

Level, Pressure, and Density Instrumentation for the Petrochemical Industry



Application Examples and Products

VEGA



Measurement technology for the petrochemical industry

This brochure presents examples of applied level, pressure, and density measurement technology. Here, you'll learn which sensors fit which measuring tasks and the benefits those sensors deliver in application.

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|-----------------------------------------|--------------------------------|----------------------------------|-------------------|
| 1 Ethylene and Propylene Storage | Level Measurement | 5 Purge Bin | Level Measurement |
| 2 Distillation Column | Level and Pressure Measurement | 6 High Pressure Separator | Level Measurement |
| 3 NGL and LPG Sphere | Level and Pressure Measurement | 7 Low Pressure Separator | Level Measurement |
| 4 Gas Phase Reactor | Level and Density Measurement | 8 Pellet Silo | Level Measurement |





Solutions for a demanding industry

VEGA offers a wide range of sensors for typical applications in the petrochemical industry: from the delivery of crude oil via pipeline or ship to the storage of finished products. Measuring instruments from VEGA deliver reliable data on the volume, level, and pressure of all types of media.


Continuous Level Measurement

Instrument Type		Measuring Range	Process Fitting	Process Temperature	Process Pressure
VEGAPULS 6X Non-contact radar sensor for continuous level measurement of liquids and bulk solids		up to 393 ft (120 m)	Threads from ¾" Flanges from DN 50, 2" Swivelling flange from DN 100, 4" Mounting strap	-321 ... +482°F (-196 ... +250°C)	-14.5 ... +362 psi (-1 ... +25 bar)
VEGAFLEX 81 Guided wave radar sensor for continuous level measurement of liquids		up to 246 ft (75 m)	Threads from ¾ NPT, G¾ Flanges from 1", DN25	-40 ... +392°F (-40 ... +200°C)	-14.5 ... +580 psi (-1 ... +40 bar)
VEGAFLEX 86 Guided wave radar sensor for liquid and interface measurement in high temperatures/pressures		up to 246 ft (75 m)	Threads from ¾ NPT, G¾ Flanges from 1", DN25	-320 ... +842°F (-196 ... +450°C)	-14.5 ... +5,800 psi (-1 ... +400 bar)
FiberTrac 31 Radiation-based sensor for continuous level measurement		up to 23 ft (7 m) with single detector	Mounts external to the vessel	-4 ... +122°F (-20 ... +50°C)	Mounts external to the vessel
SoliTrac 31 Radiation-based sensor for continuous level measurement		up to 10 ft (3 m) with single detector	Mounts external to the vessel	-40 ... +140°F (-40 ... +60°C)	Mounts external to the vessel
VEGAMAG 82 Combination measuring system — magnetic level indicator paired with bridle and guided wave radar		up to 50 ft (15 m)	Threads from ½ NPT, G½, Flanges from 1", DN25	-320 ... +842°F (-196 ... +450°C)	-14.5 ... +5,800 psi (-1 ... +400 bar)
VEGAPASS 81 Bridle chamber		up to 13 ft (4 m)	Threads from ½ NPT, G½, Flanges from 1", DN25	-320 ... +842°F (-196 ... +450°C)	-14.5 ... +3,626 psi (-1 ... +250 bar)


Point Level Detection

Instrument Type		Insertion Length	Process Fitting	Process Temperature	Process Pressure
VEGASWING 66 Vibrating level switch for liquids in high temperatures/pressures		up to 10 ft (3 m)	Threads from 1 NPT, G1, Flanges from 1 1/2", DN40	-321 ... +842°F (-196 ... +450°C)	-14.5 ... +2,320 psi (-1 ... +160 bar)
VEGAVIB 63 Vibrating level switch with tube extension for bulk solids		up to 20 ft (6 m)	Threads from 1 NPT, G1, Flanges from 1 1/2", DN32	-58 ... +482°F (-50 ... +250°C)	-14.5 ... +232 psi (-1 ... +16 bar)

Pressure Measurement

Instrument Type		Deviation	Process Fitting	Process Temperature	Measuring Range
VEGABAR 83 Pressure transmitter with METEC® measuring cell		0.075 ... 0.2%	Threads from 1/2 NPT, G 1/2, Flanges from 1", DN25	-40 ... +392°F (-40 ... +200°C)	-14.5 ... +14,500 psi (-1 ... +1,000 bar)

