

# VEGA journal

Issue 01/10

## The new radar intelligence



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now with plics® advantages

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## The new radar intelligence

**The new plics®plus radar sensors have been on the market since the end of October 2009. With its new sensor generation, VEGA has gained an edge on its competitors once again and thus strengthened its position as technology leader in the area of radar level measurement. Many details of the VEGAPULS 60 series were improved – these bring users considerable advantages and make sensor implementation even simpler.**

There's an opportunity in every situation and VEGA is using that opportunity. In launching plics®plus, VEGA has brought the next development stage of its modular instrument concept plics® to the market. This new instrument generation is even easier to use, making day-to-day tasks in the plant easier for users

and offers more advantages throughout the entire product life cycle. The trailblazers are, as always at VEGA, the radar sensors. With numerous intelligent features, smart details, still more efficient hardware and software as well as additional instrument versions, they're again taking over even more areas of application.

### **Technologically in the lead**

The heart of the new radar hardware is an efficient signal processor that offers considerably more possibilities in echo analysis. Latest state-of-the-art electronic components increase the echo signal scanning rate by about the factor 5. This allows the level signal to be more easily separated from the interfering signals. In turn, the improved echo analysis in combination with the efficient components increases the precision to 2 mm, which

VEGAPULS 60 radar sensors are undisputedly some of the most efficient sensors for continuous level measurement.

represents a deviation of 0.005 % in a maximum measuring range of 35 m.

Despite the considerably improved performance, energy consumption is drastically reduced. All two-wire radar sensors of the new generation need no more than 9.6 V for reliable operation and can be operated with no problem on all power supply devices. By means of a new barrier, the 20 V voltage previously needed for the Ex “d” instrument could



State-of-the-art components now permit VEGA to bring a level of performance to radar sensors that nobody would have dared to dream of only a few years ago.

be reduced to only 14 V. The sensors can thus be operated on all established control systems.

The microwave modules were also revised and made even more efficient thanks to new components. For the user, the resulting increase in sensitivity has the advantage that a higher measurement reliability can be achieved even in media with very poor reflective properties.

A clever new software algorithm brings advantages for signal processing. In the revision process, proven concepts were kept and extended with new ideas. For example, through the echo signal movement detection, the level signal can be distinguished considerably better from interfering reflections and condensate deposits on the antenna system can be imaged. The objective of these new signal processing algorithms is an automatic false signal storage.

### New application parameters

During the development of the new sensors, special importance was also placed on the adjustment and servicing functions. Fifteen new application parameters were worked out together with customers. The user himself can set up and commission the instrument without special knowledge, saving a lot

of time and money: the process is simplified through selection menus, whereby medium type, medium, application, shape of vessel floor and ceiling as well as container height are entered.

The adjustment structure is also arranged more clearly. Evaluations by independent institutes provided valuable suggestions on how to make instrument handling even simpler.

The topics of diagnosis, service and maintenance also received their fair share of attention during the revision. All asset management information provided by plics®plus radar sensors for preventive servicing fulfills the requirements of NAMUR recommendation NE 107, which defines four standardized status messages. Additional error messages in clear, readable text allow a detailed and targeted diagnosis. Besides the implementation of a real time clock, which makes storage of event data with time stamp possible, the measurement data memory was considerably enlarged: up to 100,000 measured values and events can now be stored in the sensor. For the exact analysis of difficult applications, echo curves can be recorded manually or via an event-driven command – these functions provide specific information and make the work of the service staff a lot easier.

### New sensor versions extend the application range

High temperature versions, special materials and higher chemical resistance have contributed to the significant extension of radar technology's application range.

To accommodate higher temperature ranges, the VEGAPULS 62 instrument series is supplemented by 2 new versions at once. In addition to the classic PTFE antenna material, materials like PEEK or aluminium oxide ceramic are available now, too. The new high performance plastic PEEK makes implementation possible at temperatures up to +250 °C at a pressure of 100 bar. The ceramic version can even be used in temperatures up to +450 °C and pressures up to 160 bar.

VEGAPULS 63 with PTFE encapsulated antenna system is now deployable in a pressure range from vacuum to 16 bar and in temperatures from -200 °C to +200 °C. It offers a cost-effective alternative to special materials and enamel-coated instruments when aggressive media like chlorine have to be dealt with.

