedures.

Precise and robust: Instrumentation for marine and naval applications

- Robust housing technology, for on-deck installation (protection class IP 66, IP 68 and IP 69 K)
- Encapsulated electronics, unaffected by condensation
- Oil and seawater resistant housings and cable materials
- Shock and vibration resistant
- Classifications as per ABS, CCS, DNV, GL, LR and RINA
- All sensors deployable in hazardous areas (Ex ia or Ex d)

Application diversity and reliability under all conditions

More than 90% of all worldwide goods are transported via ocean-going vessels. Such vessels are thus the most important means of transport for world trade. To lower the operating and personnel costs of merchant ships, the latest measurement technology is increasingly used on board. The conditions on the high seas, as well as the highly diverse applications on ships, place extremely high demands on the measurement technologies.

Container ships, frigates or tankers

The applications on board are as diverse as the ships themselves. Every type of ship has its own specific requirements on measurement – and VEGA has a fitting solution for each requirement. Whether cargo, ballast or forepeak tank: VEGA always has a reliable solution for the measuring task at hand.

Reliability under harsh conditions

Ocean-going ships place heavy demands on the electronics and sensor technology used on board. The instruments on deck are particularly exposed to extreme mechanical loads and climatic conditions. Breaking waves, salt water and vibration affect the instruments, as well tropical climate or ice formation during journeys in polar areas. The new plics® generation instruments meet these challenges with reliable, tried-and-tested sensor and housing technologies.

Every type of tank and pipe connection

From simple thread and flange connections, right through to complex special solutions, VEGA sensors always offer a suitable process fitting. Irrespective of the applied measuring principle, whether for ballast, cargo tanks, or even draught measurement: VEGA solutions give confidence in all areas of installation.

Measurement in the focus

Solutions from VEGA orientate themselves around the measuring tasks on board. “The correct measuring principle for every application” is our credo, when it comes to instrument selection. Depending on the application, there are up to six physical measuring principles available enable the optimal uncompromising measurement performance. Besides the physics, it’s the mechanical requirements, as well as the simple installation and setup, that are at the forefront of our development strategy.

plics® – easier is better

Indicating and adjustment module


PLICSCOM


VEGACONNECT

Electronics


4 … 20 mA/ HART


Profibus PA


Foundation Fieldbus


Level switch

Housing


Plastic


Stainless steel


Aluminium


Plastic double chamber


Stainless steel double chamber


Aluminium double chamber

Process fitting


Thread


Flange


Hygienic connection


Customer-specific

Sensor


Radar


Ultrasonic


Guided microwave


Capacitive


Vibration


Microwave barrier

Process pressure

Hydrostatic


Differential pressure

Explosion protection

Safety standards

Hygienic standards

Ship approvals

Forward-looking measurement technology orientates itself around the people who use it. That's why we developed plics® – the world's first modular product system for instrumentation. Every one of our sensors is custom built from plics® components and thus optimally fulfils the requirements of every industry and its specific applications.

Simpler planning with plics®

Being able to select and combine sensor, process fitting, electronics and housing without restrictions simplifies instrument selection and engineering for applications in machines and systems. Cost reduction with plics® thus starts already in the planning stage.

Clear advantages for shipyard and crew

Short delivery times, uncomplicated connection and simple setup and commissioning save the shipyard and the crew time and money. The configuration of VEGA instruments, their wiring and their initial operation are always the same. This knowledge can be applied to all plics® applications and measuring principles.

Assistance for the user

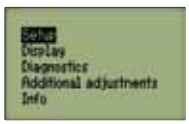
plics® delivers a convincing performance in daily use because of its high operational reliability, simplified maintenance and the reduced replacement part stocks resulting from designs using many identical components. In this area, the consistency of technology and operation simplifies and accelerates work with different plics® instruments. Adjustment always follows the same concept and is carried out via the menu-driven procedures in PLICSCOM, via on-site adjustment with a PC or via the control room.

Always smooth sailing with plics®

plics® provides the best prerequisites for reliable acquisition of all pressure, level and draught measurements. Experience, refined technology and robust construction form the basis of reliable measured value acquisition. For their worldwide use on ships, the sensors are tested and approved by the leading marine classification organisations.

- Cost-effective instrumentation via customised instrument configuration
- Chemically and mechanically robust housings through the use of high-resistance materials
- Simple planning, fast setup and commissioning
- Easy servicing via the saving of settings in the adjustment module

Where man and machine meet: Adjustment and system integration

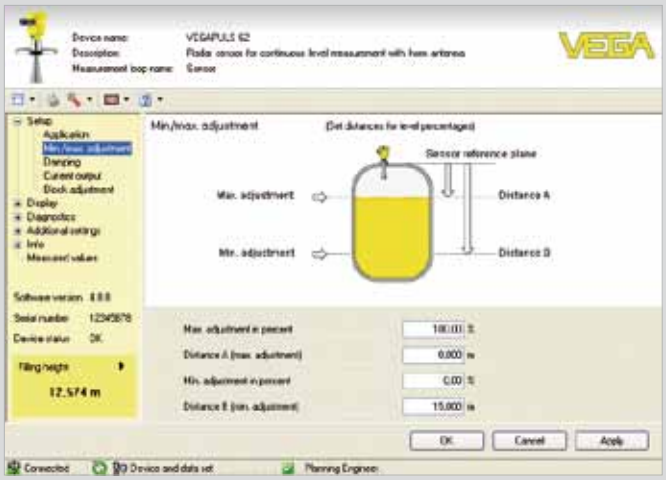


On-site instrument adjustment with PLICSCOM

The indicating and adjustment module PLICSCOM can be plugged into any plics® instrument at any time. It functions as a measured value indication on the instrument and as an on-site adjustment device. The structure of the adjustment menu is clearly organized and makes setup and commissioning easy. In addition, the status messages are displayed in clear, readable text. When an instrument is exchanged, PLICSCOM ensures fast availability of the measuring point: all sensor data are saved by pressing a key on the PLICSCOM and later copied into the replacement sensor.

