

SICKinsight

MAGAZINE

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Energy. Efficiency. Transparency.

The negative effect of CO₂ on our climate is now undisputed. However, the need for energy is growing strongly worldwide due to increased consumption in developing and emerging countries. We will therefore have to learn to live with fossil fuels for some time and are facing the challenge of making a smooth transition to other sources of energy.

SICK would like to make a contribution in this area. There is still great potential for increasing efficiency in power plant technology for generating energy and heat. The same applies for the diverse energy conversion processes in the production of raw materials. The basis for optimization is always transparency: Without reliable measurement data from sensors, advancement is hardly possible. And with Industry 4.0, it is increasingly becoming feasible to provide the customer with additional information from the combination of data, which in turn allows for improvements. Increasing energy usually results in energy savings and therefore less CO₂. This is a significant contribution to both climate and environmental protection.

Natural gas plays an important role in the decarbonization process. For this reason, SICK supplies sensors for production, transport and storage. Data transparency regarding the quality and quantity of natural gas is a significant factor in the worldwide transport network. We also see a high degree of dynamism in regenerative energy generation. We think hydrogen is playing an important role, both as a storage medium for surplus “green” energy and as an energy supplier in the mobility field. SICK has its finger on the pulse and is already supplying sensor technology for quantity and quality measurement in pilot plants for hydrogen generation.

Nearly any increase in efficiency therefore saves energy, thereby making our customers even more competitive. Transparency with intelligent sensors is the prerequisite. That is what we at SICK are working for!

VISIBLY MORE ENERGY EFFICIENCY

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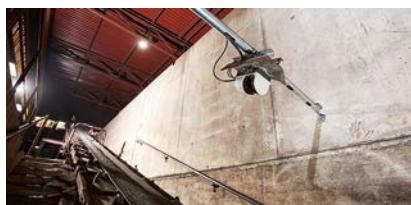
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SICK, A QUALIFIED PARTNER

MORE GAS FOR THE ENERGY REVOLUTION

Green technologies for producing energy are creating real hope: Bio-coal can already be produced synthetically through CO₂ recycling, bio-butanol can be made with genetically-modified microbes and bio-gas and bio-hydrogen can be generated with wind power electrolysis. But it will take years for these technologies to be perfected and become profitable. Until then, natural gas can secure supply and help push forward the energy revolution in a practical manner by continuing to displace coal and oil. This could happen even faster for fuels with liquid natural gas (LNG), liquefied petroleum gas (LPG) and compressed natural gas (CNG). SICK process analytics and verifiable ultrasonic measurement technology are involved in production and distribution worldwide.

>> With about 12.5%, the EU is the third largest CO₂ emitter in the world. With around 20% of the EU's share, Germany has the largest share. About half of the EU's emissions is created by the production of heat and power for residential buildings and industry, while a good 20% is created by road traffic. Both, particularly road traffic, use petroleum products on a large scale which is why a large share of gas is especially beneficial here, since natural gas burns with 25% less CO₂.

Possible replacements are cryotechnically liquefied natural gas (LNG), natural

gas liquids (LPG / liquid petroleum gas or camping gas) as well as compressed natural gas (CNG) which are heavily reduced in volume. All three – in addition to hydrogen-powered fuel cells – are major competitors for gasoline and diesel for goods transport. There is already a large filling station network for LPG; CNG is now being pushed by automobile manufacturers. Particularly promising, however, is LNG, which can be procured independent of pipelines and transported in large volumes by ship. It is particularly well-suited as a replacement for heavy fuel in maritime transport. It is also being discussed as a replacement

for kerosene for powering airplanes. LNG can also independently supply industry and residential buildings, and even entire countries, like Japan. The EU also currently houses LNG port facilities with a fifth of the regasification capacity worldwide. The EU Commission is now also promoting massive LNG filling stations and trucks with liquefied natural gas tanks in the framework of the "LNG Blue Corridors" project.

Analytics for raw gas processing, liquefaction and emissions monitoring

SICK analytics are already used for the production of LNG and LPG. During raw gas processing, for example, a TRANSIC100LP laser spectrometer controls the supply of oxygen while the separated acid gas is burned to sulfur dioxide and processed into elementary sulfur. A GMS800 OXOR gas analyzer monitors the oxygen content in the Merox® process, in which LPG acquired from raw gas is desulfurized. The GMS800 UNOR makes a contribution to producing syn-gas for industrial application.

In a liquefaction plant in Oman, a GMS800 UNOR prevents residues from the previously separated CO₂ from clogging the gas turbines of the cooling unit. On LNG tankers and floating evaporation platforms, MARSIC analyzer systems are used for continuous emission monitoring systems (CEMS); during evaporation on land, particularly cost-effective cold/dry extractive PowerCEMS50 systems perform the same task. In large LNG import projects in Panama and Bahrain, SICK is involved with complete measurement stations with which the quality and amount of the gases output to the customers are recorded reliably and with high accuracy.

SICK also has the right analyzer systems for auxiliary plants for natural gas processing; CEMS monitor combustion processes in boilers and gas turbines while TRANSIC oxygen detectors measure the inert atmosphere in pipes and storage tanks. TOCOR analyzers show the smallest hydrocarbon contaminations in the process and cooling water, surface and waste water.

“We like to be involved in projects which aim to advance sustainable, CO₂-neutral value-added chains and support concepts or making conventional technologies ‘green’.”

Dr. Michael Markus, Strategic Industry Manager Oil and Gas at SICK

Accurate billing and intensified flare gas monitoring

The well-known, highly reliable and nearly maintenance-free ultrasonic flow measurement systems from SICK are also used all over the world. The FLOWSIC gas flow meters are used for recording gas volumes under the toughest conditions – on drilling rigs in Norway, in coal gas fields in Australia and for shale drilling in the US, in flare gas and LNG systems as well as in the entire distribution network from the pipeline to the industrial end customer or CNG filling stations.

Flare gas alone is extremely climate-relevant: Around 350 million tons of CO₂ are released all over the world every year through controlled or uncontrolled burning; this amounts to about 40% of all German CO₂ emissions. In the meantime, verification requirements in many countries have started forcing drastic reductions and exact measurement of flare gas emissions. Many flares are therefore not in operation most of the time. The streamlined FLOWSIC100 Flare has proven its worth here; it can record the smallest flow rates, and can

also withstand massive flows at short notice in the event of a malfunction.

Future vision of CO₂-neutral fuels based on green energy

According to the Paris Agreement, 90% of energy should be created from renewable fuels by 2050. “Green” power-to-x processes could then be the focal point of a new gas infrastructure in which excessive green power is saved in the form of gas and converted to CO₂-neutral fuels. Then synthetic natural gas and LNG could be created from wind power by means of power-to-gas. SICK is already testing the technology and developing suitable measurement concepts. “We like to be involved in projects which aim to advance sustainable, CO₂-neutral value-added chains and support concepts for making conventional technologies ‘green’,” says Dr. Michael Markus, Strategic Industry Manager of Oil and Gas at SICK. “It is sometimes possible to achieve amazing results.” (sr)

SOLUTIONS FROM SICK FOR GREATER SUSTAINABILITY IN THE ENERGY INDUSTRY

MEASURING THE SUCCESS OF CHANGE

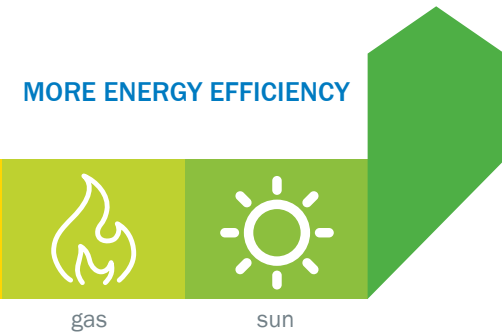
When changes are made in some situations, the results are instantly seen. Wind power plants and solar modules are examples of this. Visible from great distances, they are an eye-catching symbol of the revolution we are experiencing in how we produce energy. There are other important factors in achieving sustainable change, however, such as our efforts to phase out nuclear energy and the bridging technologies we are using to facilitate this – plus our continued use of fossil fuels, especially natural gas. In these areas, the most significant types of modernization and change tend to unfold in ways that we are unable to see. The ongoing development work that is taking place in intelligent sensor technology from SICK is playing a key role in optimizing processes in this field. SICK does much more than simply respond when radical change happens. It also sets the pace for developments in technology, and acts as an expert partner for new solutions tailored to customers' needs. Not only that, but it is able to provide these services in every single area of energy generation that matters today – and will matter tomorrow.



wind



MORE ENERGY EFFICIENCY



>> In order to respond to changes in the methods used for generating energy, companies and electricity producers need to come up with sustainable solutions quickly. The scenarios they face go beyond simply phase-out actions; It is just as important for them to adapt in line with evolving legislative positions and optimize existing processes. Evidence shows that there are potential savings of up to 10% to be made by harnessing energy-efficiency measures. Often left unexploited, these savings increasingly become an economic force to be reckoned with as measurement results improve and more accurate conclusions can be drawn from them. Sensor intelligence from SICK is one decisive step ahead of the game, delivering valid, pre-processed data directly from the point of measurement.