### User requirements take priority

Throughout the entire innovation process, care was taken to make sure the user has to adapt himself to as few changes as possible, so even the instrument name VEGAPULS 60 was kept. The electronics are compatible with previous housings; a retrofit is simple to carry out and the adjustment software is of course downward compatible, as is customary with VEGA technology.

## literature

The new brochure “Radar Level Measurement with VEGAPULS – The New Intelligence” introduces the advantages of the new plics®plus radar sensors.

We'd be happy to send you a copy.



## Combining a proven method with all the advantages of the plics® concept

Interview with the product manager for pressure transmitters, Michael Hannig, about the introduction of the new differential pressure transmitter VEGADIF 65.

**VEGA Journal:** *Is the integration of differential pressure measurement into the plics® concept a step into a new measurement technology?*

**Hannig:** This question must be considered from different angles. For almost 40 years VEGA has been developing and producing pressure transmitters and is one of the market leaders in the area of ceramic-capacitive pressure transmitters. For 16 years we've also had differential pressure transmitters in our product line. However, these were distribution products which were not comparable to plics® instruments. So this integration is not a new measurement technology, but the combining of a tried and trusted measuring principle with all the advantages of the plics® concept.



**VEGA Journal:** *What is the reason for integrating differential pressure technology into plics®?*

**Hannig:** The customer's wish. Once you've established an instrument concept as successful as plics® on the market, you'll

always be measured in terms of it by the customer. Since differential pressure transmitters are always a decisive part of the instrumentation in process automation, users rightly expect differential pressure to be integrated in plics®, too.

The previous instrument was perceived by users as a break in the instrument family. None of the advantages of plics® instrumentation applied to differential pressure measurement until now. But this has changed: through the introduction of the new VEGADIF 65, we have integrated differential pressure 100 % into the plics® family and thus taken the demands of customers into account.

**VEGA Journal:** *It was therefore "the voice of the customer" that led to the development of VEGADIF 65. But how will you position yourself on the market with this instrument and what chances do you see?*

**Hannig:** The market for differential pressure transmitters in process automation is an increasingly hard-fought market and there are many competitors out there with excellent measurement technology. Due to the in-house development of the plics® hardware and software, the instrument now has a completely different significance for VEGA. That means we are determined to tap the full potential of this measurement technology. Besides pres-



sure and level measurement, we also offer interface and density measurement as well as flow-rate measurement with differential pressure transmitters – applications that we've declined in the past.

**VEGA Journal:** *Doesn't that place you in direct competition with the large suppliers of differential pressure and flow instrumentation?*

**Hannig:** Yes, we are indeed entering into competition with the well-known market leaders. However, you've got to consider the different orientation of those companies with regard to marketing as well as product range. Our market are customers with individual projects that derive benefit from the versatile housing technology and the simple indicating and adjustment concept plics®. And all customers who need, besides level, switching and pressure, also differential pressure measurement or flow measurement with an orifice plate.

## On a direct path to the goal

**VEGA has found a simple, fast and cost-effective way to transfer data from the field to the Ethernet. The decisive advantage of this extraordinary solution: additional components and bus systems are rendered superfluous by clever signal conditioning instruments. This saves not only money, but also simplifies infrastructure, installation as well as maintenance and servicing, particularly in**

Ethernet. Everyone knows about it and has been using it as a matter of course for years now – at home and in the office. Many customers would also like to use this key technology in an industrial environment and profit from its advantages. Because, this established and proven technology is safe, simple and known to work reliably. Ethernet and the de facto standard Modbus via TCP/IP are a well-coordinated team that is used in many plants and supported by almost all manufacturers. In almost all PLC and control systems there is an Ethernet input card that is able to communicate with Modbus. To bring the information in process control systems from the bottommost to the topmost level today, many intermediate components, like couplers, repeaters, separators, remote I/Os and bus systems, are usually necessary.

VEGA does it differently: always on the lookout for simple solutions for customers, VEGA already “invented” years ago signal conditioning instruments that make it possible to transmit 4 ... 20 mA signals as well as HART information directly to the Ethernet. A solution that is interesting primarily for small and mid-size applications and opens the gate to industrial Ethernet.