Instrument adjustment via PC and control system

FDT/DTM technology is an innovative, manufacturer-independent description technology for field instruments. Complex field devices can be operated as easily with laptop computers and PCs as with the current engineering and operating environments of control systems. With DTMs, the sensors are configurable down to the last detail and important adjustments can be carried out easily and quickly. As a system-independent operating system for DTMs, PACTware is the first choice for many field device manufacturers. VEGA also delivers the corresponding field device descriptions for system environments that depend on EDD description technology.



HART COMMUNICATION PROTOCOL · PROFIBUS PROCESS FIELD BUS · Fieldbus Foundation · EDDL · FDT · PACTware

All current standards for measurement data transmission

VEGA offers practice-oriented solutions: from the proven 4 … 20 mA/HART measurement data transmission to fieldbus technologies like Profibus PA or Foundation Fieldbus, to wireless transmission. For level detection, the selection ranges from contactless switch, to relay and transistor right through to NAMUR signal.

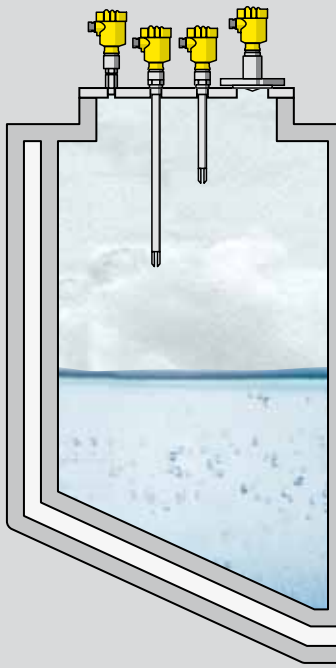
Communication at all levels

VEGA supports all important standards for uniform, centralized field instrument operation. If the instruments are integrated in primary management or control systems, the field instruments can be accessed for adjustment, servicing and diagnosis purposes via the existing infrastructure. Both DTM as well as EDD description technologies are supported.

Monitoring of cargo tanks

Storage tanks on board

The levels of storage tanks on board of chemical tankers must be continuously monitored because of strict safety and environmental requirements. Overfilling or product discharge on deck or into the sea could have devastating consequences for human life and the environment. The charging and discharging procedures have to be especially carefully supervised and under control. Continuous level measurement and redundant monitoring of conveyor pumps with level switches, are essential parts of the safety system. The internal pressure of the tanks is monitored continuously, to prevent damage to the tanks caused by overpressure or vacuum, during charging and discharging procedures or through fluctuations in external temperature.



Continuous level measurement with VEGAPULS 63

Radar measurement is not affected by product properties, temperature, pressure or superimposed gas. The PTFE antenna cover ensures optimum chemical resistance, even for applications in aggressive products. VEGAPULS 63 radar sensors deal with the changing conditions in the product tank safely and reliably.

Inert gas pressure measurement with VEGABAR 52

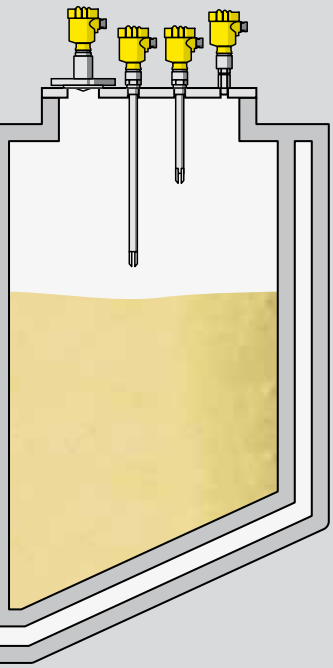
The VEGABAR 52 pressure transmitter is particularly suitable for monitoring the gas pressure in product tanks. Its ceramic-capacitive CERTEC® measuring cell enables precise monitoring of the internal tank pressure to within a few millibars and also withstands pressure shocks caused by rough seas.

VEGAPULS 63

- Non-contact measurement
- Wetted parts of PTFE
- High chemical resistance

VEGABAR 52

- High overload resistance
- Very good long-term stability
- Rugged ceramic measuring cell



95% and 98% alarm detection with VEGASWING 63

Two VEGASWING 63 vibrating level switches are applied for 95% and 98% alarm detection. A rugged construction, hard-wearing tuning fork, reliable switching characteristics, and the ability to work with changing products, make VEGASWING 63 ideal for this application. Its test key makes fast and reliable on-site checking possible.

Multi-sensor flange

The small, compact construction of plics® instruments allows a central installation of the radar, pressure and alarm sensors on one flange, together with a port for manual sounding. This brings enormous cost savings, in installation, setup and, as an additional plus, the complex correction tables for differing installation points on the tanks can be eliminated.

VEGASWING 63

- High chemical resistance
- Adjustment-free
- Product independent
- Reliable function even in adhesive liquids

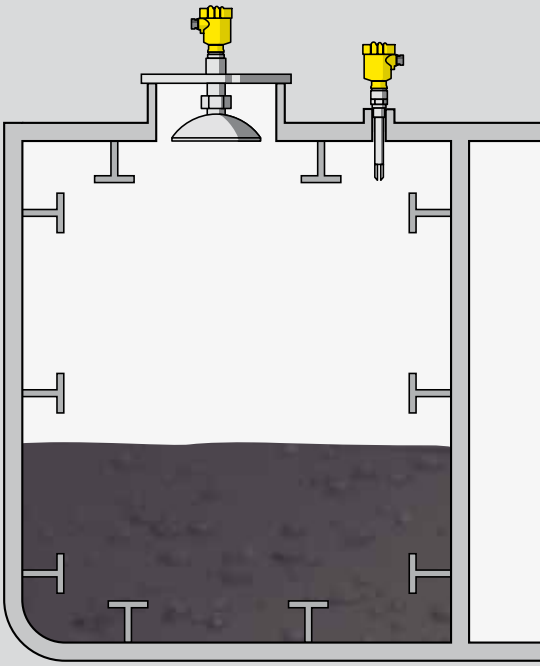
Multi-sensor flange

- Central installation of cargo sensors on one dome
- No correction tables required
- Direct comparison of radar measurement and manual sounding possible

Crude oil transport

Floating Production Storage and Offloading (FPSO)

The extracted crude oil is pumped directly into the cargo tanks on board in order to separate gas, oil and water from each other using the principles of gravity. To ensure profitable utilisation of the loading capacities, as well as effective control of the pumps, the level is measured continuously and the limit level monitored.