Knowledge is power

Knowledge is what holds the key to both exploiting sources of renewable energy and harnessing the full potential of energy generation chains. A rethink is now happening in areas where energy had previously been squandered – whether this occurred through inefficient processes or burning off natural gas as an unwanted by-product of oil extraction. What this means is adopting a policy of use rather than abuse, and staying open to the latest forms of technology. Glean-

ing as much efficiency from processes as possible requires smart solutions – anything from Power-to-x technologies to the successful CO₂ neutralization of process chains. SICK is involved in several pilot projects in the area of P2X development, for example.

A new era of devices

First and foremost, successfully converting energy losses into genuine gains on the energy market requires improved sensors as well as measurement results that are even more precise and more widely available. The main areas in which the latest sensor generations have improved are in data management, processing and preparation, and the initial classification of data directly in the sensor. From this point, the measurement results that have been processed are communicated directly to the control systems or to the cloud. However, the process as a whole does not become truly smart until the technicians and engineers involved have injected their significant experience into it. Their expertise enables signals to be interpreted and evaluated correctly, right from the programming stage – and it can be harnessed in flow measurements, particle emissions measurements, and gas analysis alike. Any maintenance that is required, and any potential malfunctions, are detected and displayed with certainty. A good example in this case is the FLOWgate™ communication software for ultrasonic gas flow measuring devices. Working solely on the basis of the signal quality, FLOWgate™ detects and calculates a wide variety of process issues that may occur due to contamination or valves that have not been fully opened, for example.

SICK maintains a presence in every single energy sector, offering a multitude of products and applications: from encoders in solar and wind power plants, to the measuring of combustion products and flows in power plants with fossil fuels, all the way through to feedback

monitoring in biomass power plants. While simply collecting data used to be enough, nowadays every branch of the energy industry looks for expert methods of managing information.

Reliability, reproducibility, availability

Measurements deliver results. To ensure that energy companies are also able to take advantage of good results – which do not result in costs or energy losses that could otherwise have been avoided – there must be reliable methods of retrieving them in place at all times. Failures and discrepancies simply cannot be allowed to happen. This area of data validation is another in which SICK is assuming a leading role, offering customers complete solutions from a single source. Emissions measurement is a good example of the steps being taken. Here, the evidence shows that devices with low calibration and maintenance requirements are achieving much more than the required 95% reliability rate. This means that customers can feel secure in placing their entire process in the hands of a system like this – from ensuring compliance with all environmental guidelines to the report from the relevant authority. In the near future, SICK intends to enhance this form of data validation through smart solutions and new software products in an aim to reach the theoretical limit of 100% availability.

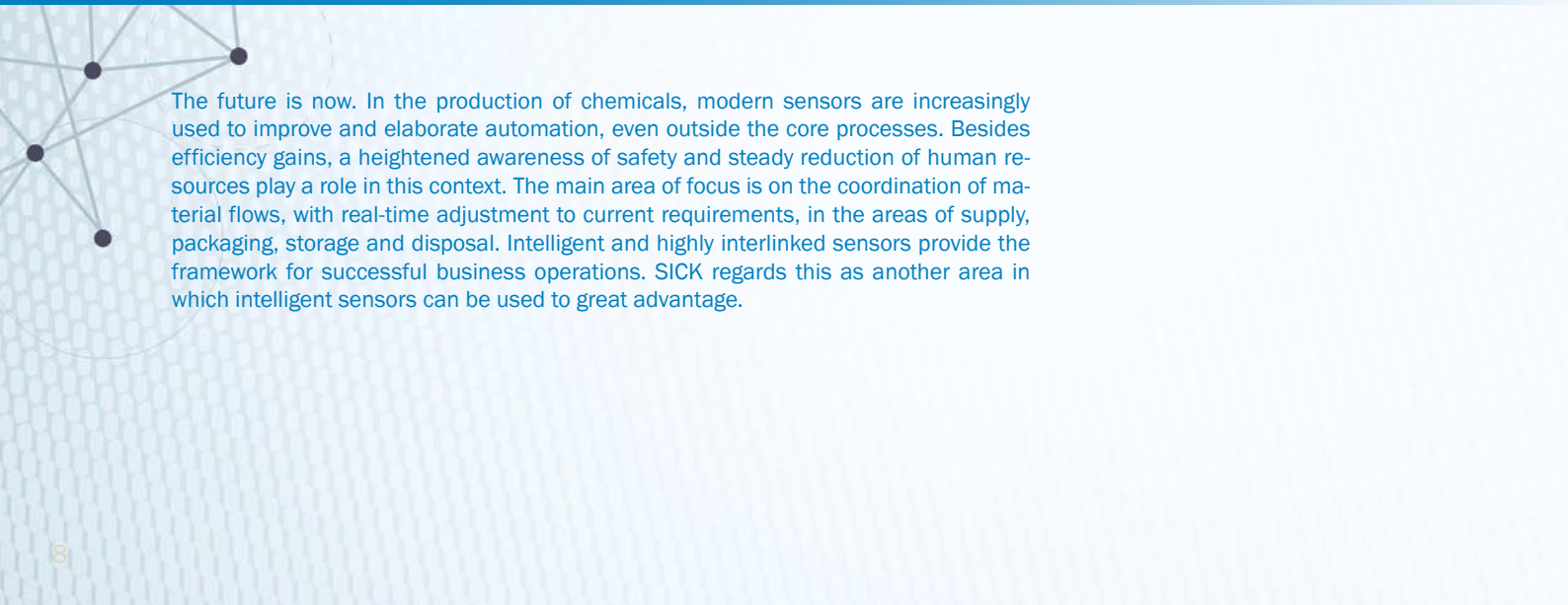
Gaining maximum value

SICK pushes the boundaries of what can be achieved – both when it comes to data availability, and in its work with its customers. Evolving from its status as purely a hardware supplier, SICK is becoming an industry service provider. And this is a change that is bringing added value with it. As the energy market reshapes itself, entire new business models and even more efficient and sustainable value-added chains are opening up to partners. In many cases, measuring is where they take their first steps into the field of process automation – and that is how their success stories start. (mw)



SENSOR INTELLIGENCE FOR THE CHEMICAL INDUSTRY

CROSS-LINKING AND DIGITALIZATION OF THE VALUE CHAIN



The future is now. In the production of chemicals, modern sensors are increasingly used to improve and elaborate automation, even outside the core processes. Besides efficiency gains, a heightened awareness of safety and steady reduction of human resources play a role in this context. The main area of focus is on the coordination of material flows, with real-time adjustment to current requirements, in the areas of supply, packaging, storage and disposal. Intelligent and highly interlinked sensors provide the framework for successful business operations. SICK regards this as another area in which intelligent sensors can be used to great advantage.

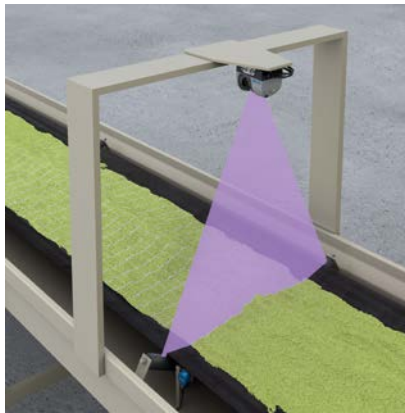
>> Process efficiency begins with the logistics: Whereas the focus in the past has mostly been on the core processes used to manufacture a product, today it is recognized that there is a significant degree of automation potential across the entire logistics chain. This is where SICK, as an established industry partner, can help, because sensor solutions for

and collision protection solutions from SICK. Manned forklift trucks, too, can be equipped with driver assistance systems such as safety laser scanners or vision cameras to prevent accidents.

An additional goal is to reduce the workload on staff by providing information that they can use directly. Intelligent sensors are thus becoming important



Safe moving of vehicles due to intelligent sensors



Measuring of bulk material volume on conveyor belts

Material transport on conveyor belts: non-contact volume flow measurement

The Bulkscan® LMS511 accurately measures the volume flow of bulk materials regardless of weather conditions, and delivers information for the precise control of raw material quantities in production.

factory and logistics automation can also be applied to the process world.

Intelligent sensors provide the framework

From the detection and registration of delivery vehicles and materials through to packaging, the intelligent SICK sensors deliver the necessary data for perfect synchronization of the production process. SICK sensors can also protect hazardous zones or monitor restricted access areas. The range of possible applications relating to the delivery or dispatch of raw materials and finished products are supplemented by a wide variety of sensor applications in the area of truck and train positioning, or maneuvering safety in general. Collision awareness is an important issue not only in loading stations, but also for all maneuvering activities within the factory gates.

Mobile platforms and automated guided vehicles of various sizes can work together safely and without accidents thanks to the 2D and 3D line guidance

sources of assistance for those employees who find themselves taking on more and more responsibility due to the increasing complexity of the technologies used in the field.