Density Measurement

Instrument Type		Measuring Range	Process Fitting	Process Temperature	Process Pressure
MiniTrac 31 Radiation-based density and point level measurement		up to 40" (1 m) of process material	Mounts external to the vessel	-40 ... +140°F (-40 ... +60°C)	Mounts external to the vessel



Application: Ethylene and Propylene

Reliable

Measure liquefied gases with very low reflective properties

Cost-effective

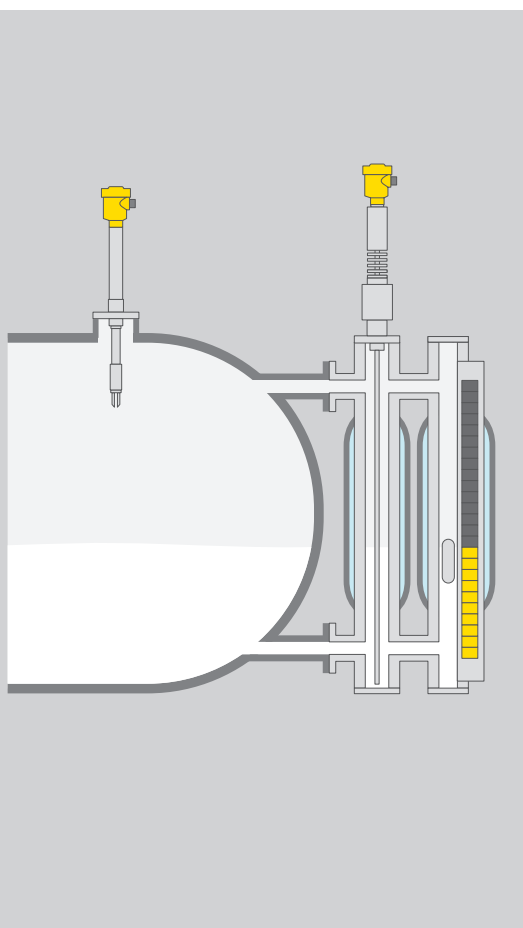
Easily retrofit existing specific gravity-based measurement systems

Convenient

Changes in process do not require recalibration

Continuous Level Measurement for liquid Propylene and Ethylene

Reflux drums, storage tanks, and knockout drums all make for a challenging measurement when the process medium are liquefied gases. These applications can cause reliability and performance problems for specific gravity based measurement systems making guided wave radar uniquely qualified to handle these applications. Although challenging in that the dielectric values are very low, the VEGAFLEX guided wave radar is capable of measuring cryogenic liquids with a dielectric value as low as 1.4.



VEGAFLEX 86

Measure liquefied gases reliably with out any moving parts or concern for specific gravity changes

- Capable of measuring liquids with a dielectric value of 1.4
- Possible to replace existing displacers without replacing the chambers
- Measure cryogenic liquids as cold as -196°F



VEGAMAG 82

Local indication of level measurement

- Oversize chambers are available to mitigate any flashing that may occur
- Combining guided wave and point level technologies creates a redundant measurement system of greater security



VEGASWING 66

Point level switch for high pressures in low temperature environments

- Reliable point switching in high pressure low temperature environments
- High and low level alarming for liquids with densities as low as 0.42 specific gravity/cm³



Application: Distillation Column

Reliable

Unaffected by process conditions

Cost-effective

Low maintenance costs, because no moving parts

Convenient

Overfill protection increases plant safety

Level Control of Column Trays

Accurate level control of the distillation tower ensures product quality, but is made difficult due to flashing and other extreme process characteristics. Technology that is immune to product density changes and buildup is necessary to produce an accurate measurement through changes in the process.