Continuous level measurement with VEGAPULS 62

Since FPSOs are frequently based on converted oil supertankers, the cargo tanks are reinforced with structural ribs up to 1.5 m high on the floor and on the walls. VEGAPULS 62 with parabolic antenna is particularly suitable for reliable level measurement in the up to 35 m high crude oil tanks. The strong focussing of the radar beam permits a sure measurement all the way to the tank floor, even when the ribs are close together.

Level detection with VEGASWING 63

To ensure that the feed pumps are switched off at the right moment, the limit level is detected by the vibrating level switch VEGASWING 63. Completely independent of the oil consistency, the maintenance-free tuning fork of stainless steel detects the switching point with absolute certainty.

VEGAPULS 62

- Non-contact level measurement
- Simple setup and commissioning
- Local indication on the instrument

VEGASWING 63

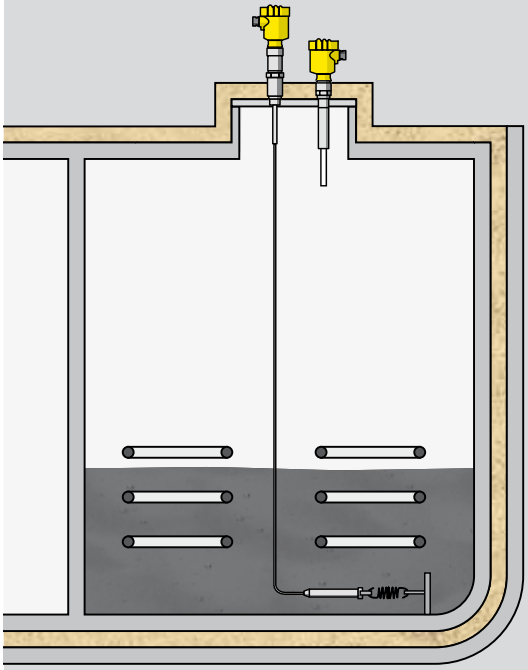
- Product independent and adjustment-free
- Switching point independent of process conditions
- High reliability and functional safety

Bitumen tankers

Bitumen

Cargo tanks are heated for transporting bitumen – the usual storage temperature of the product is approx. +170 °C to +190 °C. The material is liquid and pumpable only at these temperatures. Heating is supplied via coiled, multi-layered heating tubes mounted on the floor and sides of the container.

To guarantee optimum utilisation of the tanks as well as a safe ship attitude, the levels in the bitumen tanks are monitored continuously during loading and unloading.



Overfill protection with VEGACAP 64

A level detection system for preventing cargo tank overfilling is mandatory. This function is performed reliably by VEGACAP 64. Its proven, robust measuring principle is not affected by the high temperatures and product buildup, ensures that the instrument switches reliably when covered with bitumen.

VEGACAP 64

- Robust and maintenance-free
- Insensitive to buildup, no
- adjustment required
- Simple setup and commissioning

Level measurement with VEGAFLEX 66

VEGAFLEX 66, with a robust secured cable, is the ideal solution for this measuring task. The measurement is completely unaffected by buildup or emulsions and withstands the high temperatures of up to +190 °C. With the signal focussed around the cable, it makes it possible to guide the measurement through the narrow spaces between the heating coils right down to the tank floor.

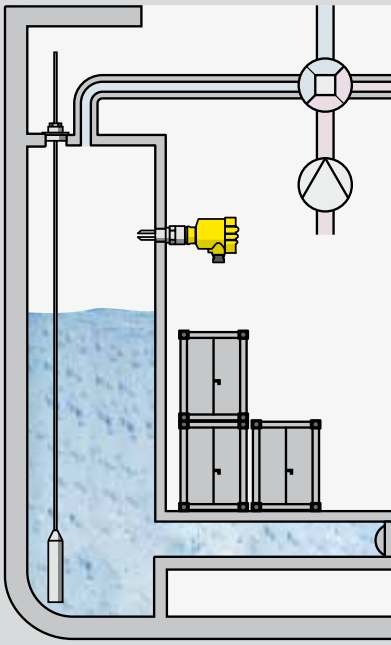
VEGAFLEX 66

- High measuring precision
- Independent of product features
- Unaffected by pressure, temperature and density

Anti-heeling systems

Counteracting the heel

Ship heeling caused by high winds, uneven cargo loading or the centrifugal forces of sharp turns, is counteracted by anti-heeling systems. Especially in the case of container ships and ferries, they prevent critical ship attitudes caused by the cargo. On cruise ships, the anti-heeling systems are applied primarily for the comfort of the passengers, while on research vessels they assure a steady platform to the sea swell. To counter the various causes of heeling, ballast tanks are connected to each other by pipe systems. Butterfly valves allow fast opening or closing of the connecting lines. Depending on the attitude of the ship, the tanks are either blown out or flooded using compressed air blowers or pumps.



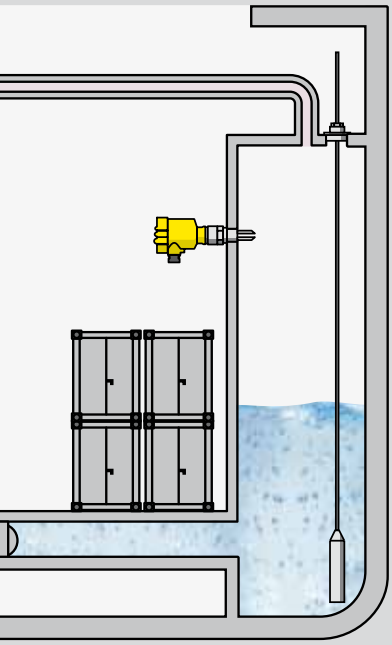
Level detection with VEGASWING 61

To prevent overfilling in the ballast tanks, which could damage them, the pumps or blowers must be switched off quickly.