The range of possible applications outside the production area includes the packaging of the finished products, for which SICK offers a variety of optical sensors, along with camera-based and RFID solutions for track and trace purposes. SICK sensors can therefore also be employed at the end of the local value chain, thereby providing a complete overview of the process.

Link to Industry 4.0

Since the company was founded over 70 years ago, SICK has specialized in the optimization of automated processes by means of increasingly intelligent sensors. Interconnected automation is at the heart of, and a prerequisite for, Industry 4.0 production processes. To enable communication and cooperation, the sensors need to deliver a wide

range of data or information. An important aspect is predictive maintenance, because unplanned downtime due to a defect usually results in high costs.

Automation solutions from SICK provide many opportunities to effectively support customers on their path to meet the challenges of the fourth industrial revolution. *(editorial team)*



LASER VOLUME FLOWMETER ENSURES THE CORRECT QUANTITY AND METERING OF IRON CHIPS

STEEL RECYCLING: STEEL SCRAP ADDS COLOR TO CITIES

Concrete is the most commonly used construction material in the world. Roof tiles, ceilings, stacks, facades, paving stones, staircases, cellars, garages, and trash cans are all made from it. The material is currently enjoying a change of image in regards to its aesthetic appearance. Among other things, one reason for this is the trend away from drab gray to colored concrete materials. The Inorganic Pigments business unit from LANXESS today offers architects and concrete product manufacturers a range of over 100 color shades. By dyeing the concrete with synthetic iron oxide and chromium oxide pigments, it is therefore possible to provide the facades of luxury hotels or the paving stones of fashionable waterside promenades with an aesthetically attractive appearance, for example.

>> At its production site in Krefeld-Uerdingen, LANXESS uses five laser volume flowmeters from SICK for process optimization in material transportation of high-quality iron chips – Bulkscan® LMS511. Color pigments are obtained from this raw material in an oxidation process as well as a chemical precipitation process. For this purpose, the iron chips must be transported to the individual processing stations. This is done using conveyor belts.

The iron mix makes the color

The chips are ground, strained, and sorted or mixed for the planned color. This material is then stored before processing by oxidation into color pigments in powder form based on a 100-year-old recipe. These pigments are marketed under the name BAYFERROX®. The iron chips cover long distances on conveyor belts during their transformation.

Precise material management

As with any process, it is important to adapt the individual process and handling stages to each other during the plant planning stage. This is the only way to guarantee the optimum utilization of the plant. In bulk materials conveyor process, this means that the plant down-stream of the conveyor belt is able to accept and handle the amount of bulk material delivered. If the amount of bulk material exceeds the handling capacity



of the subsequent stages, there will be overfilling and material blockage that will ultimately cause downtime of the plant. Furthermore, machines and conveyor belts may be damaged, further lengthening the downtime.

“On the one hand, we would like to know what quantity and what volume is currently being transported on the conveyor belt so that the plant is not overloaded,” explains Achim Eumes, Process Control Technology Inorganic Pigments, LANXESS Deutschland GmbH. “We have installations that are able to transport lower quantities than the upstream sections due to the plant design. Using the laser volume flowmeters, we measure and control the volume so that the plant does not become blocked. On the other

hand, we can also control the metering flow in a sensible way over the course of the day and thus get a feeling for the capacity utilization of the plant.”

“We have a classic control loop at two locations. The Bulkscan supplies us with the current actual value for the quantity being transported on the conveyor belt. Setpoint values are additionally used for control at certain points,” says Achim Eumes when describing process control. “The measurement supplies the actual value and the controller then adapts the desired quantity by means of the speed of the first screw conveyor. This results in a constant transport flow.”

Better performance with 5-echo technology

“We were looking for a non-contact measuring principle,” says Achim Eumes to explain the starting situation. “However, it is a great challenge for an optical device to function in such an environment, i.e., detecting the dark iron chip mass on a dark conveyor belt under difficult lighting conditions,” he adds.

The ultra-fast sampling technology from SICK enables high-precision laser measurement in virtually all weather and ambient conditions. The 5-echo technology is perfectly suited for applications that require the reliable detection of dynamic objects in changing or unfavorable conditions. Even for applications with poor visibility, such as in tunnels or in mines. In addition to maintaining excellent visibility in unfavorable weather conditions, 5-echo technology also ensures maximum accuracy.

The system

The laser scanners are mounted at five locations above the conveyor belt in

the Krefeld-Uerdingen factory and continuously measure the height profile of the iron scrap passing underneath by laser pulses. The laser radiation is eye-safe and corresponds to laser class 1. The notable aspect of this design is the reliable detection of the height profile, even with external interference factors such as dust or bulk material suspended in the air. This is possible due to new signal analysis technologies, which are able to filter out the correct height profile signal reliably from a large number of echoes. The software algorithm reliably determines the correct signal from the various reflected laser pulses and at the same time reliably suppresses any haze that might interfere with the measurement. Fast scanning frequencies of up to 75 Hz and fast response times are used both to achieve maximum resolution for the height profile (and thus high measurement accuracy) as well to enable measurement of fast conveyor belts moving at speeds of up to 30 meters per second.

The Bulkscan system from SICK offers six individually assignable switching outputs for further signal processing, e.g., as a warning or impulse output or as continuous outputs for measured value transmission over TCP/IP (Ethernet). Processing and measured value preparation take place directly in the sensor, which therefore also has two inputs. No additional data acquisition system is required. This facilitates mounting and commissioning. (as)



LIQUEFIED NATURAL GAS FOR POWER SUPPLY

TOWARD THE FUTURE OF ENERGY: WITH SICK

Onshore storage of liquefied natural gas (LNG), regasification, and gas delivery: A well-known construction company is building an LNG terminal hub with adjacent gas-to-power plant in Panama. The showcase project is of great economic importance to the region and completion is planned within one year. SICK is in charge of engineering and design of the customized metering skid for custody transfer measurement of the natural gas quantities transported.

>> Natural gas is intended to strengthen Panama's economy. An initiative from the president of Panama is gaining momentum. The LNG terminal and the gas-to-power plant in the Colón province on the Atlantic coast of Panama are scheduled for commissioning in 2019. In addition to supplying the power plant with gas, 15 million households and industrial installations near the Panama Canal and Colón are being supplied with electricity. The EPC company received the order to construct both the gas-and-steam turbine power plant and the

onshore LNG import terminal with a tank holding 1,800,000 m³. This plant covers an area of 20 ha and is looking to do more than just be the LNG distributor hub in this region. It will also establish itself as a storage reserve for alternative fuels for marine vessels.

On a pier, the gas cooled to -160 degrees Celsius is transported in cryogenic pipes from the new jetty to the LNG tank. On the way to the power station, the liquefied gas will be regasified to natural gas. The amount of gas to be delivered

and charged to the power station has to be correct. SICK is providing an 8" metering station with gas meters, a process gas chromatograph, and a flow computer with supervisory function. These are the major components of the measuring station for controlled recording and metering of the enormous quantities of energy supplied in form of natural gas. This metering skid in the form has two main measuring runs – one inlet and one outlet DN200 pipe. The designed Z configuration of these pipes are for full redundancy allowing the switching of the gas

over to the other metering run to allow maintenance work or testing to be completed. It also allows “series proof” testing of the system from one master custody transfer meter (“master”) against the other duty custody transfer meter.

An intelligent mix

Correct configuration of this station is crucial for the profit of the operating entity and the investors. Thus, the main task of the metering skid is exact measurement of the gas quantity. Two gas flow meters – FLOWSIC600 – have been selected for this measuring task. Thanks to its ultrasonic technology, there are nearly no measurement uncertainties. FLOWSIC600 is one of the most reliable industry-tested meters. Advanced diagnostics is a further plus. The process gas chromatograph checks the composition of the gas and provides the flow computer with the hydrocarbon values where they are combined with the flow volumes to produce standardized measured values. The Flow-X flow computer from SICK records the data of the various assemblies of the station and transmits the information to the control centers. This is measurement technology of high precision with fast signal processing and very high computing and memory capacity for a wide variety of documentation purposes. It also makes the flow computer from SICK the ideal choice for custo-

dy transfer measurements using the FLOWSIC600 ultrasonic gas flow meter.

In this project, SICK is in charge of engineering, design, and supply of the complete skid. The skid frame is made from stainless steel and is engineered on a floating unit to be earthquake-proof to measure reliably even in the event of dangerous vibrations. Additional measuring instruments can be added at any time.