### Only one bus instead of several

This solution reflects the idea of simplicity that VEGA has also championed in its instrument concept plics®. The signal conditioning instruments connect the sensors in the field on the basis of the existing standards 4 ... 20 mA or HART and couple them directly to the Ethernet. The big plus of this solution: one single component takes over communication, galvanic separation and also Ex separation



if required and even the function of power supply for the connected two-wire sensors. With the help of the signal conditioning instrument, a direct path from HART to Ethernet can be realized. The user has to deal with neither remote I/Os nor fieldbuses nor coupling components. Every additional bus system means more work with setup, maintenance and servicing, more contact persons and higher expenditures.

There are essentially three reasons why the industrial Ethernet is not wired directly to the individual sensors:

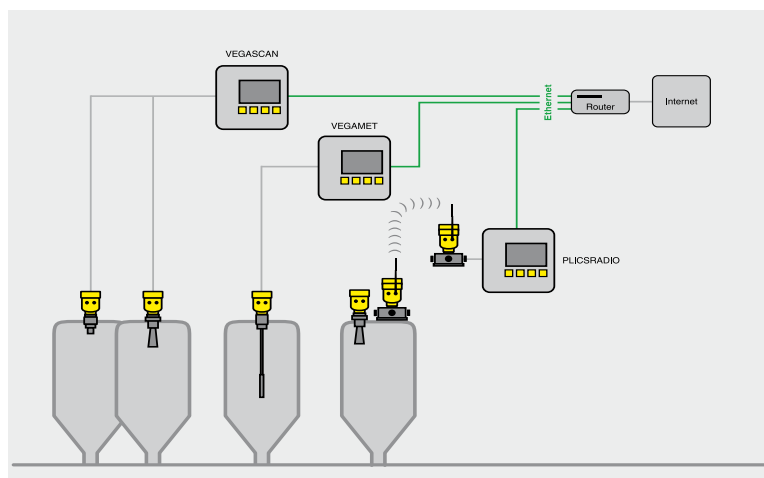
1. Solutions for “energy over Ethernet” are missing – this is an important factor for users, especially in process automation. Industry has reacted to this need by defining power supplies.

The smart solution from VEGA transmits HART signals to the Ethernet.

2. The topic “Ex” has not yet been clarified, i.e. approximately one-third of all applications in process automation cannot be coupled directly to the industrial Ethernet.
3. After over 35 years, no standard for the industrial Ethernet exists. In VEGA’s opinion, the Modbus TCP/IP protocol would be perfectly suitable for connecting sensors.

**The key to success**

VEGA’s solution is optimized for smaller or medium-sized projects in which it wouldn’t pay to install a fieldbus. The Ethernet interface is offered as an option with all signal conditioning instruments and VEGA has been upgrading the Ethernet solution consistently for years. The signal conditioning instruments take over simple regulatory and control functions and relieve the PLC. VEGAMET (1 or 2 channels), VEGASCAN (5 to 15 channels) and PLICSRADIO (wireless communication) are a complete product family offered by the company. As an alternative to the Ethernet interface, users can also use a serial interface for connecting standard modems (e.g. GSM/GPRS).



VEGA signal conditioning instruments take over the gateway function between 4 ... 20 mA/HART and the control system.

Every signal conditioning instrument is equipped with a background illuminated display as well as on-site adjustment options similar to those of PLICSCOM, which are used in conjunction with the plics® sensor family. In HART Multidrop operation in combination with VEGASCAN, up to 15 two-wire sensors can be connected in parallel at the input, just as 15 devices can be connected to a fieldbus. One small shortcoming here is the speed (0.5 seconds per participant). However, for applications where time is not critical, like typical storage level and many pressure applications, HART Multidrop is ideal. Whoever has a speed problem can simply change to the 2-channel VEGAMET 625 or the 1-channel VEGAMET 624.

One small difference, with respect to real fieldbusses, they deliver the status automatically. With HART, the user has to specifically request status information. Different protocols transmit the information to the Ethernet. The de facto standard Modbus via TCP/IP is used most frequently.

**1001 possibilities**

Through the purely digital signal transmission, losses in accuracy caused by analog/digital convertors can be avoided. No measuring precision is lost through via conversion. Since the solution is based on common standards, instruments of any manufacturer can be connected. Like all products from VEGA, the signal conditioning instruments can be parameterized without limitation by means of FDT technology, for example with PACTware.

An integrated web server makes simple access possible via standard Internet browsers. Users can access the instruments from anywhere, e.g. from a measuring station or an office, and enquire measured values as well as diagnosis and status information. The Ethernet even allows an extremely fast readout of the measured data memory with up to 200,000 values. Moreover, the signal conditioning instruments provide the data in different formats: XML, http, TXT and CSV [Excel]. E-mail and SMS messages can be triggered via defined times, events or error messages.