The VEGASWING 61 vibrating level switch is a wear and maintenance-free sensor and ideal for level detection in the ballast tanks without adjustment.

VEGASWING 61

- High functional safety
- Small installation dimensions
- Adjustment and maintenance-free



Level measurement to the millimetre with VEGAWELL 52

To be able to correct the ship's attitude, the contents of the ballast tanks must be measured with millimetre precision. A heel of only 2.5° can tear apart the loading ramps of a ferry. Quick reaction, high precision and long-term stability characterise this level measurement. The pressure transmitter VEGAWELL 52 is the ideal solution for this application. Its ceramic-capacitive CERTEC® measuring cell withstands extreme pressure shocks up to 20 times higher than the nominal measuring range and guarantees excellent long-term stability.

VEGAWELL 52

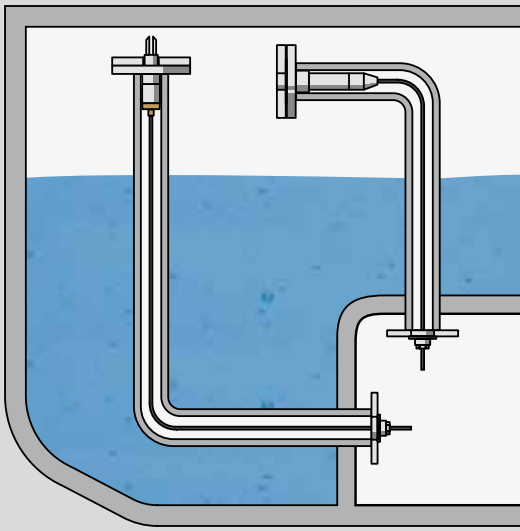
- Front-flush ceramic diaphragm
- Highly overload resistant CERTEC® measuring cell
- Corrosion protection through PE-coating

Heavy lifters

Heavy lifters (Flo/Flo vessel)

Flo/Flo ships are characterised by their large number of ballast water tanks. These make it possible to lower the ship until the main deck is up to 30 m below the water level. This allows large floating loads to be taken on board. The load is then lifted out of the water and balanced by pumping out or blowing out the ballast water tanks. To avoid damage to the ballast water tanks from overpressure or vacuum, the internal tank pressures and levels are continuously monitored.

The measurement technology and its wiring is installed in service tunnels, as all space on deck is needed for the payloads.



Level detection with VEGASWING 51

VEGASWING 51 is used as an independent level detection system in the ballast tank. Completely independent of the water density, the maintenance-free tuning fork sensor reliably detects when the water reaches the switching point. The narrow design allows recessed installation in a protective tube.

VEGASWING 51

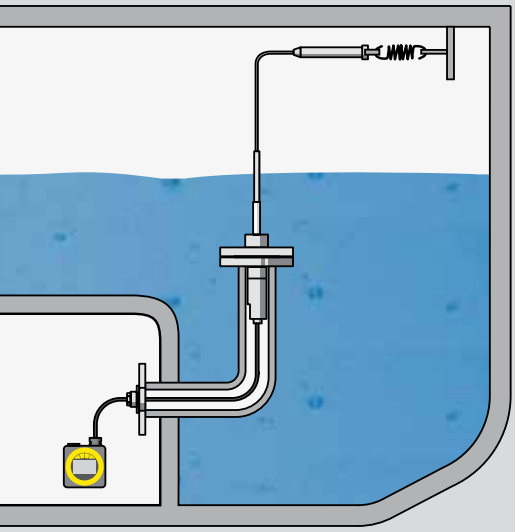
- No moving parts
- Small, compact construction
- Robust and maintenance-free

Monitoring of tank pressure with VEGAWELL 52

The pressure inside the tank must be measured continuously. VEGAWELL 52, with its ceramic-capacitive measuring cell, resists pressure shocks, abrasion and particles suspended in the ballast water. The diversely redundant double seal design of the measuring cell, ensures long-term operational reliability.

VEGAWELL 52

- Very exact and overload resistant
- Simple mounting via thread connection
- Protection class IP 68 (30 bar)



Continuous level measurement with VEGACAL 66

VEGACAL 66 is implemented for level measurement in the pressurised ballast water tank. This measuring principle permits installation from above and below the tank and the measurement it is unaffected by the pressure changes inside. The sensor can be operated at a distance of up to 30 m away from the main electronics. This allows setup and adjustment of the measuring point from within the service tunnel.

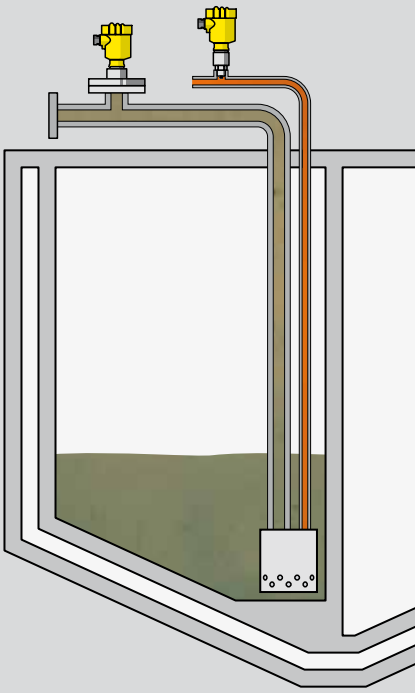
VEGACAL 66

- Tried-and-true measuring principle
- No moving parts
- Resistant against pressure shocks

Pipe pressures on the manifold

Manifold – interface for loading and unloading

Monitoring the pipeline pressures at the manifold ensures the safety of on-board and dock equipment, and provides the basis for pump control. During loading and unloading processes, excess pressure or vacuum can arise in the product pipelines if pump capacity is too high or if valves remain closed. This can damage the manifold or the cargo tanks. Local pressure indication provides additional security for all operations.