VEGAFLEX 81 and VEGAPASS 81

Guided wave radar sensor with bridle chamber for reliable tray measurement

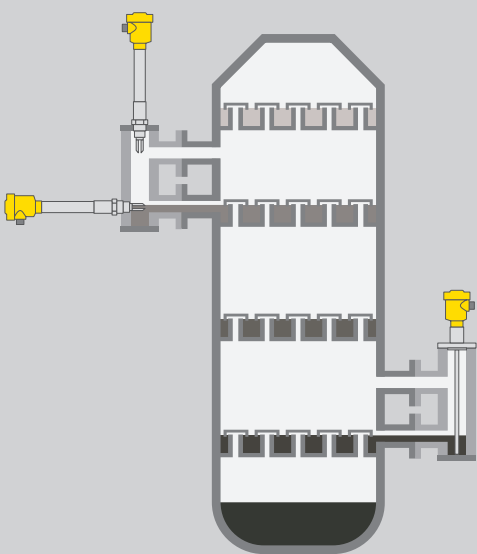
- Non-moving parts are immune to mechanical failure
- Low maintenance requirements reduce downtime and costs
- Single rod probe prevents plugging and results in a reliable measurement



VEGASWING 66

Vibrating level switch for monitoring high- and low-alarm in the distillation unit

- Reliable measurement unaffected by high temperature and pressure
- Test function during operation provides higher plant availability
- Redundancy increases plant safety and availability





Application: NGL and LPG Sphere

Reliable

High measuring accuracy,
independent of vapor, pressure or
dielectric constants

Cost-effective

Maintenance-free operation

Convenient

Isolate and remove the device
without emptying the sphere

Level Monitoring of NGL & LPG Spheres

NGL and/or LPG tanks are usually only accessible for service and maintenance work every few years during shut-down periods. As a result, this measurement requires a very reliable level transmitter. The need for system isolation and low product dielectric constants require an instrument suitable for these process attributes.



VEGAPULS 6X

Level measurement with radar in spherical tanks

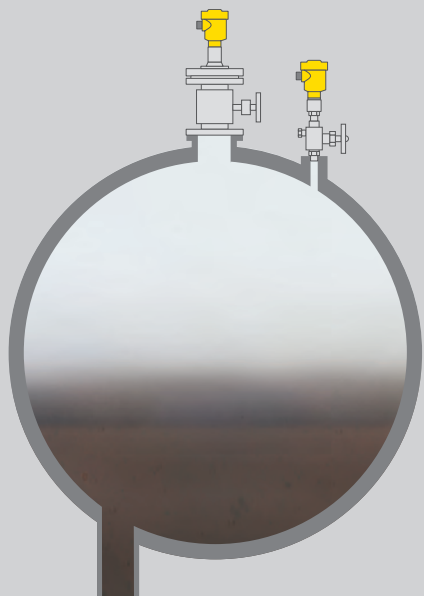
- Maintenance-free operation thanks to non-contact measuring principle
- High measuring accuracy even with low dielectric constants
- Reliable measurement independent of vapor
- Isolation valve provides the ability to remove the device without emptying the sphere and without affecting measurement reliability



VEGABAR 83

Pressure transmitter for pressure monitoring in spherical tanks

- Universally applicable, fully welded measuring cells for direct connection to process
- A variety of process fittings always enables an appropriate adaptation to the vessel
- If additional technology is required for redundant measurement, the simple addition of a pressure transmitter at the tank bottom allows for level measurement via electronic differential pressure
- Extremely robust measuring cells of Alloy, for higher safety during operation





Application: Gas Phase Reactor

Reliable

External components, not exposed to process conditions

Cost-effective

Increase in production with reduction of carryover induced shut downs

Convenient

Proven technology already used through out industry

Level Measurement in the Disengaging Zone

To prevent carryover of material with unreacted gases, it is important to reliably measure the level in the disengaging zone of the reactor. If carryover occurs it is possible to foul downstream equipment and cause a unit shutdown. To prevent carryover, the level in the vessel is often kept lower at the expense of production capacity. Volatility in the vessel and varying densities in the bed prevent traditional differential pressure instruments from delivering a reliable measurement. Since product density in the bed does not influence level measurement, it is possible to increase the level of the bed while monitoring for potential carryover.

SoliTrac 31



Series of detectors builds profile of bed front in disengaging zone, measuring bed elevation.