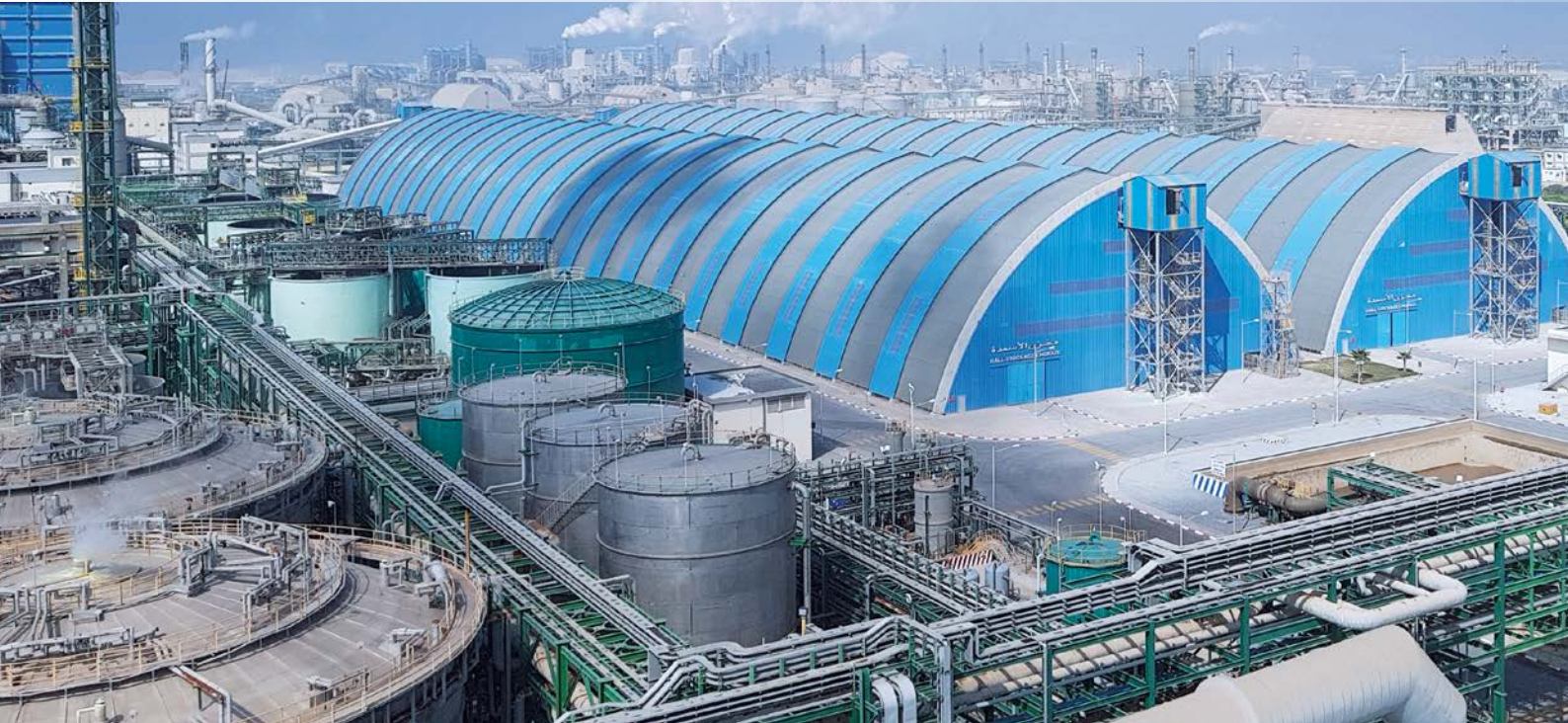
This also includes temperature and pressure transmitters or valves for change-over between the metering runs. Even in the planning phase, SICK weighed in with its technological knowledge of systematic project design with numerous planning options so that the individual requests of the customers can be implemented. (sh)

Metering skid, completely assembled and ready for transportation to Panama



SELECTED MEASURING SOLUTIONS

New field: SICK reduces process costs for one of the world's largest fertilizer manufacturers



The world's population is growing but the space available for agricultural land is limited. As a result, huge quantities of fertilizer are used all over the world in order to increase yields. Producing fertilizer, however, is an energy-intensive process which requires monitoring. One of the world's largest fertilizer manufacturers has chosen to use gas and dust measuring technology from SICK. With the MCS300P HW process gas analyzer, the GM series of in-situ gas analyzers, the DUSTHUNTER dust measuring devices, and an extensive range of services from a single source, SICK proved to be the best choice. In total, over 100 analyzers will be installed in the existing plants at a cost of several million euros. As a special solution, SICK developed a self-cleaning in-situ measuring probe for reliable gas measurement in environments with wet dusts.

>> The customer is a leading global manufacturer of phosphoric acid, various phosphate fertilizers, special fertilizers, and feed additives. Phosphate is one of the main nutrients for plants and one of the key components of most chemical fertilizers. It is generally obtained from phosphate ore, which is converted into phosphoric acid with the aid of sulfuric acid. The phosphoric acid is then turned into phosphate fertilizer using ammonia. The customer possesses large deposits of phosphate rock and produces some of the starting products, such as sulfuric acid, in-house.

However, the measuring technology used until recently was not always able to live up to expectations. As new production lines were added and local regulations demanded additional measurements, the partially internal Engineering Procurement Construction (EPC) realized it needed a new supplier. Specifically, the company needed a solution for monitoring gas and dust emissions during the processing of phosphate rock and the production of sulfuric acid and phosphoric acid. Furthermore, it also had to be capable of monitoring processes during the manufacture of mono- and diammonium phosphate (MAP/DAP).

The customer's key requirements were greater plant safety, fewer failures, lower operating costs, and access to real-time production data. The order was divided into four sub-projects.

In most cases, SICK already had tried-and-tested products available that were ideal for the task at hand. With regard to the processing of phosphate rock, the company needed a product to monitor SO_2 , NO_x , CO , and CO_2 as well as dust loads at the outlet of the rotary kilns. In this particular case, the solution had to be able to provide reliable and accurate measurements even in the pre-



task was taken on by the GM700 laser gas analyzer, which has a proven track record in the measurement of aggressive and corrosive HF.

Low NH_3 concentrations also need to be measured during the production of mono- and diammonium phosphate (MAP/DAP) from phosphoric acid and ammonia in order to monitor the efficiency of the wet scrubbers. At the same time, the HF emissions from the stack need to be monitored as well, as they provide information about the fluoride content and, hence, the quality of the final fertilizer product. And last but not least, the dust emissions also have to be measured.

These tasks proved to be a major challenge, as the humid, aggressive, and dusty process media made it very difficult to take continuous measurements. The chosen solution in this case was the GM700 in-situ gas analyzer combined with the FWE200 extractive dust measuring device. SICK developed a special measuring probe for the GM700 which cleans itself periodically. The solution can withstand the high levels of salt formation in the stack without any problems and significantly reduces the amount of maintenance work required. As a result of the continuous monitoring, the excess ammonia in the process can also be cut considerably. The final step was to install

eight FWE200 dust measuring devices at one of the sites. Preparations are already under way for the installation of further devices at a second site. (sr)

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“We have a great deal of global experience in the monitoring of production processes in the chemical industry, particularly using gas analyzers and dust measuring devices. We are therefore able to handle the difficult application conditions in the fertilizer industry,” explains Technology Product Manager Jörn Baasner. “We can provide tailored solutions and services not just for many complex chemical processes, but for the upstream and downstream processes as well. SICK’s entire analysis and sensor technology portfolio could be used in the fertilizer industry – from the quarry to the production processes and right through to shipping.”

”

sence of fine dusts. SICK provided the GM32 in-situ gas analyzers for SO_2 and NO_x , the GM35 for CO and CO_2 , and the DUSTHUNTER SP100. The chosen solution provides a number of benefits, not least reliable in-situ measuring technology and excellent value for money.

In the case of sulfuric acid production, the solution had to be able to monitor SO_2 and O_2 emissions from the stack. In this case, the best choice was the MCS300P HW multi-component analyzer system, as it requires significantly less maintenance due to its hot/wet extractive measuring technology and it eliminates the complicated process of sample preparation.

As phosphate rock contains fluoride, HF is released during the production of phosphoric acid and is washed out in the wet scrubber. In order to monitor the performance of the scrubber, HF levels need to be measured on the stack. This





MEASUREMENT PRINCIPLES GO HEAD-TO-HEAD IN THE PROCESS OF INERTING A TOLUENE TANK

OXYGEN TECHNOLOGIES DO BATTLE

The TRANSIC100LP laser transmitter has exactly the right nose for oxygen – and a customer's own comparison has proved this. Pitted against the established method of paramagnetic measurement, TDLS technology is able to offer a lower initial investment level for measuring stations, and much more besides: It also considerably reduces operating and maintenance costs for controlling inerting processes.

>> When it comes to controlling inerting systems, the range of measuring techniques is varied. To date, the tried-and-tested solution of paramagnetic oxygen analyzers, extractive measuring devices, have always been the industry standard. Now it is becoming clear that TDLS (Tunable diode laser spectroscopy) is taking over the role of best-practice technology for oxygen measurement.

Oxygen and TDLS technology

TDLS is already a well-known technique for highly selective measurements and, up to now, has found its place in demanding chemical and HPI tasks as well as combustion monitoring applications. Its advantages lie in the level of robustness it offers, its resilience to disturbances, and its minimal maintenance requirements. Now, thanks to the new generation of TDLS process transmitters from SICK, this technology is available at a price that makes it a very attractive option for standard measurements. Already been proven successful at more than 500 measuring stations, the TRANSIC100LP has been developed as an intrinsically safe version (in line with

ATEX/IECEx) for installations in zone 1 and measurements in zone 0, and can be used both in-situ and with extraction.