Pressure monitoring of the product pipeline with VEGABAR 54

The hydraulic submersible pumps handle widely different products out of the storage tanks with pressures up to +16 bar. VEGABAR 54, with its front-flush ceramic diaphragm, is particularly suitable for monitoring the pipeline pressures. The ceramic-capacitive CERTEC® measuring cell is resistant to abrasive or corrosive products and can be easily cleaned by rinsing. The indicating and adjustment module PLICSCOM, visible through the instrument lid, locally indicates the current line pressures.

Pressure measurement at the feed pumps with VEGABAR 53

The hydraulic feed pumps are operated with an on-board pressure between +160 and +250 bar. VEGABAR 53 is used to regulate the output of these hydraulic pumps. The rugged strain gauge measuring cell in the sensor can withstand hydraulic pressure up to +400 bar.

VEGABAR 54

- Abrasion resistant CERTEC® measuring cell
- Vibration resistant
- Front-flush
- Resistant to pressure and vacuum shocks

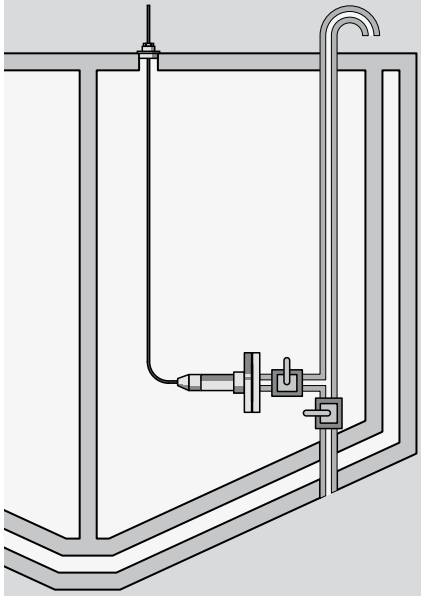
VEGABAR 53

- Small front-flush metallic measuring cell
- Especially vibration resistant
- No elastomer seal

Draught measurement

Draught, trim and list

The most important measurements on board are those for determining draught, trim and list. The safety of the ship depends heavily on them. Using the values transmitted from the different measuring points, the load master, as part of the cargo control system (CCS), can determine the exact values of ship attitude and draught. One forepeak and one afterpeak measuring point are usually implemented. On larger ships, two additional measuring points are often applied midships, one portside, one starboard.



Reliable and accurate with VEGAWELL 52

VEGAWELL 52 pressure transmitters are used here to ensure reliable and accurate measuring results. The encapsulated stainless steel housing in protection class IP 68 and IP 69K, reliably protects the electronics and measuring cell from external moisture. The rugged sapphire-ceramic measuring cell can withstand pressure shocks up to 20 times higher than the nominal measuring range and features high corrosion resistance against seawater.

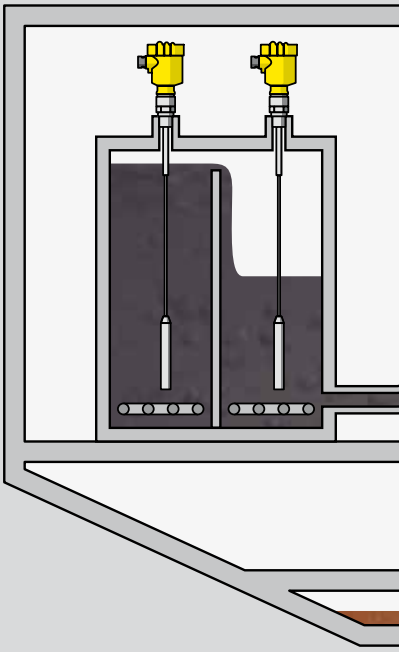
VEGAWELL 52

- Rugged CERTEC® measuring cell
- Resistant to pressure and vacuum shocks
- Longitudinally watertight cable
- Housing material 1.4462

Heavy oil tanks and engine room

Settling and service tank

To ensure fuel feed to the main engine, the separated heavy fuel oil (HFO) is first pumped into the settling tank (buffer tank). The downstream service tank (day tank) is filled through continuous overflow from the settling tank and is connected directly with the main engine. Heating coils in both tanks ensure an even temperature between +75 °C and +90 °C, which keeps the oil pumpable. A reliable level measurement in these tanks guarantees continuous availablitiy of the ships engines.

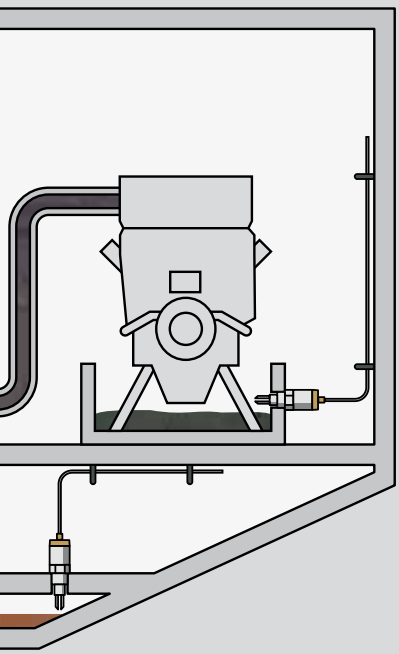


Level measurement with VEGAFLEX 61

The heavy fuel oil stored in the settling and service tank has a high storage temperature and different chemical compositions. The sticky oil vapours arising within the tank make the level measurement very difficult. But the VEGAFLEX 61 guided microwave sensor handles this problem without difficulty. The space-saving installation of the cable version from above, makes it the ideal level measuring instrument for all heavy oil tanks.

