SIKORA EXTRA

Your magazine for Hose & Tube | Sheets

Stefan Küker, Director SIKORA service back office, is focused on innovative processes and optimization plans

Dear readers,

Customer benefit is an essential part of SIKORA's company philosophy. As a reliable partner, we have been developing future-oriented technologies to optimize your production processes for 45 years.

Experience the combination of precise diameter measurement with high-speed lump detection. Manufacturers of hoses and tubes with diameters ranging from 0,2 to 25 mm, used, for example, at automotive and installation areas, receive a space-saving and economic alternative. Read more about the advantages of the LASER LUMP 2000 gauges on page 8.

At SIKORA, innovations are accompanied by focusing on perfect customer support. With this in mind, we have further extended our sales and service network. Abraham Ayala has been managing the newly established subsidiary in Mexico since last year. Learn more about the potentials of the Mexican market on page 9.

The decision for a suitable measuring device for your production line is not always easy. On page 10, we reveal the aspects you should consider when making such a decision.

Enjoy reading!

Sincerely,

Dr. Christian Frank
CEO SIKORA AG

Harry Prunk
Managing board SIKORA AG

f.l.: Dr. Christian Frank, Harry Prunk

CONTENT

YOUR BENEFIT IS OUR PERSONAL CONCERN.

OVERVIEW: DIFFERENT TECHNIQUES FOR DIAMETER MEASUREMENT

Advantages of the LASER Series 2000/6000 with CCD line sensors

An increasing quality awareness in many areas of daily life and especially in the field of industrial goods has been observed for some years now. Also, manufacturers of hoses and tubes have been investing intensively in measuring and control technologies as well as in inline control over the last years. Especially the diameter and ovality of products play a crucial role. These product parameters can be measured in the production line by different techniques, which shall be described in the following.

Diameter measurement

Currently three different methods for measuring the diameter have been established on the market: laser scanning, the conventional shadow projection, as well as the diffraction-based method (laser shadow projection).

Laser scanner

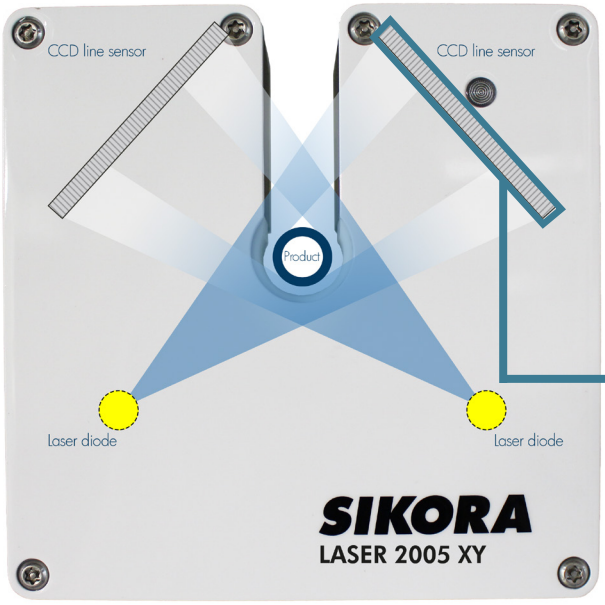
Laser scanner measuring devices work with a rotating polygon mirror striking a laser beam across the measuring field. Furthermore, two lenses are used which, on the one hand, adjust the laser beam almost parallel across the measuring field and, on the other hand, focus the laser beam onto a light sensor on the receiver side. The diameter results from the time during which the laser beam is shadowed by the product.

Conclusion: The measuring frequency is depending on the rotation speed of the mirror. Furthermore, an averaging of several measurements is necessary to smooth rotational variations of the measuring values. A high measuring rate is needed to minimize measuring errors caused by production-related vibrations of the product.

Shadow projection

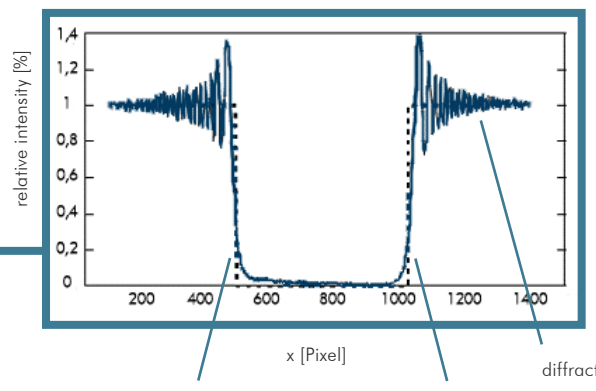
The digital measuring method with CCD line sensors requires no moving components resulting in higher accuracy. One can distinguish between the classical shadow projection and the diffraction-based method.

The conventional shadow projection, like the laser scanning method, uses two lenses, which are installed in front of and behind the measuring object. These lenses adjust the laser beam onto a CCD line. The shadow area defines the extent of the product's diameter.