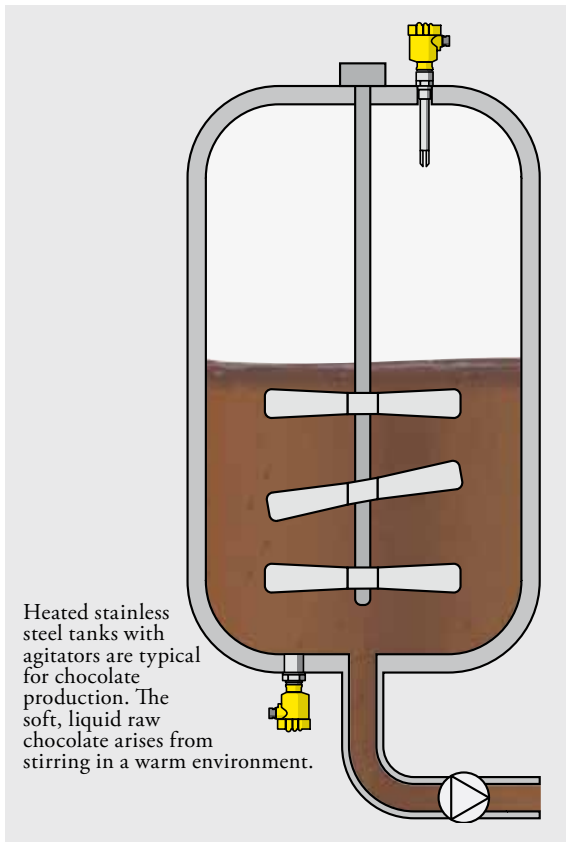
VEGAMET 391, an instrument developed especially for the requirements of applications in water and sewage management, came on the market this year. It has at its disposal e.g. the functions flow rate and flow volume measurement as well as intelligent pump management. With its measured data memory, measurements can be recorded over a longer period of time.

**A solution with added value**

With VEGA’s “HART on Ethernet”, users with small and mid-sized applications can transmit signals from the field to the Ethernet quickly, efficiently and cost-effectively and use all the advantages associated with it. Clever signal conditioning instruments simplify the structures, make life easier for users and save hard cash. The smart communication solution has already proven itself in many applications in automated inventory management, in tank farms and in the water/sewage sector.

**literature**

The brochure “Communication for Process Automation” shows the user the communication concept and the advantages of data visualization from VEGA.



## Level measurement in liquid chocolate

**The German family business, RITTER, has kept a sweet secret since 1912: the success recipe for producing great chocolate. Today the various kinds of RITTER SPORT are sold in about 90 countries and appreciated by chocolate lovers everywhere. To keep the quality of the chocolate at a high level, reliable level measurement is required in the production processes.**

### Chocolate, a challenging product

In chocolate production, a liquid cacao paste, the so-called raw chocolate, is prepared after the cocoa beans are roasted, crushed and ground.

From this stage onward, the paste is held permanently at a temperature of approx. +45 °C in double-walled steel vessels to keep the chocolate in a liquid, processable state.

All system components, measuring systems as well as materials must meet hygienic requirements. However, in the actual production of various kinds of chocolate, like nut chocolate or chocolate with almond splinters, the hygienic aspect is not the only decisive factor: the process itself proves to be a rather rough business. Sensors that are in direct contact with the moving cacao paste must be highly abrasion resistant.

### Advantageous – sensors with a ceramic measuring cell

Pressure transmitters with a dry ceramic measuring cell are the ideal solution for measuring the different cacao pastes. The ceramic measuring cell, 10 times harder than steel, resists abrasion extremely well. Even mechanical hand cleaning, cleaning with 2 ... 5 % acid or lye solutions at +60 °C (CIP) as well as sterilization with steam at a temperature of +125 °C (SIP) cannot damage the measuring cell.

The installed pressure transmitter VEGABAR 52 delivers, in addition to the actual level measurement, the product temperature in the area of the measuring cell.

The high precision class (0.075 %) of VEGABAR 52 allows exact control of the chocolate recipe via the charging weight. The additional level switch VEGASWING 63, mounted in the tank lid, reliably switches off the filling process when the permissible maximum charge is reached.