VEGAFLEX 61

- Independent of product characteristics
- Simple adjustment
- Product temperatures up to +150 °C
- High resistance to medium



Bilge and leak monitoring

Every motorised ship has a bilge well, the space between the floor of the engine room and the bottom of the ship. A water/oil mixture collects in this space at the lowest point of the ship. The mixture is then separated by an on-board skimmer and demulsifying unit. The bilge de-oiling equipment is controlled by level switches.

The oil sumps of the main engine and the accessory systems must also be monitored continuously for safety and environmental reasons. Liquids collecting in these sumps could indicate damage to system components.

Level detection with VEGASWING 51

The limit levels in the bilge and in the oil sump are monitored by the vibrating level switch VEGASWING 51, which is mainly characterised by its small, compact design. The small dimensions allow mounting in practically any place or position. Foam, bubbles and viscosity have no effect on its switching accuracy.

VEGASWING 51

- Product-independent switching point
- Very small installation dimensions
- No adjustment required

Liquid gas tanks

Liquid petroleum gas (LPG) and liquid natural gas (LNG) applications

To transport the gases in bulk, they are liquefied by applying a pressure of approx. +10 bar or by cooling them down to -70 °C to -170 °C. To make the process more efficient and cost effective, both physical principles are often used in combination.

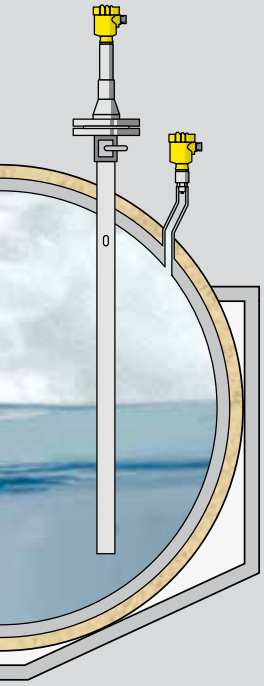
Due to the considerable pressure and temperature loads on their structural materials, the tanks are made of special stainless steel and insulated from the body of the ship. Spherical tanks, which jut out visibly over the deck, are commonly used. The gas tanks on LNG tankers can be up to 45 m high.

LPG level measurement with VEGAPULS 66 and ball valve fitting

The non-contact measuring principle radar enables simple and reliable level measurement. Due to the poor reflective properties of liquid gas, the radiated energy is guided and focussed in a standpipe. Because it operates with a lower frequency in the C band range, VEGAPULS 66 requires an aperture of only 50 mm diameter. This makes it possible to measure right through the aperture of an opened ball valve fitting.

VEGAPULS 66

- Non-contact measurement
- Minimum required vessel aperture 50 mm
- Independent of pressure and temperature



LNG-level measurement at low temperatures

VEGAPULS 63 is the ideal sensor for applications in very low temperatures. Due to its front-flush, PTFE-coated antenna, the sensor requires no sealing material and can be applied in extremely low temperatures down to -200 °C.

Monitoring the tank pressure with VEGABAR 52

Because the liquefaction process depends to a large degree on the pressure inside the tank, this pressure must be monitored continuously. To carry this monitoring out at extremely low temperatures, the medium that conveys the pressure to the measuring instrument must be warmed up to -40 °C via evaporation lines. VEGABAR 52 is particularly suitable for this application due to its ceramic measuring cell. The special seal material, as well as the dry measuring cell, allow product temperatures down to -50 °C.

VEGAPULS 63

- Non-contact measurement
- For temperatures down to -200 °C
- Highly resistant PTFE-encapsulated antenna

VEGABAR 52

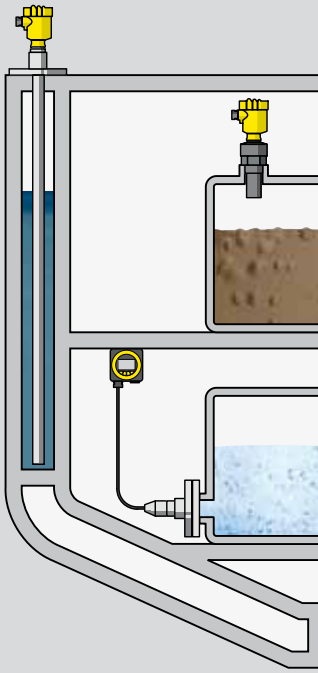
- Product temperatures down to -50 °C
- High measuring accuracy of 0.1 %
- Dry, ceramic measuring cell

Service and ballast water tanks

Drinking water and grey/black water

Drinking water is an essential commodity on a shipand it is stored in separate, dedicated tanks. Depending on the type and size of the ship, different amounts of fresh water are required for drinking, for personal hygiene as well as for cleaning. Direct electrical measuring principles are mandatory for level measurement.

Waste water, so-called grey/black water, is treated on large ships using on-board treatment plants or stored in special grey/black water tanks to await final disposal.



Grey or black water measurement with VEGASON 61

Due to the large concentration of solids and the changing density of the tank contents, a non-contact measurement with ultrasonic technology qualifies well for this application. The VEGASON 61 sensor with PVDF-encapsulated transducer is resistant to the corrosive gases in the tank and requires only a G1½ A threaded mounting boss as process fitting.

Drinking water measurement with VEGABAR 54

Flanged directly onto the tank, VEGABAR 54 measures the level reliably and accurately. Drinking water safe materials and a front-flush diaphragm form the basis of an immaculately hygienic measurement. The rugged sapphire-ceramic diaphragm withstands chemical and mechanical cleaning. The external electronics can be mounted in an easily accessible place for local display and setup.

VEGASON 61

- Non-contact and maintenance-free measurement
- Resistant against aggressive gases
- Compact design

VEGABAR 54

- Hygienic process fitting
- Front-flush, rugged sapphire-ceramic diaphragm
- Simple adjustment

Ballast water in the wing and double bottom tanks

The ballast water measurements in the wing and double bottom tanks go directly into the calculations for ship trim, draught and list. Since the measuring points are virtually inaccessible during operation on board, reliability and stability are an absolute must. Pressure shocks, abrasive sand particles and brackish water place additional heavy demands on the instrumentation.