Diffraction analysis of the CCD line sensor signal. Measurement by means of two measuring axes

Diffraction signal on a CCD line sensor



Conclusion: The advantage of this method is the parallel exposure of the measuring field with a very short light pulse. Any movement of the product does not influence the measuring result. Downside: The quality of the lenses determines the measuring accuracy and slight impurities on the lenses can already influence the measuring result.

Diffraction-based method

When using the diffraction-based method – the measuring principle of SIKORA's LASER Series 2000 and 6000 – the high-resolution, fan-shaped laser beam directly illuminates the CCD line. Due to the monochromatic light, a shadow image is cast on the line as visualized in the picture "Diffraction signal on a CCD line sensor".

At the transitions from bright to dark, intensity fluctuations appear due to the diffraction of light at the product surface. According to the theory of diffraction, the information regarding the intensity fluctuations are used to calculate the tangents of the left and right geometrical-optics shadow edges. Together with the tangents of the measuring plane, which is shifted by 90 degrees, four tangents are touching the product. Thus, the diameter and ovality are – independent from the position in the measuring field – determined with an accuracy ranking in the sub-micrometer range.

The diffraction-based method works with extremely short exposure times and achieves very high single value precision, which is important for the determination of standard deviation of the production process. This allows several thousand measurements per axis per second for product diameters from 0.05 to 500 mm. Gauge heads with the CCD line sensor technology measure the diameter of transparent as well as opaque products in two or three planes. In addition, they work precisely independent of the materials used.

Conclusion: The diffraction-based method does not need any moving wear parts or lenses, resulting in high precision throughout the entire lifetime of the devices. The devices are maintenance-free and, due to optical slits, resistant to dirt. Furthermore, the gauge heads of SIKORA's LASER Series 6000 and LASER LUMP 2000 guarantee a reliable detection of lumps and neckdowns on the product surface. The measuring values of diameter, ovality, standard deviation, and number of detected lumps and neckdowns are visualized on a display directly integrated in the gauge head of LASER Series 6000 or displayed, documented, and analyzed for all LASER Series 6000 and LASER Series 2000 devices on a SIKORA display and control device.

Even after years of use, SIKORA LASER Series 2000/6000 devices measure as accurately as on the first day!

Diffraction analysis with CCD line sensor	
Highest precision	✓
Highest repeatability	✓
High measuring rate	✓
No moving parts	✓
No calibration	✓
Measurement of opaque products	✓
Measurement of transparent products	✓

NEW SIKORA SERVICE BACK OFFICE

Customer satisfaction has first priority

Stefan Küker is discussing operational planning for the service department

Whether maintenance of devices or ordering of original parts – customers are looking for a competent contact who is accessible, understands technical backgrounds and offers solutions quickly. The SIKORA service department focuses on short response times, competent advice and customer satisfaction.

Since March 1st, 2017, Stefan Küker has been managing SIKORA's service back office department at the headquarters in Bremen, Germany. Short throughput times are the core of his strategy that he applies to all services of his department in Bremen. Whether repairs, supply chain management of original parts or support, the studied graduate engineer optimally implements processes and optimization plans.

Keeping the connection to the base

Decisive for Küker to take the job at SIKORA was, amongst other things, the company structure that has been valued and maintained by the medium-sized company since its foundation. Each employee receives the possibility to build on strengths and to develop personally and professionally. "For an international corporation, this is a prerequisite for success", says Küker. "At SIKORA, the healthy mix of service and internationality is just right", he continues.

"Each change is a chance"

Learning from his own experiences when starting at SIKORA, Mr. Küker knows that each change is also a chance. His employment marked the restructuring of the service department that enables an even faster and more focused support and sets new quality standards.

The functional segmentation of the areas service back office, service sales as well as field service opens up further scope of action. A clear distribution of tasks enables colleagues to focus more on their tasks and newly created positions, as the project organization of field services, release resources.

"For customers this means always competent contacts, optimal on-site assistance due to globally available service engineers as well as comprehensive services that are perfectly adapted to their needs", says Küker and continues: "Furthermore, increasing quality standards and optimized processes continuously improve cost efficiency within the department that is beneficially transferred to our customers."

Free support

For a fast and technically competent support customers can contact our free support in Bremen from 8 am to 5 pm (MEZ) – outside these hours our worldwide offices are available.

COMPREHENSIVE SERVICE PACKAGE

Detailed services in our new service catalog

Full service package
SIKORA guarantees optimal customer support worldwide. This promise is completed by the comprehensive service portfolio. The new service catalog describes all services in detail. From the installation and commissioning as well as maintenance and calibration to consulting and training. In the service catalog, customers will find suitable services for their requirements.