Beside all these advantages, a high, long-term stability is achieved and additional work, e.g. recalibration, is avoided. With VEGABAR and VEGASWING, level and temperature can be reliably measured and the process optimally controlled.



The finished, moulded chocolate is checked for quality once again before packing: it must have the dull, silky gleam and the right “snap” when the bar is broken.

# From the world of papermaking

**This article shows working examples of level measurement in different areas of the paper and cellulose industry. Exactly in those areas where previous measuring techniques were not always able to fulfil user requirements, radar turns out to be the optimal problem solver.**

## Harry Potter performs his magic on paper from Germany

Mochenwangen Papier is a traditional German manufacturer of high-quality papers for books as well as for roll and sheet feed offset printing. The company produces, among other things, the paper that was developed especially for the novel series “Harry Potter”. Besides high paper quality, the author and publishing house demanded that environmentally friendly production methods be used. The raw materials for this paper are groundwood pulp, waste paper, long and short fibre cellulose, filling pigments and auxiliary materials. Substantial components in fulfilling the requirements are the chlorine-free peroxide bleach as well as the specially prepared starch used for gluing.

The required raw starch is stored in a silo with a height of approx. 12 m and a diameter of approx. 3 m. The level measurement, which is evaluated via the control system, ensures a sufficient supply of starch for production. The previous measurement was realized with a mechanical plumb line system, but worked only sporadically and had to be regularly serviced.

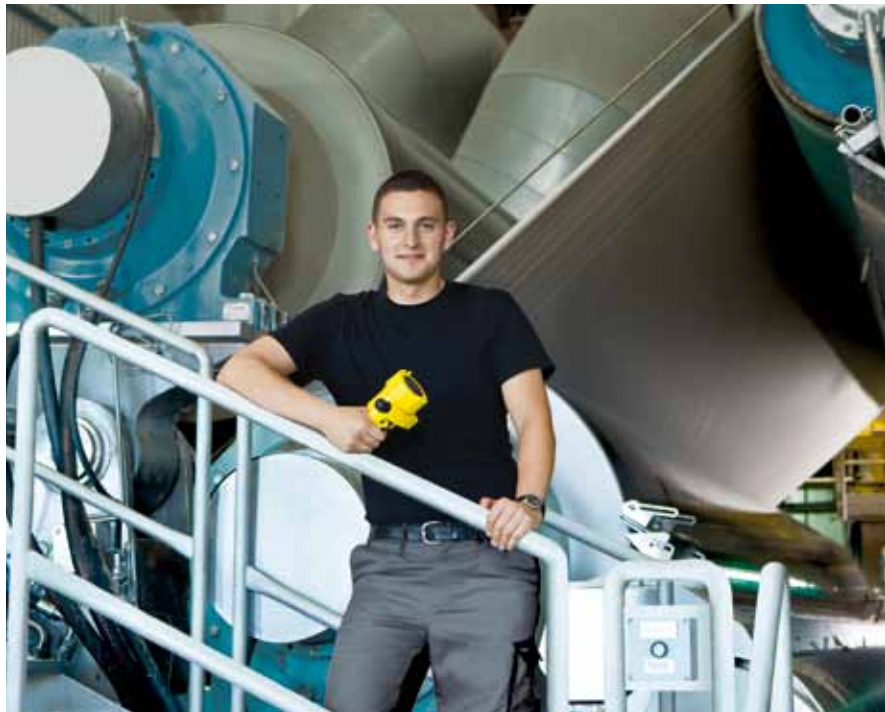
In the course of modernization, the measurement was switched over to a VEGAPULS 67 bulk solid radar sensor. This instrument is optimised for process conditions like dust or unfavourable reflective properties and operates maintenance free.

## Old becomes new – newsprint papers

UPM Schongau in Germany is an important manufacturer of newsprint papers and natural papers with high filler content. The company produces up to 750,000 tons of paper per year on three modern paper machines. Waste paper, mechanical pulp and fillers like e.g. kaolin are the raw materials.

The large quantities of fibre residue material created in production are dried, stored in a silo and later burned. The still hot ash is conveyed pneumatically into storage silos up to 25 m high. Filling, emptying as well as the associated logistics are controlled via a level measurement that provides essential information to the control system.