VEGAPULS 66 in the wing tank

VEGAPULS 66 provides reliable and safe measurement in the straight, vertical wing tanks. The sensor is resistant to breaking waves and abrasion. Temperature fluctuations in the tank do not influence the measuring result either. The housing is available in IP 68 version and needs no ventilation. A special connection is available for optional manual sounding.

VEGABAR 66 in the double bottom tank

With its IP 69K sensor housing and ceramic measuring cell, VEGABAR 66 is the perfect sensor for the harsh conditions in the double bottom tank. The climate compensated electronics protects against the influence of moisture and can be installed and ventilated on site.

VEGAPULS 66

- Non-contact measurement
- Independent of product characteristics and vessel form
- Small installation dimensions

VEGABAR 66

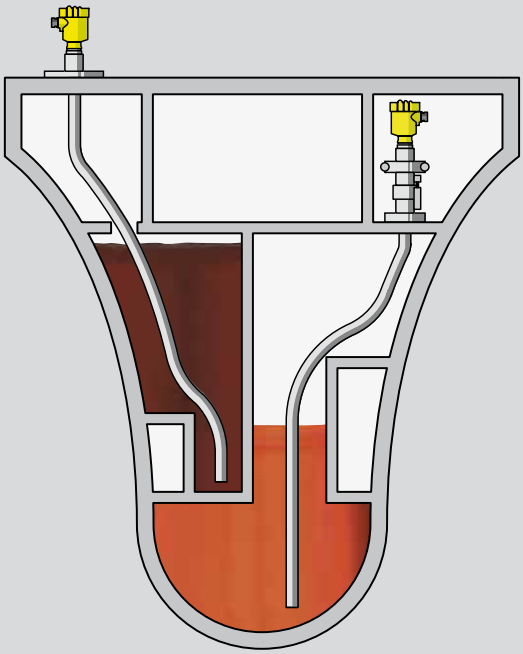
- Housing protection class IP 68, IP 69K
- Abrasion-resistant ceramic measuring cell
- High long-term stability

Cavities

Service tanks on board of naval and research vessels

To extend the duration of stay at sea, every cubic centimetre of space on naval and research vessels is exploited. Existing cavities or inaccessible places on the ship are used as additional tanks for drinking water, diesel or aviation fuel. The tank shape and dimensions are completely different from familiar standard tanks and, depending on the type and size of the ship, they can extend over several decks. Tank capacity can be anywhere from one to one hundred tons.

Reliable level measurement is indispensable for the continuous readiness of these ships.



Level measurement with VEGAPULS 66

A sounding pipe provided by the shipyard is sufficient for a reliable and precise level measurement in the tank. The non-contact measurement with VEGAPULS 66 is the best solution, irrespective of tank form or product. The microwaves are guided through the tube – completely unaffected by vessel installations and constrictions. Due to the low operating frequency, the system is not influenced by butt and welded seams and allows the use of existing 2" tubes.

VEGAPULS 66

- Non-contact measurement
- Independent of product characteristics and vessel form
- Small installation dimensions

Radar measurement and manual sounding

The VEGAPULS 66 radar sensor is used for special applications on ships in the US Navy. Existing manual sounding pipes are used for measuring the levels – the signal of the radar sensor is coupled directly into the sounding pipe. Should manual sounding be necessary, VEGAPULS 66 can be swivelled away from the sounding pipe by means of a special mounting.

VEGAPULS 66

- Non-contact measurement
- Independent of product characteristics and vessel form
- Easy manual sounding via swivel mount

Instrument overview

VEGAPULS 62

Radar sensor for continuous level measurement of liquids

- Non-contact measurement
- Simple installation
- Wear and maintenance-free
- Unaffected by pressure, temperature, gas and dust
- High measuring precision

Process temperature:	-200 … +450 °C (-328 … +842 °F)
Process pressure:	-1 … +160 bar (-100 … +16000 kPa)
Process fitting:	Thread G1½ A or 1½ NPT Flange from DN 50 or ANSI 2"
Measuring range:	up to 35 m (115 ft)

VEGAPULS 63

Radar sensor for continuous level measurement of liquids

- Non-contact measurement
- Encapsulated antenna system
- Front-flush installation
- Wear and maintenance-free
- High measuring precision

Process temperature:	-200 … +200 °C (-328 … +392 °F)
Process pressure:	-1 … +16 bar (-100 … +1600 kPa)
Process fitting:	Flanges from DN 50 or ANSI 2"
Measuring range:	up to 35 m (115 ft)

VEGAPULS 66

Radar sensor for continuous level measurement

- Very small minimum distance
- Measuring precision +/-10 mm
- Simple special connection for manual sounding

Process temperature:	-60 … +400 °C (-76 … +752 °F)
Process pressure:	-1 … 160 bar (-100 … +16000 kPa)
Process fitting:	Flanges from DN 50 or ANSI 2"
Measuring range:	up to 35 m (115 ft)

The pictured instruments are standard models.

corresponds to: American Bureau of Shipping; China Classification Society; Registro Italiano Navale; Det Norske Veritas; Germanischer Lloyd; LLoyd's Register; Bureau Veritas

Instrument overview

VEGAFLEX 61

TDR sensor for continuous level measurement

- Setup without adjustment
- Independent of product properties
- Insensitive to dust, steam, buildup and condensate
- Wear and maintenance-free
- High measuring precision

Process temperature:	-40 … +150 °C (-40 … +302 °F)
Process pressure:	-1 … +40 bar (-100 … +4000 kPa)
Process fitting:	Thread from G¾ A or ¾ NPT Flanges from DN 25 or ANSI 1"
Measuring range:	Cable up to 32 m (105 ft) Rod up to 4 m (13 ft)

VEGAFLEX 66

TDR sensor for continuous level measurement

- Setup without adjustment
- Independent of product properties
- Insensitive to dust, steam, buildup and condensate
- Wear and maintenance-free
- High measuring precision