Onto a winner

After a year of testing, the American chemicals company which carried out the comparison did not take long to reach a decision. It had been looking for an alternative type of measuring technology after encountering repeated problems with its paramagnetic oxygen analyzers. What also really mattered was that the device had to be easily accessible when installed on the tank; ideally, a gas conditioner would not necessarily be required and it would be possible to calibrate the equipment on site. Ultimately, it was the TRANSIC121LP laser transmitter, with FM approval for use in Ex-protected working environments, that won out over the competition. The PTFE filter designed to protect the transmitter meant it was possible to do away with the gas conditioner altogether. Additionally, a straightforward extractive gas sampling system enabled the transmitter to be installed in a way that made it easy to access. Finally, the equipment has made the job of calibra-

tion using nitrogen and ambient air much easier for the maintenance staff.

Down with costs!

The company scrutinized and evaluated the two measurement principles under entirely neutral conditions, looking at factors including cost. In this particular area, the TDLS technology and transmitter concept proved a clear winner: In fact, gas conditioning costs dropped to virtually zero. Similarly, installation costs fell by three-fourths and the financial outlay associated with TDLS measurement amounted to 64% less than the paramagnetic measurement principle. Even when it came to maintenance, the TRANSIC figures spoke volumes: This technology effortlessly saved 75% of expenses. While one hour's maintenance work on the gas conditioner per month was logged in the case of TDLS measurement, paramagnetic measurement clocked up four hours per month. What is more, the results showed that the TDLS measuring station required just a fourth of the parts and consumable materials that paramagnetic measurement did over the course of the year. (sh)



MERCEM300Z: READY TO GO FOR MERCURY MEASUREMENT OF TOMORROW.

THIS IS **SICK**
Sensor Intelligence.

The MERCEM300Z already meets the demands of tomorrow. It provides superior monitoring of mercury emissions down to the smallest certified measuring range of 0 to 10 $\mu\text{g}/\text{m}^3$. Its large range even makes measuring ranges of 0 to 1,000 $\mu\text{g}/\text{m}^3$ possible, and it is ideal for raw gas measurements. Tested for suitability in accordance with EN15267-3, it detects elemental and oxidized mercury and completely fulfills all official guidelines. Simply brilliant: a mercury gas analyzer for the future. The MERCEM300Z is the clear leader when it comes to use outdoors or as a variant for temperature-controlled rooms. We think that's intelligent.www.sick.com/mercem300z

FLOWSIC FLOW MEASUREMENT FOR STEAM

THE SMART CHOICE



Many industries are successfully employing SICK's ultrasonic technology for flow and volume measurement in natural gas pipelines, industrial plants, and exhaust ducts. But is ultrasound also the best technology for steam flow measurement? SICK certainly thinks so based on its two device variants: FLOWSIC600 and FLOWSIC100.

>> The use of steam revolutionized production plants over 200 years ago and still continues to be popular. Old, inefficient steam plants and steam driven machinery have had their day; technological developments since then have led to lower fuel consumption, and now to high efficiency processes. Steam is not only used as a working fluid for turbines that produce electricity, or to drive pumps and compressors. We use steam as a motive force, to heat, to dry and optimize entire combustion processes. Steam, on closer consideration, has become a valuable

commodity. Opportunities to improve its efficient production, distribution and accounting are sometimes overlooked. Steam flow must be accounted for and be billed correctly through accurate measurement of the quantity of saturated or superheated steam distributed to the individual on-site users (cost centers) or to an external consumer. This is where reliable flow measurement comes into play, and traditional measurement technologies don't always fit the bill.

System change

Billing losses at low flow rates, and high maintenance costs have spelled the end of two traditional technologies for flow measurement in a large steel mill in Europe. Turbine flowmeters and vortex flowmeter devices were used to measure the flow of steam for internal costing purposes. A flow turndown of 100:1 had to be covered. Vortex meters were not able to achieve a flow turndown greater than 20:1 for this application resulting in loss of measurement, and loss of accounting, at lower flow. Turbine flow meters of-

ferred a better flow turndown but did experience poor linearity at low flows. In addition, rapid changes in flow rates led to failures of the turbine flowmeter device. Damage to the blades and bearings occurred on a regular basis requiring costly repairs and downtime. The device was sent off for maintenance around three times a year for repair. The associated decommissioning and recommissioning work for the device were clearly unacceptable; the costs from lost measurements also continued to add up.

Investigation results

The FLOWSIC100 fitted easily into the existing 8" (DN200) piping at the steel mill. In contrast to the old turbine meter, FLOWSIC does not generate any pressure loss, does not have any moving parts and accurately measures the flow velocity over a wide flow range. In a running process, changing conditions can arise at any time resulting in rapid flow rate and pressure fluctuations or brief pressure surges. When a pressure surge is accompanied by water accumulation, these forces will of course act on the measurement device. Obstructions in the line or moving parts can be damaged as a result of this slug. FLOWSIC measurement devices do not obstruct the line and therefore do not suffer these challenges to performance and reliability. Delivering highest performance from a rugged and reliable meter ensures a long service life for the most challenging steam flow measurement requirements.

The ultrasonic sensors developed by SICK deliver exceptional performance. At the heart of this technology is an ultrasonic transducer that is hermetically protected in a titanium housing and thereby insensitive to contamination, corrosion, erosion, moisture and condensation. Measurement accuracy is not affected by wide temperature gradients, high pressures, or excessive noise. Both ultrasonic flow meters – the FLOWSIC600 and FLOWSIC100 – are equipped with these high performance sensors. Being certified for custody transfer measurement, the FLOWSIC600 also guarantees exceptional measurement accuracy, even over a flow turndown of greater than 100:1. In the case of the FLOWSIC100, flow turndowns up to 400:1 are achievable.

In addition to the actual measured value, ultrasonic measurement devices also provide numerous useful diagnostic data. This data provides device health status, or changes in process conditions. Thanks to this additional information and the compact design of the device, maintenance work is kept to a minimum. Should it be necessary to replace the FLOWSIC 100, this can be done quickly and easily, even while the process is running.

The results are good

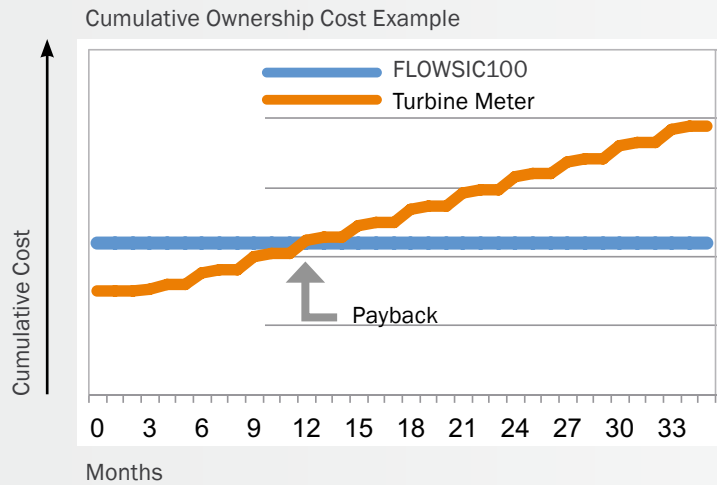
After eight years in operation the steel mill operators remain very satisfied as their experience has proven that the FLOWSIC100 has enabled them to obtain the required measurements with the

highest reliability and accuracy. FLOWSIC technology is often an attractive option, in particular for challenging saturated steam applications where traditional technologies may struggle to meet the full performance, efficiency, reliability and safety needs. While initial purchasing costs may be higher, they are quickly amortized during operation.

Often it is the sales revenue requirements that determine the measurement technology. Whether it be vortex, turbine, differential pressure based devices or ultrasonic technology – each technology has its place, the pros and cons need to be carefully considered. How complex are the measurement requirements, what measurement obstacles need to be overcome, and how much will the system actually cost in the end (payback)?

While it is still novel for FLOWSIC measurement devices to be used in process applications outside the natural gas industry, one thing is certain however: they adapt to the tasks and ambient conditions at a wide variety of measurement locations. Everyone familiar with FLOWSIC appreciates their outstanding performance. If you have not heard of them yet, why not give this long-lasting, state-of-the-art ultrasonic technology a try. (sh)

Rapid return on investment



In spite of an initially higher capex cost, the FLOWSIC100 process flow meter delivered a return on investment of less than one year; considering maintenance savings alone.

For a wide range of saturated and superheated steam applications

FLOWSIC100 For maximum reliability and a high level of flexibility when installing the device in existing systems and systems with large pipes.

- Can be installed in the existing pipes
- Large measuring range: > 400 : 1
- The optimum solution for steam injection in flare gas systems
- No pressure loss



FLOWSIC600 For high measurement accuracy and maximum reliability in new installations where an in-line measurement device must offer the lowest possible measurement uncertainty.