Typical measuring conditions are dust, noise and material cones during filling as well as spouts during emptying. Plumb lines, ultrasonic, guided microwave as well as strain gauges were used as measuring systems up till now, all of which did not work to UPM Schongau’s full satisfaction. The disadvantages were: high maintenance costs, frequent cable break, temperature sensitiveness as well as inaccuracy. Today, the bulk solid radar sensor VEGAPULS 68 is implemented as the ideal solution. The high signal



As a long-standing partner of the paper industry, VEGA makes sure that plants maintain high availability.

sensitivity of the sensor is precisely adapted to the ash and its extremely low Dk value and unfavourable reflective properties. With its measuring range of up to 70 m, the sensor is also well suited for high silos. Automatic compressed air rinsing of the antenna system keeps the measurement setup operational at all times without additional servicing.



## Process data transmission via GSM/GPRS with PLICSMOBILE

**The new product PLICSMOBILE to be introduced by VEGA Grieshaber KG is a new component for wireless communication. Through quadband technology, measured-value transmission, remote diagnosis and teleservice can be carried out worldwide over the mobile telephone network. PLICSMOBILE will be available as of May 2010.**

With PLICSMOBILE, VEGA has gone a step further in the area of remote data transmission. The module with standard SIM card is integrated in the two chamber plastic housing or, in the detached version, connected to a sensor.

PLICSMOBILE opens up completely new areas of application for VEGA sensors. "The transmitting and receiving unit PLICSMOBILE is equipped with a SIM card. This enables worldwide data transmission via standardized GSM-GPRS services. With this module, remote diagnosis and teleservice can also be conducted over the mobile telephone network", explains Franz Harter from Product Management Communication at VEGA.

PLICSMOBILE can be integrated into the double-chamber housing of plics®plus instruments. In the detached version any plics® or plics®plus sensor can be connected to PLICSMOBILE T61. The product manager mentions the integrated energy management of PLICSMOBILE as a further advantage.

"In principle, the device is in standby mode. Data transmission is carried out time or event driven depending on the setting. This saves power. In the remote version an accumulator or a battery can be integrated, which brings further advantages with regard to power supply" Harter continues.

The power supply for the connected sensor is provided via PLICSMOBILE. The low operating voltage of both module and sensor allows supply via accumulator or battery. PLICSMOBILE can thus be used independently of an external power supply.

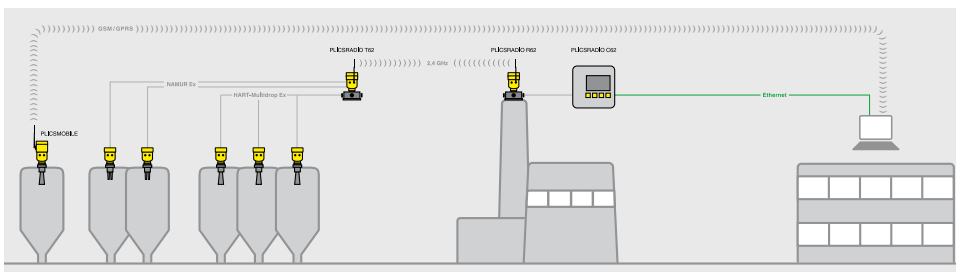
A solution for powering the instruments with solar panels is already in the works. "For this, the relevant framework conditions first have to be clarified. But we do see a large customer advantage in such a solution."

Adjustment of PLICSMOBILE is carried out via a PC with PACTware and DTM. This allows comprehensive, remote access to sensors with HART, Profibus PA or Foundation Fieldbus interface.

Ideal areas of use for PLICSMOBILE are applications in which a measurement takes place far away from where evaluation is carried out. Examples of this are mobile silos, deep wells, high containers, waste oil gathering points as well as river and sea levels.

The data can be passed on to the Internet portal WEB-VV or made available per e-mail or SMS. "WEB-VV is a web technology-based software that receives, visualizes and archives the data of PLICSMOBILE. With it users are able to carry out an inventory check of all tank data via intranet or Internet at any time" explains the product manager. WEB-VV also provides the interface to ERP systems and logistics software.