Process temperature:	-200 … +400 °C (-328 … +752 °F)
Process pressure:	-1 … +400 bar (-100 … +40000 kPa)
Process fitting:	Thread from G¾ A or ¾ NPT Flanges from DN 40 or ANSI 2"
Measuring range:	Cable up to 32 m (105 ft) Rod up to 6 m (20 ft) Coax up to 6 m (20 ft)

VEGASON 61

Ultrasonic sensor for continuous level measurement

- Non-contact measurement
- Independent of product properties
- Adjustment without medium
- Integrated temperature sensor for correction of sound running time
- Measuring precision ± 10 mm

Process temperature:	-40 … +80 °C (-40 … +176 °F)
Process pressure:	-0.2 … +2 bar (-20 … +200 kPa)
Process fitting:	Thread G1½ A or 1½ NPT
Measuring range:	In liquids up to 5 m (16 ft) In bulk solids up to 2 m (7 ft)

The pictured instruments are standard models.

VEGASWING 51

Vibrating level switch for liquids

- Setup without adjustment
- Product-independent switching point
- Very high reproducibility
- Wear and maintenance-free
- Very small installation dimensions

Process temperature:	-40 … +150 °C (-40 … +302 °F)
Process pressure:	-1 … +64 bar (-100 … +6400 kPa)
Process fitting:	Thread from G¾ A or ¾ NPT

VEGASWING 61, VEGASWING 63

Vibrating level switch for liquids (VEGASWING 63 with tube extension)

- Setup without adjustment
- Product-independent switching point
- Very high reproducibility
- Wear and maintenance-free

Process temperature:	-50 … +250 °C (-58 … +482 °F)
Process pressure:	-1 … +64 bar (-100 … +6400 kPa)
Process fitting:	Thread from G¾ A or ¾ NPT Flanges from DN 25 or ANSI 1"
Probe length:	Version VEGASWING 63 up to 6 m (20 ft)

VEGACAP 64

Capacitive rod probe for level detection

- Exact switching point even in strongly adhesive media
- Robust and maintenance-free
- High functional reliability
- Highly resistant PTFE insulation

Process temperature:	-50 … +200 °C (-58 … +392 °F)
Process pressure:	-1 … +64 bar (-100 … +6400 kPa)
Process fitting:	Thread G¾ A or ¾ NPT Flanges from DN 25 or ANSI 1"
Measuring range:	up to 6 m (20 ft)

corresponds to: American Bureau of Shipping; China Classification Society; Registro Italiano Navale; Det Norske Veritas; Germanischer Lloyd; LLoyd's Register; Bureau Veritas

Instrument overview

VEGACAL 66

Capacitive cable probe for continuous level measurement

- Robust and maintenance-free
- High functional reliability
- Simple installation and setup
- Measurement along the entire length of cable

Process temperature:	-50 … +150 °C (-58 … +302 °F)
Process pressure:	-1 … +40 bar (-100 … +4000 kPa)
Process fitting:	Thread G1 A or 1 NPT Flanges from DN 50 or ANSI 2"
Measuring range:	up to 32 m (105 ft)

VEGABAR 52

Pressure transmitter with CERTEC® measuring cell

- Dry, ceramic-capacitive sensor element
- High measuring precision
- Extremely high overload and vacuum resistance
- Very small measuring ranges

Process temperature:	-40 … +150 °C (-40 … +302 °F)
Process fitting:	Manometer connection G½ A Thread from G1 A or 1 NPT Flanges from DN 25 or ANSI 1" Fittings for the food and paper industries
Measuring range:	-1 … +72 bar (-100 … +7200 kPa)

VEGABAR 53

Pressure transmitter with metallic measuring cell

- Fully welded metallic measuring cell
- High measuring precision
- Overload and vacuum resistant

Process temperature:	-40 … +150 °C (-40 … +302 °F)
Process connection:	Manometer fitting G½ A Thread from G½ A or ½ NPT or G½ A front-flush Hygienic fittings
Measuring range:	-1 … +1000 bar (-100 … +100000 kPa)

The pictured instruments are standard models.

VEGABAR 54

Pressure transmitter with MINI-CERTEC® measuring cell

- Dry, ceramic capacitive sensor element
- High abrasion and overload resistance
- High measuring precision

Process temperature:	-40 … +120 °C (-40 … +248 °F)
Process fitting:	Thread from G½ A Flanges from DN 15 or ANSI ½" Fittings for the food and paper industries
Measuring range:	-1 … +72 bar (-100 … +7200 kPa)

VEGABAR 66

Pressure transmitter with front-flush ceramic measuring cell

- Oil-free, ceramic-capacitive sensor element
- Encapsulated cable assembly with internal capillary tubes
- Measurement deviation < 0.1%
- High overload resistance
- Self cleaning effect through front-flush configuration

Process temperature:	-40 … +100 °C (-40 … +212 °F)
Process pressure:	-1 … +130 bar (-100 … +13000 kPa)
Process fitting:	Straining clamp, threaded fitting G1½ A or 1½ NPT Thread G1½ A or 1½ NPT Flanges from DN 50 or ANSI 2"
Measuring range:	+0.1 … +25 bar (+10 … +2500 kPa)

VEGAWELL 52

Suspension pressure transmitter for level measurement of liquids

- Dry, ceramic-capacitive CERTEC® measuring cell
- High abrasion and overload resistance
- Integrated overvoltage protection

Process temperature:	-20 … +80 °C (-4 … +176 °F)
Process fitting:	Straining clamp Threaded fitting G1 A or 1 NPT and G1½ A or 1½ NPT Thread G½ A or ½ NPT and G1 A or 1 NPT
Measuring range:	+0.1 … +25 bar (+10 … +2500 kPa)

corresponds to: ABS American Bureau of Shipping · China Classification Society · Registro Italiano Navale · Det Norske Veritas · Germanischer Lloyd · LLoyd's Register · Bureau Veritas

28725-EN-100729

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
www.vega.com

Looking Forward

VEGA