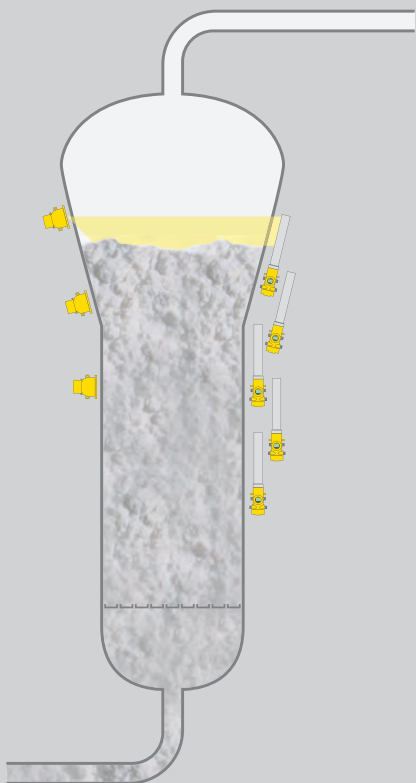
- Linked detectors deliver individual readings over small spans and create overall level measurement inside the reactor
- Non-contact operation avoids buildup and reduces maintenance
- External mounting may not require process shutdown for installation

MiniTrac 31



Independent monitor for potential carry over separate from level system.

- Compact and lightweight detector
- Non-contact technology measures through vessel walls and obstructions
- Ideal for all process conditions
- Accurate detector monitors carryover and vapor density





Application: Purge Bin

Reliable

External measurement is not affected by the nitrogen purging through product

Cost-effective

Long, flexible scintillators reduce the number of detectors

Convenient

Lightweight and easy to mount

Solids measurement during degassing

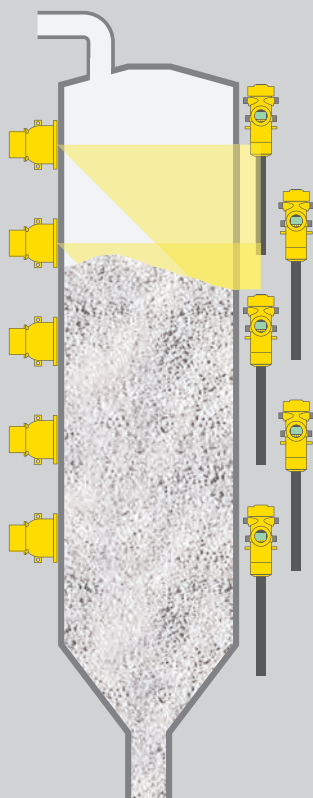
During polymer production, entrained hydrocarbon gases can create difficult process conditions. Reliable level technology is a must at all points in the polymer production process. Utilizing an external measurement with a series of radiometric detectors provides the level information needed to control the process reliably and with little maintenance relative to differential pressure units and load cells.

FiberTrac 31



Single detector can be up to 23 feet in length maximizing the level span while reducing the number of detectors needed

- Multiple detectors can be connected together to measure the entire length of the vessel
- Detectors can be added or retrofitted while process is operational
- Proven technology that has been in use on purge bin for many years





Application: High Pressure Separator

Reliable

Vapor compensated measurement allows for changing LDPE product grades

Cost-effective

System does not need constant recalibration, increasing run rates

Convenient

Systems can be retrofitted into existing process connections

Reliable measurement of LDPE Phase

Measurement of LDPE in the thick-walled High Pressure Separator (HPS) is a challenging application that requires absolute reliability. Continuous level systems are used to prevent shutdowns due to the level rising too high. Should LDPE escape with unreacted ethylene gas, it will foul process equipment. Level falling too low in the separator can allow the high pressure gas to “punch” through the LDPE creating a gas out condition, increasing energy costs to recycle gas up to correct pressures.



SoliTrac 31

Provides continuous level output to control level of LDPE phase in HPS

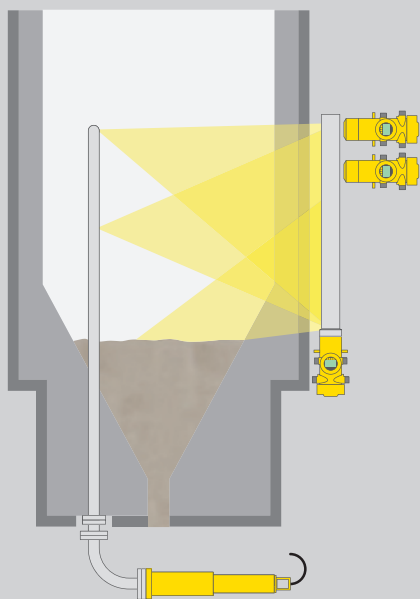
- Maximum sensitivity to reduce source sizing for thick walled vessel
- Measurement length of up to 10'
- Built in IO to process data from additional instruments



MiniTrac 31

Provides compensation for changing vapor densities in the process.