- In-line flow meter
- Large measuring range: > 100 : 1
- Accuracy up to 0.5 % of rate
- No pressure loss



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ULTRASONIC GAS FLOW MEASUREMENT WITH FLOWSIC500

SOUTH AFRICAN NATURAL GAS DISTRIBUTOR COUNTS ON SICK FLOW METERS

“Brilliant, great! I battled for two years for a solution. SICK understood our requirements exactly and delivered!” – was the reaction of Emmanuel Matodzi, Technical Manager of the EGOLI Gas Company, after it is now also working with the ultrasonic gas flow meters of SICK.

>> Egoli Gas (Pty) Ltd is a natural gas distributor, based in Johannesburg, South Africa, and provides gas to more than 7500 domestic, commercial and industrial users in the area. The company operates an 1800km gas distribution network that dates back to 1892.

The enterprise expressed a need for a technology, that was innovative and that could deliver as per its requirements of quantifying low flow rates, beyond the ability of the typical mechanical gas meters, such as rotary or turbine meters. At the end of 2016, three FLOWSIC500 gas flow meters from SICK helped the natural gas supplier to reduce its unaccounted for gas by approximately 29% amount. The meters provide accurate meter reading and eliminate the risk of gas blockages from failing mechanical meters. This was the turning point, which

forged a strong relationship between SICK and EGOLI Gas (Pty) Ltd.

That success has recently been replicated on a much larger scale across the gas supplier's distribution infrastructure, with several additional flow meters being delivered at the end of 2017.

SICK was able to provide it with a solution that went beyond its expectations. “You have equipped us with a tool that has allowed us to be proactive. We are able to see consumption and flows in real time for different flow ranges which is brilliant,” said Emmanuel Matodzi. The meters – the FLOWSIC500 and the FLOWSIC 600XT – supply the level of accuracy required for quantifying low flow rates that was not possible with typical mechanical gas meters, providing a greater operational and process transparency, which

allows the gas supplier to reduce issues of losses, incorrect billing and theft. *(editorial team)*



GAS CLEANING IN “WASTE-TO-ENERGY” INCINERATION PLANTS

EARLY DETECTION OF UNTREATED GAS PEAKS – THANKS TO TRANSPARENT DATA

SICK gives operators of waste incineration plants certainty with rugged measurement technology and rapid measurement results. The MCS300P HW analyzer solution measures sulfur dioxide and hydrochloric acid while the MERCEM300Z is specially designed to measure mercury. Both systems are ideal for optimizing processes in waste incineration plants.

>> Waste incineration makes it possible to generate thermal and electrical energy. However, the pollutants released by the combustion process must be minimized as far as possible. Without efficient and state-of-the-art gas cleaning equipment, it's virtually impossible to reduce the high concentrations of hydrochloric acid, sulfur dioxide and mercury in untreated gas to the required limits. And yet, what's the use of even the best cleaning plant if it can't precisely detect gas concentrations or display them rapidly enough? The MCS300P HW and MERCEM300Z analyzer systems from SICK supply measured values that enable plant operators to quickly initiate the necessary process regulation measures as well as to regulate the exhaust gas cleaning. Rapid measurement results also make it possible to respond appropriately to sudden peaks, which support efforts to comply completely with the current emission limits. In the European Union, the measurement of industrial emissions is governed by the Industrial Emissions Directive (IED) 2010/75/EU – formerly the Waste Incineration Directive (WID) 2000/76/EC. Thanks to the upcoming revised BREFs (Best Available Technique Reference Documents) for waste incineration plants with the list of BAT-AELS (Best Available Technique – Associated Emission Levels), this Directive applies across the EU and must be implemented accordingly by all EU member states.

Potential savings are in the air

Indeed, acidic gas components must be removed from gas mixtures. To achieve this goal, it's one thing to know the exact concentration of hydrochloric acid and sulfur dioxide and it's another thing to reduce the quantity of consumables for the cleaning process. Most often, exces-

sive amounts of chemicals are used in this cleaning process in order to keep emissions within the prescribed limits. In fact, exact and rapid gas concentration measurement additionally allows operators to save money. Precise and rapid measuring makes it possible to use only the quantity of chemicals that's actually necessary in the cleaning process. In most cases, once adjusted in light of this vital information, chemical consumption itself can be reduced, which also reduces the quantity of used adsorbents to be disposed of, while additionally providing significant cost savings. With a mere 10% reduction in adsorbents, the capital investment for the MCS300P HW is amortized in just one to two years.

Additional advantages: the MCS300P HW measures HCl, SO₂ and H₂O simultaneously; as well as other gas components if desired, e.g. CO, NO and O₂. With heated gas extraction (above the acid's dew point) and very high gas flow, response times of approximately 30 seconds are realistic. The exhaust gas is extracted without passing through a cooler and passes directly into the heated gas measuring cell. A special blow-back function ensures that the coarse filter at the sample probe is automatically cleaned. The entire system is corrosion-resistant. Modern, digital communication interfaces support optimal data transparency while maintenance costs remain low thanks to remote maintenance.

Mercury in untreated gas

Compared to emission measurement, mercury measurement upstream of the electrostatic filter or scrubber is significantly more demanding – with higher dust loads and higher concentrations of interfering components like sulfur dioxide

and hydrogen chloride. Even the Hg concentrations might be detected up to the mg/Nm³ range. Dropping activated carbon upstream of the electrostatic filter or scrubber adsorbents eliminate mercury out of the process gas. Although the addition of these chemical auxiliary agents is expensive, excessive quantities of both are often used due to intransparent information of the actual existing Hg concentrations in the untreated gas. Costs can be reduced as well, if the plant operator uses the correct quantity of each chemical auxiliary agent. Ideal for this application, the MERCEM300Z supplies rapid and reliable measured values. Furthermore, excessive mercury concentrations in the process can cause a long-term contamination of the entire plant. In the worst-case scenario, the plant may face downtime.

Additional advantages: the MERCEM300Z is designed especially for monitoring total mercury emissions in flue gases, which can be measured both in untreated gas as well as purified gas. The system meets all current and currently known future limits and requirements. Continuous measurement with simultaneous conversion of oxidized Hg at 1,000 °C in the gas measurement cell in combination with Zeeman atomic absorption spectroscopy (AAS) is patented and licensed exclusively for use in the MERCEM300Z by SICK. This technology also ensures that measurement performance is not disturbed by interfering components like SO₂. SICK's popular operating concept and the modern communication protocols are the perfect finishing touches to the MERCEM300Z's profile, making it a sophisticated mercury measurement system that is easy to integrate and stable on a long term basis. (sh)

HAZARDS POSED BY EXPLOSIVE OR FLAMMABLE GASES AND DUSTS

LIMITING EXPLOSIONS

Where explosion hazards exist, protective measures must be taken. This includes selecting measurement devices that are suitable for use in explosion-hazardous areas. The measurement technology from SICK is successfully being employed in these areas, and with a wide variety of devices for gas and dust measurement to choose from, this sensor manufacturer offers tailored solutions that can be relied on even under the most stringent measurement conditions.

>> When the risk of explosion accidents is discussed, everybody immediately thinks of the chemical industry. But these hazards are not only found in chemical plants but also throughout the entire processing industry, where explosive gas and dust mixtures can arise. To ensure the safety of the personnel and production facilities, it is essential that protective measures and statutory requirements be adhered to. The potential hazard posed by gases, vapors and dusts is clearly defined, the required explosion protection measures are set out in numerous national and international standards, and explosion-hazardous areas are classified into classes and zones.

When flammable gases, vapors and dusts are combined with oxygen in a particular ratio, they become explosive. This mix ratio is characterized by an upper and lower explosive limit (UEL and LEL). To ensure there are no ignition sources present when measuring process gases, only explosion proof measurement devices can be used. SICK offers a broad range of these devices for gas analysis, dust and flow measurement in gas ducts, filter systems, tanks and silos, as well as solutions for early warning systems, in particular for automotive spray painting and metal strip processing lines. Two new measurement device variants from SICK cover even more measuring tasks.

More gas measurement capability

SICK now offers a new variant of its GM700 laser gas analyzer. The standard variants are already well regarded in many industrial sectors where reliable, accurate and fast measurement of corrosive and aggressive gas components, e.g., ammonia, hydrogen fluoride, and hydrogen chloride, are required. These gases can arise both in stacks and in process gas ducts. The gas flows are often hot and moist, which places stringent demands on the materials and workmanship of the measurement device.



Measurement of ammonia in composting and waste incineration plants – also in hospitals



GM700 Ex cross-duct version: Ideal for aggressive or very hot gases – also measures accurately in large duct diameters

GM700 Ex probe versions: Suitable for very high gas and dust concentrations

When used in Ex zones, they must also include comprehensive safety functions. The pressurized enclosure of the GM700, as required by ATEX category 3G (Ex zone 2), prevents the explosive gases and dusts from penetrating into the measurement device. The required permanent overpressure in the housing is regulated using protective gas. Both the sender/receiver unit and the control unit are intrinsically safe, whereby their electrical cables are connected to one another via a pressurized hose. The Ex-p control unit is attached to the signal-processing connection unit. To protect the sender/receiver unit against contamination or aggressive gases – and, depend-

ing on the model, the reflector unit as well, the unit is flushed using an ex-proof purge air unit. This prevents dust particles from settling. The protective gas used to flush the sender/receiver unit is supplied through an Ex-p valve.