As, for example, SIKORA service programs, which include the organization of maintenance and calibration appointments, operator trainings for a professional usage of the devices, a current and calibrated calibration equipment as well as the exchange of wear parts with the latest original parts by SIKORA. Or the 13.3" industry tablet Smart Assistance Manager (SAM) that, due to its various application possibilities, can be used as an offline diagnosis device and/or online as a direct connection to SIKORA's service engineers.

For further information on these and all other SIKORA services, please refer to the SIKORA service catalog. You may download the catalog free of charge and without obligation on the SIKORA website www.sikora.net/en/service or request it at service@sikora.net.

Service contact
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service@sikora.net

New SIKORA service catalog with comprehensive service portfolio

NEWS FROM THE LASER SERIES 2000

Reliable diameter measuring devices now with high-speed lump detection – technology that excites

Worldwide, SIKORA customers count on measuring devices of the LASER Series 2000 for their hose and tube extrusion lines. The devices ensure precision and reliability, and therefore, an efficient diameter measurement at the highest level. With the new feature of the high-speed lump detection, SIKORA continues its claim for "Technology to Perfection".

Hitherto, the combination of diameter measurement with high-speed lump detection is unique. It unifies precision of diameter measurement with a fast and reliable detection of lumps and neckdowns for a perfect quality control. The recording of events (lumps/neckdowns) is triggered and length-related. Therefore, the operator receives a two-in-one system that reduces investment costs and leaves more space in the line as only one gauge head has to be installed.

The high-speed lump detection is predestined for smaller hose and tube diameters. Their usage is especially suited for automotive and installation areas. Currently, the following models featuring the newly developed lump detection are available: LASER LUMP 2010 T, LASER LUMP 2010 XY as well as LASER LUMP 2025 T.

The technology used for the diameter measurement is explained in detail on page 4 to 5 in this EXTRA edition. For a fault detection as comprehensive as possible, only 3-axes measuring systems are used. However, these systems are not fast enough to simultaneously detect lumps on the surface of measuring objects. On the other hand, lump detectors are not suitable for measuring the diameter.

In general, the detection of lumps and neckdowns is based on the recording of change in light quantity resulting from a fault location passing the measuring plane. A guarantor for a reliable lump detection is the SIKORA double-sensor technology featuring two sensors per measuring axis which are passed by the measuring object one after the other. Using the optimum of both systems leads to an improved performance.

If a tube with a surface fault runs through the gauge head, the tube is slightly bigger at the location of the fault. Accordingly, the light quantity illuminating the first sensor is reduced. At the same time, the second sensor measures the light quantity of the tube without a lump. The diffraction signal of both sensors triggers the lump signal.

The devices can be optionally equipped with different interfaces, such as Profibus-DP, DeviceNet, or EtherNet/IP. Therefore, manifold connection possibilities occur, for example, with a SIKORA ECOCONTROL display and control device. The combination with this powerful processor system results in a graphic as well as numeric visualization of the measuring values. Comprehensive trend diagrams and statistics are also available.

PERFECT PROSPECTS FOR THE MEXICAN MARKET

Interview with Abraham Ayala, Director SIKORA MEXICO

In 2017, SIKORA opened a further subsidiary in Queretaro, Mexico. With SIKORA MEXICO, the company ensures a fast and efficient support in the region. Abraham Ayala, Director SIKORA MEXICO, explains why he is convinced of the subsidiary's success.

Mr. Ayala, you are the director of the Mexican subsidiary. In your opinion, what was the reason for SIKORA to open a subsidiary in Mexico?

Today, Mexico is the country with the most free trade agreements worldwide. That makes Mexico an ideal production location for the automotive and automotive supply industries, and therefore, very interesting for SIKORA. Only in 2017, Audi opened a plant in Mexico and also Mercedes and BMW are currently investing millions in the expansion of their plants. In addition to further automobile brands, the three premium manufacturers from Germany are now represented in Mexico. Therefore, for many automotive suppliers, it stands to reason to relocate their production to Mexico as well. Hence, competition is growing and quality requirements are continuously increasing. For SIKORA, the growing market implies a large customer base that requires comprehensive support. According to SIKORA's philosophy, this is only possible with a locally based subsidiary.

That sounds like a lot of work and many different requirements. How did you prepare for these tasks?

Part of SIKORA's company philosophy is the gapless training of new employees. After having received a first introduction to the product portfolio in the American office SIKORA INTERNATIONAL CORP in Peachtree, GA, USA, I was trained on the devices about all used technologies for several weeks at the headquarters in Germany. Here, my studies as mechanical engineering technician came in very handy. Furthermore, I always have the opportunity to contact my sales and service colleagues from all over the world to discuss and find solutions

for customer wishes and requirements. Last but not least, with Jhonathan Ruiz, Technical Sales Manager SIKORA INTERNATIONAL CORP, I have a very competent colleague who actively supports me and the comprehensive customer base with his extensive knowledge that he has gathered for years.