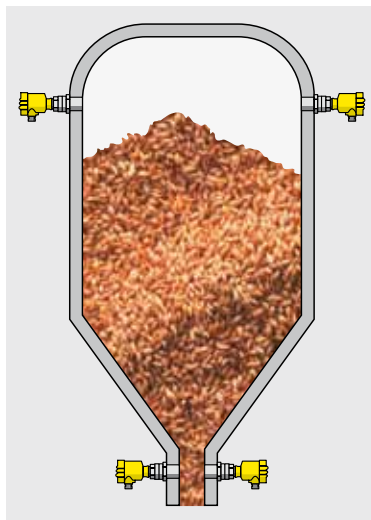
PLICSMOBILE ideally rounds out the product range in the area of wireless. Moreover, there are plans for further development of other systems. "We're also thinking about an accumulator-powered version of the radio module PLICSRADIO. With it, data transmission independent of external power would be possible for distances up to 1,600 m," adds Franz Harter in conclusion.



Flexibility through wireless data transmission: the possibilities within the VEGA portfolio.

# VEGA introduces a new microwave barrier: VEGAMIP 61

**The microwave barrier VEGAMIP 61 reliably detects the limit level under very rough process conditions. Dirt, dust and build up have virtually no effect on the sensor.**



The microwave barrier VEGAMIP is used as a universal level switch in bulk solids or liquids.

The non-contact microwave barrier VEGAMIP has, as the name implies, no direct contact with the medium. This is especially advantageous when dealing with abrasive products or very high temperatures. VEGAMIP 61 simply measures from the outside through a microwave-permeable window made of a material such as ceramic or plastic.

Also when used for level detection of liquids or object detection, the microwave barrier offers many advantages over other measuring principles.

The microwave barrier consists of a VEGAMIP T61 transmitter

and one or several VEGAMIP R61 receivers. The receiver measures the attenuation of the received microwave signal and generates a switching signal from it. VEGAMIP can be used as either a maximum or a minimum sensor. Its switching delay can be set between 0.1 and 20 s.

VEGAMIP 61 fits perfectly in VEGA's plics® concept and offers all the advantages of that modular system.

The user can choose between housings of plastic, aluminium or stainless steel as well as different antenna systems and process fittings. He therefore has the possibility to configure the sensor especially for his own individual requirements.



## Dates

### Seminars: March - October 2010

PACTware Training Day

Wednesday 3rd March

Burgess Hill

UK

PACTware Training Day

Wednesday 21st April

Burgess Hill

UK

PACTware Training Day

Wednesday 19th May

Burgess Hill

UK

PACTware Training Day

Wednesday 23rd June

Burgess Hill

UK

PACTware Training Day

Wednesday 22 September

Burgess Hill

UK

PACTware Training Day

Wednesday 20th October

Burgess Hill

UK

For details contact Melanie Crowley

Phone: 01444 870055 / e-mail: melanie.crowley@uk.vega.com

### Trade fairs: March - June 2010

MSR Rhein-Main

03 March

Frankfurt-Höchst

Germany

M+R Gent

04 March

Gent

Belgium

Hannover Fair

19 - 23 April

Hanover

Germany

POWTECH

27 - 29 April

Nuremberg

Germany

KALI

04 - 06 May

Berlin

Germany

Middle East PETROTECH

22 - 24 Mai

Manama

Bahrain

NEFTEGAZ

21 - 25 June

Moscow

Russia

Hillhead 2010

22 - 24 June

Buxton, Derbyshire

United Kingdom

## Fresh off the printing press

### Product brochure “A new dimension in Modularity with plics®plus”

The new brochure “A new dimension in Modularity with plics®plus” presents the new products and additional application options resulting from the consistent further development of the plics® instrument concept. The reader can easily find all innovations having to do with housing versions, instrument adjustment, level measurement, level detection, pressure measurement and radiation-based measurement



### Innovation brochure “Radar Level Measurement with VEGAPULS”

plics®plus is the continuation of the success story of the modular instrument concept plics®. The first instruments being launched on the market with the new functions are the radar sensors VEGAPULS 60.

Users of these sensors profit from the improved reliability and higher measuring precision that are achieved through state-of-the-art electronic components and more intelligent software. A

particularly interesting feature: the downward compatibility of the new electronics units ensures that users of existing instruments can also exploit the advantages of the new plics®plus instrument series in their applications.

The brochure “Radar Level Measurement with VEGAPULS – The New Intelligence” summarizes the benefits as well as the advantages for users.



### Technology brochure “Communication for Process Automation”

The new technology brochure “Communication for Process Automation” presents all the communication possibilities, including HART, Wireless, Profibus, Foundation Fieldbus

and the advantages of VEGA’s internet based data visualisation system, WebVV. A comprehensive instrument overview rounds out the brochure

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