Using direct laser spectroscopy with a precisely adjusted spectral line, the GM700 delivers a high-resolution measurement with reliable measurement results, even when the fuel used changes or fluctuations in the gas flow or gas concentration occur.

Dust measurement is challenging

SICK has also expanded its range of dust measuring devices with the DUSTHUNTER SP100 Ex, which is certified for gas applications in Ex zone 2, and dust applications in Ex zone 22. In machining and processing areas of production facilities, more and more effort is being put into increasing efficiencies, which is why the dust measuring devices from SICK are not only performing traditional emission measurement, but are also increasingly being installed in closed systems, containers, tanks and rooms. Shavings, lint, powders or dust particles can form an explosive atmosphere, whether it be in the food industry, in pharmaceutical manufacturing, in the dye industry, or when processing wood or metal. In the traditional applications of SICK's dust measuring devices, such as in the chemical or petrochemicals industry, the primary aim is to prevent gas explosions.

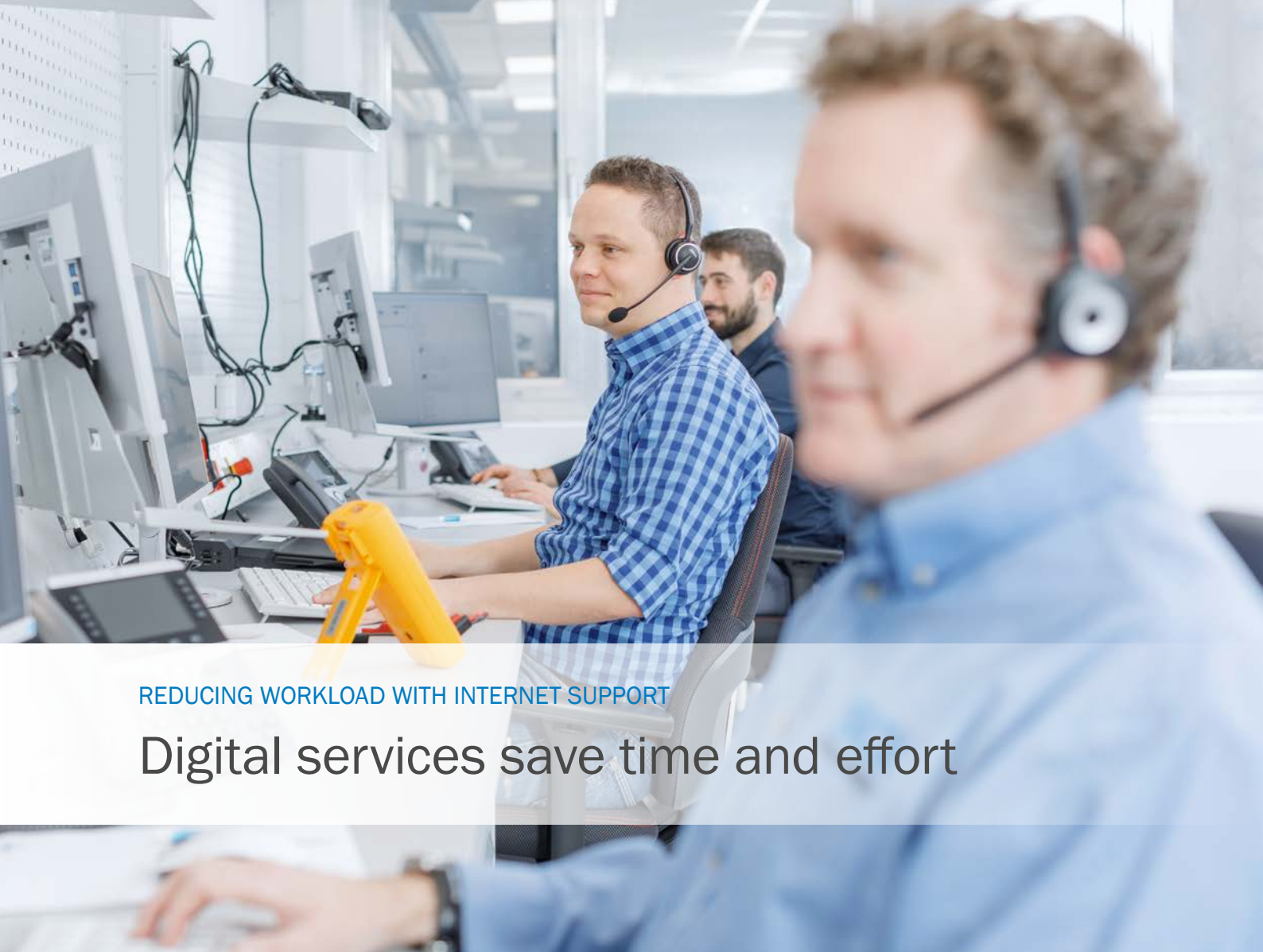
The product development department at SICK has responded to current needs. Because it uses the scattered light measurement method (forward scatter), the DUSTHUNTER SP100 Ex is capable of detecting ultra-low dust concentrations at low flow velocities. This technology is the result of SICK's many years of experience in the measurement of dust. This in-situ measurement device is made even easier to work with due to its low maintenance costs, thanks to integrated self-test and control functions. The real added value of this new device generation is that it is suitable not just for explosion protection in gas applications but also, without compromise, for dust applications. (sh)

DUSTHUNTER SP100

Feature:	In-situ measurement directly within the process
Your Benefit:	Delivers measured values quickly for representative measurements
Feature:	Suitable for gas channels with small to large diameters and for thin and thick-walled stacks
Your Benefit:	Versatility of use
Feature:	No alignment or adjustment on dust-free measuring track required
Your Benefit:	Quick and easy initial operation
Feature:	Ex approval gas zone 2 (3G) and dust zone 22 (3D)
Your Benefit:	Ensures compliance with legal requirements and quality
Feature:	Modular design supports optional I/O systems and SOPAS-ET
Your Benefit:	Flexible setup with reliable upgrades and configuration



TASK	ZONE (ATEX/ IEC Ex)	CLASS/DIV. (NEC500)	SOLUTION FROM SICK	IGNITION PROTECTION TYPE
DETECTING	1, 2, 22	—	W24-2 Ex photoelectric sensors	Intrinsic safety (electrical, optical)
	2, 22	—	W18-3 Ex and W27-3 Ex photoelectric sensors	Non-sparking equipment, intrinsic safety (optical), protection by enclosure
	1	—	WLL24 Ex fiber-optic sensors	Intrinsic safety (electrical, optical)
	20, 22	—	MZT8 ATEX magnetic cylinder sensors	Non-sparking equipment, protection by enclosure
	0, 2	—	MZT8 NAMUR magnetic cylinder sensors	Intrinsic safety
	0, 1	—	IM Namur inductive proximity sens	Intrinsic safety
	1	—	MM Namur magnetic proximity sensors	Intrinsic safety
PROTECTING	1, 2, 21, 22	Class I, Div 1 Class II, Div 1 Class III, Div 1	deTec4 Ex 2GD safety light curtain	Protection by enclosure, pressure-resistant casing
	1, 2, 21, 22	Class I, Div 1 Class II, Div 1 Class III, Div 1	C4000 Advanced Ex 2GD safety light curtain	Protection by enclosure, pressure-resistant casing
	2, 22	—	deTec4 Ex II 3GD safety light curtain	Non-sparking equipment, optical beam
	2, 22	—	C4000 Fusion Ex II 3GD safety light curtain	Non-sparking equipment, optical beam
	2, 22	—	deTem Ex II 3GD multiple light beam safety devices	Non-sparking equipment, optical beam
MONITORING AND CONTROLLING	1	—	EuroFID3010 total hydrocarbon analyzer (certified as gas warning device according EN 50271:2010)	With industrial housing: pressurized enclosure for Zone 1
	2	Class I, Div 2	S715 Ex modular gas analyzer	Restricted-breathing enclosure
	1, 2	—	GMS815P modular gas analyzer	Pressurized enclosure, restricted-breathing enclosure
	1	—	GMS820P modular gas analyzer	Pressure-resistant and flame-proof enclosure
	2	Class I, Div 2	GMS840 modular gas analyzer	Ignition protection type: wall mounting enclosure
	1	—	S720/S721 Ex modular gas analyzer	Pressure-resistant casing
	1, 2	—	MCS300P Ex process gas analyzer	Pressurized enclosure
	2	—	GM32 Ex in-situ UV gas analyzer	Pressurized enclosure, intrinsic safety
	2	—	GM700 Ex laser gas analyzer	Pressurized enclosure
	0, 1, 2, 21	Class I, Div 2	TRANSIC151LP and TRANSIC121LP (FM) laser oxygen transmitter	Intrinsic safety, increased safety, protection by enclosure, non-incendive
MEASURING (FLOW)	2, 22	—	DUSTHUNTER SP100 Ex dust concentration measuring device	Pressure-resistant casing or protection by enclosure
	1	Class I, Div 1 Class I, Div 2	FLAWSIC500 gas flow meter	Intrinsic safety
	1, 2	Class I, Div 1 Class I, Div 2	FLAWSIC100 Flare mass flow measuring devices and FLAWSIC300, FLAWSIC600 and FLAWSIC600-XT gas flow meters	Intrinsic safety, increased safety, pressure-resistant casing
	2	—	FLAWSIC100 Process mass flow measuring devices	Ignition protection type “n”
ACCESSORIES	0	—	FLAWSIC60 flow velocity measuring device	Intrinsic safety
	EN2-2 Ex intrinsically safe NAMUR amplifiers			