- Level output is corrected automatically.
- 4 ... 20 mA output can be monitored independently of vapor density compensation function
- May also be used as a switch if LDPE elevation increases too high
- Sensitive instrument detects foam





Application: Low Pressure Separator / Devolatilizer

Reliable

Complete external system not affected by process conditions

Cost-effective

Possible to mount external system during unit operation

Convenient

Lightweight and easy to mount

Reliable measurement of LDPE phase

With changing product consistencies measurement of LDPE in the Low Pressure Separator (LPS) can be just as difficult as it is in the HPS. Similar to the HPS, it is critical to maintain the correct level inside the vessel to ensure the product level does not get so high that LDPE exits with vapor. Preventing the level from dropping too low is important to protect the extruder below the vessel. The level system allows for complete control of the process to ensure shut downs are not due to poor level control. The output provided is compensated for changing vapor densities and is not impacted by product density changes.

FiberTrac 31



A flexible, contoured detector spans the vessel wall and measures into the separator's conical end.

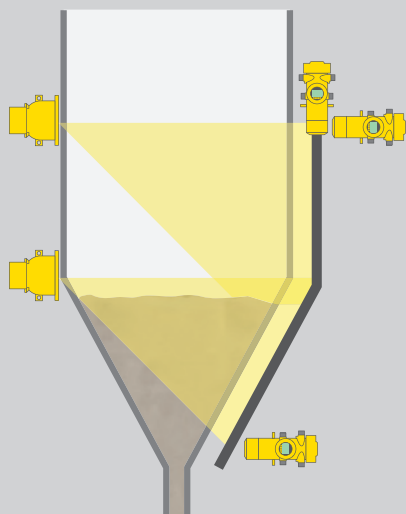
- Flexible detector conforms to vessel wall shape
- Lightweight design reduces hardware and equipment needs during installation
- Detector replacement is online, eliminating downtime for maintenance

MiniTrac 31



Utilization of density detectors allow the level output to be compensated for swinging vapor densities as well as buildup on the vessel wall.

- Compact and lightweight detector
- Non-contact technology measures through vessel walls and obstructions
- Ideal for all process conditions





Application: Pellet Silo

Reliable

Reliable measurement even in dusty and noisy environments

Cost-effective

No downtime of your facility because maintenance is not required

Convenient

Simple mounting and setup

Level measurement in a pellet silo

In the manufacture of plastics, the finished products are stored as powders, grit, or granulate in tall, narrow silos. To control production and delivery, the content of each silo has to be determined with level measurement. Thanks to its large dynamic range, VEGAPULS 6X can reliably detect products with poor reflection properties, such as plastics. It is a non-contact measurement, wear-free, and ensures accurate measurement data even if the properties of the granulates change.



VEGAPULS 6X

Non-contact radar level measurement in pellet silos

- Easy sensor alignment with aiming swivel mounting and VEGA Tools app for smartphone
- Reliable measurement, independent of dust, abrasion and product moisture content
- Eliminates need for load cells or yo-yo systems, reducing maintenance calls



VEGA VIB 63

Vibrating level switch for protection against overfilling

- Simple setup without calibration
- Reliable detection despite changing density of the medium
- Dependable function thanks to product-independent switching point
- Position of the switching point is determined via the tube extension





plics® — Easier 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 customized, user-friendly instrument within an amazingly short time. And the best part: these instruments are more cost-effective and advantageous in every way – and that throughout their entire life cycle.

Display and Adjustment

The display and adjustment module PLICSCOM is used for measured value indication, adjustment, and diagnosis of the sensor. Its menu structure is simple and allows for quick setup and commissioning. Status messages are displayed in plain text.

Connection

The mobile VEGACONNECT is used to connect your instrument to a PC via the USB interface. Parameterization of the instruments is carried out with the tried-and-true adjustment software PACTware and the appropriate DTM. For EDD-based adjustment we also offer graphics-driven EDDs.

Recognition of Maintenance Requirements

The integrated self-monitoring function of plics® instruments continuously reports 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.





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