REDUCING WORKLOAD WITH INTERNET SUPPORT

Digital services save time and effort

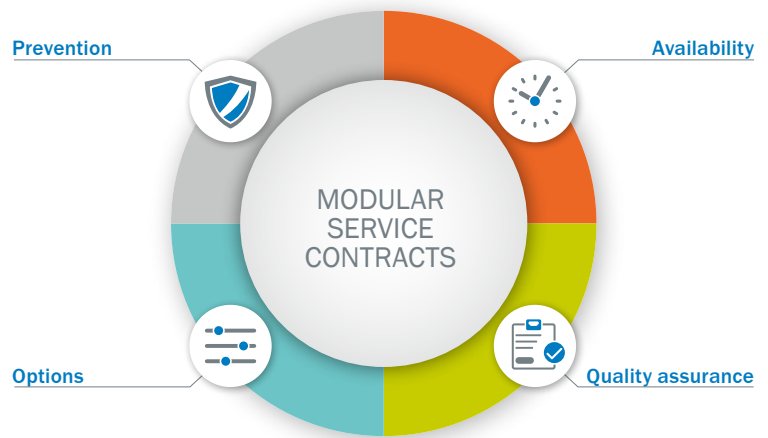
Compliance and user responsibility are a lot of work and not much fun. If you can't afford failures or problems with authorities or inspectors, you should take extensive precautions. SICK LifeTime Services (LTS) considerably reduce the workload for system operators in this area. No other sensor manufacturer offers such extensive services from a single source. In particular, the "Smart Services" through the Internet are gaining in popularity: Hazards are detected early on, maintenance and calibration are much faster, availability and service life increase. Even old devices can often be digitally retrofitted.

>> Whether you're dealing with cars or intelligent measurement systems – both last longer and work trouble-free when they are monitored, maintained and corrected with an eye to prevention. Many system operators must also prove that their emission measurement technology is reliable according to DIN 14181 and that all requirements on environmental and health protection are fulfilled. For some, however, the constant effort required for trainings, preventative and maintenance routines, recording and documentation is simply too much. Others are overwhelmed by the technical requirements. "Smaller operations in particular often make mistakes with the mandatory reports for emission measurements. That can get expensive," ex-

plains Jan Gläser, Product Manager for Services at SICK.

That is why more and more operators are falling back on the manufacturers themselves or certified service providers. SICK is perfectly situated for this with modular service concepts which can be tailored to any system. The customer can also select from layered consultation, organizational and remote services. The offer ranges from consulting and complete supervision and optimization of the measurement system to spare part management. The measures aim to prevent failures as well as achieve maximum availability and quality assurance from the beginning of the planning phase.

This integrated offer emerged as SICK grew from a product supplier into the service provider it is today, as customers become more international. "We realized that we could achieve even more added value for our customers concerning the life cycle of their systems with our service expertise," says Daniel Schmitz, National Product Manager for LifeTime Services from SICK. "That is why we are expanding our previous LTS offer to include consulting services and project business. This also includes retrofit work which leads to system replacement. In addition, the topic of training and education was incorporated as an international product."



Flexible and individual service concepts

Trouble-free operation at predictable costs

More and more systems are now equipped with the Meeting Point Router from SICK for remote diagnosis and maintenance. Although direct help was originally provided through point-to-point connections, telephone and modem, it is now given through state-of-the-art https



The Meeting Point Router does not permit any external connections to access the network.

and SSH-secure Internet or LTE cellular connections.

After customer approval, SICK specialists in Germany directly access the controls of the analysis devices. This is how they can put analyzers and systems into operation as well as monitor, debug, correct, adjust and calibrate them – anywhere, and at any time. This ensures trouble-free operation at predictable costs. It also saves time, customer resources and, last but not least, considerable costs for service technicians.

“Multi-day assistance during on-site commissioning already costs five to ten percent of the device purchase price,” explains Jan Gläser.

No problem with dispatching regulations

The use of Smart Services of course also has special charm abroad and in remote areas. Without remote diagnosis and remote debugging, it often takes days until the system is up and running again. “For example, the nearest available service technician for a system in the Congo might be in South Africa. And when he finally gets to the site, he might notice that he is lacking certain spare parts or certain expertise,” says Jan Gläser. Even in neighboring European countries, technicians often cannot help fast enough since dispatching regulations require time and effort. “Smart Services don’t have this problem.”

Can customers also operate their systems without Smart Services? “Of course, but then they have to find other ways to optimize their productivity and availability. We are naturally also happy to help here, for instance with service level agreements which guarantee the quickest possible response time of our technicians – even 24/7, if requested,” explains Daniel Schmitz. “However, Smart Services give our customers a sustainable competitive edge.” (sr)

SICK LIFETIME SERVICES

EVERYWHERE AND AT ANY TIME THE RIGHT SERVICE PERFORMANCE

The important part of LifeTime Services from SICK is its modular service concept. Every company can compile its individual service contract choosing from a wide range of standardized service modules - always taking into consideration the optimum performance and the best possible availability of the measuring systems.



PREVENTION: Optimum support for your measurement system to maintain maximum availability

Preventive maintenance	Maintenance tailored to your plant	+ Optimization of operating expenses, budgetable maintenance costs, and reduced failures
Training	Ongoing knowledge transfer	+ Independence, fast response times and efficiency
SICK Remote Service	Highly secure remote diagnostics	+ Optimization of service and maintenance deployments, increased plant availability



AVAILABILITY: For fast restoration of operational status in the event of a fault

On-call service	Locally available service experts	+ Increased availability of your measuring equipment
Condition Monitoring	Defined service intervals plus Remote Service	+ Reduced failures of machines and systems
Performance Check	Testing of specified functions	+ Early detection of performance degradation of the measuring system



QUALITY ASSURANCE: Reduced organizational effort in service deployments

QAL3-Support	QAL3 process incl. CUSUM card	+ Compliance with official requirements
Test gas management	Test gases and reference materials	+ Reduced organizational effort in service deployments
Calibration	Recalibration service under laboratory conditions	+ Compliance with official requirements

Examples from the service brochure "Modular Service Contracts"



TELEMATIC DATA SOLUTIONS

SMART DATA FOR SMART PROCESSES

With a smart solution for data collection, analysis, and efficient further processing, you will reap the benefits not only in fleet management but in other areas too. Gateway systems like the TDC (Telematic Data Collector) collect sensor data via various interfaces and make this data available to applications connected to the networks to which they are assigned. In so doing, they ensure that all processes work in perfect harmony.

Once it has been processed by the TDC, the incoming data is displayed on a customized user interface. The sensor data from the individual machines on the network provides a complete and up-to-date picture of ongoing processes. Making use of GSM/GPS tracking and also ultra-wideband (UWB), the TDC is even able to take over the localization and navigation of entire ships of a fleet with absolute precision. Process visualization in real time facilitates not only the comprehensive monitoring of automated workflows but also predictive maintenance. The mobile communication present in the system transmits the data to a customer server or a cloud. The TDC uses the incoming data to perform evaluations that will trigger alarms in the form of SMS text messages that are sent in real time in the event of critical statuses. The incoming and outgoing data increases transparency, can be used for downstream process optimization and, in so doing, helps to boost productivity.

Seamless sensor connectivity

Gateway solutions for data processing and data availability are also having an impact at sea. One major application is MARSIC300 for gas analysis upstream of selective catalytic reduction (SCR) and



to monitor the exhaust gas scrubber in combination with FLOWSIC100 (for the mass flow calculation of carbon dioxide). To measure the dust, a DUSTHUNTER can be installed and connected as an option. By comparing the data collected by the sensors with fuel oil consumption levels, for example, it is possible to optimize the effectiveness of the engine, the SCR denitrification system, and the scrubber. This leads to significant savings on running costs for ship operators. Another advantage is that through the combination of the CO₂ mass flow, the ship's route, and freight data in a customer server or on the cloud, a report can be created automatically and sent to the notified bodies according to MRV rules.



Networking without limits

The networking of mobile applications can only be truly effective if there are no limits on connectivity and reliable solutions are available for tasks such as installation administration or Smart Services, for example. The TDC gateway system meets these requirements. It is compatible with many different interfaces and is easy to install on mobile machines and vehicles. (tm)



The system TDC collects condition and process data - also along the oil and gas pipelines. Arising disturbances can be realized early to avoid or quickly solve them



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SICK

Sensor Intelligence.

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