A large and further increasing customer base as well as solid training seem to be the best prerequisites for future tasks and challenges. What are your goals for the future?

For me, it is important to transfer the high quality standard of SIKORA products to the customer support and to always advise my customers optimally on sales and service matters. SIKORA has been successfully active in the Mexican market for decades and was able to establish a broad customer base. Furthermore, we are going to use the manifold possibilities the Mexican market has to offer to strengthen our strong position in the wire & cable, hose & tube, optical fiber, and plastics industries.

Mr. Ayala, thank you very much for the interview!

THE OPTIMAL MEASURING DEVICE FOR YOUR LINE

Measuring rate, averaging, and "accuracy" provide valuable information

When comparing two measuring devices, often the question arises, which device is the "best". It seems to be easy to compare numbers for which "more" or "less" is considered to be better. However, this simplification often is of little significance. For example, in the area of digital photography, the size of the sensor, and therefore, of the single pixel, is just as important as the total number of pixels. Nevertheless, the information of the number of pixels is the most important selling point.

The measuring rate of a measuring device is also a significant comparison criterion that acknowledges "more" as "best". However, this sole information is not sufficient – important is the knowledge about the absolute accuracy and repeatability of a single measurement.
It may occur that a measuring device with a higher measuring rate, but poorer single value precision for controlling or characterization of the process is less suitable than a device with a lower measuring rate, but higher single value precision. For instance, this is the case when a lower single value precision requires a long averaging time. Then, there is the risk of actual product variations occurring within this averaging time being artificially fined – in the worst case the specifications are even violated without being visualized by the measuring device.

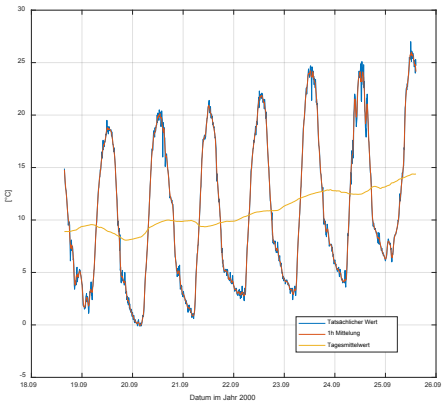
Variations of measuring values may have different causes:

1. Actual product variation
2. Systematic fault of the measuring device (fault is always the same)
3. Random fault of the measuring device (fault varies with each single measurement)

The random error of a measuring device can be reduced by averaging – the measuring value is more and more smoothed out with each averaging.

The difficulty occurring by averaging the measuring value can be visualized by the example of a temperature curve of one week in September 2000.

The displayed "actual value" are single measurements taken in a ten-minute interval. An averaging over an hour only smoothes the extreme values, within 12 hours, the temperature



profile is significantly "fined". If a daily average is calculated, information on daily temperature variation is completely lost. This corresponds to the situation when a measuring device needs so much time generating a stable measuring value that the actual product variation is not recognizable anymore.

For an objective comparison of two measuring devices, the specifications of the manufacturer are to be questioned and brought to a comparable basis. Answering the following questions helps in the process:

- "**Averaging depth**": Is the information based on single or averaged values?
  If the information is based on averaged values: How many values are averaged over which period of time?
- "**Precision**": What is the spread width of these measuring values?
- "**Accuracy**": Which absolute measurement uncertainties do these measuring values have?
- "**Environment**": Under which conditions is the information valid?

RAFFLE

					9		B	6
	4	8				3	9	
6			8	1				
2		A	1				7	
	6		2		4		3	
	7				6			1
				8	5	C		7
	9	5				8	6	
7			9					

SIKORA SUDOKU

Complete the SIKORA Sudoku by entering the numbers from 1 - 9 in the corresponding fields. Each number can only be entered once per row and line as well as the blocks.

A	B	C

Send us the numbers of the answer boxes via email by October 31, 2018, to: extra@sikora.net

Win one of three TrackR Bluetooth-Tracker (multifunctional tracker)

Your contact details will not be passed on to third parties. Each correct answer takes part in the raffle. Employees of SIKORA AG and SIKORA Holding GmbH & Co. KG and their relatives are excluded from participation. Each player can only participate once. We value the first email, all subsequent e-mails will be considered invalid. The legal process is excluded.
GOOD LUCK!

Congratulations to the winners of the alphabetical jumble – SIKORA EXTRA edition 1/2018:

- Orif Shamsiyev
- Bahador Eslamdoost
- Martin Stoll

NEXT EVENTS

Plastic Pipes XIX 24.-26.09.2018 | Las Vegas, NV, USA

Fakuma 16.-20.10.2018 | Friedrichshafen, Germany

ACS 2018 09.-11.10.2018 | Louisville, KY, USA

Oct 16 - 20, 2018

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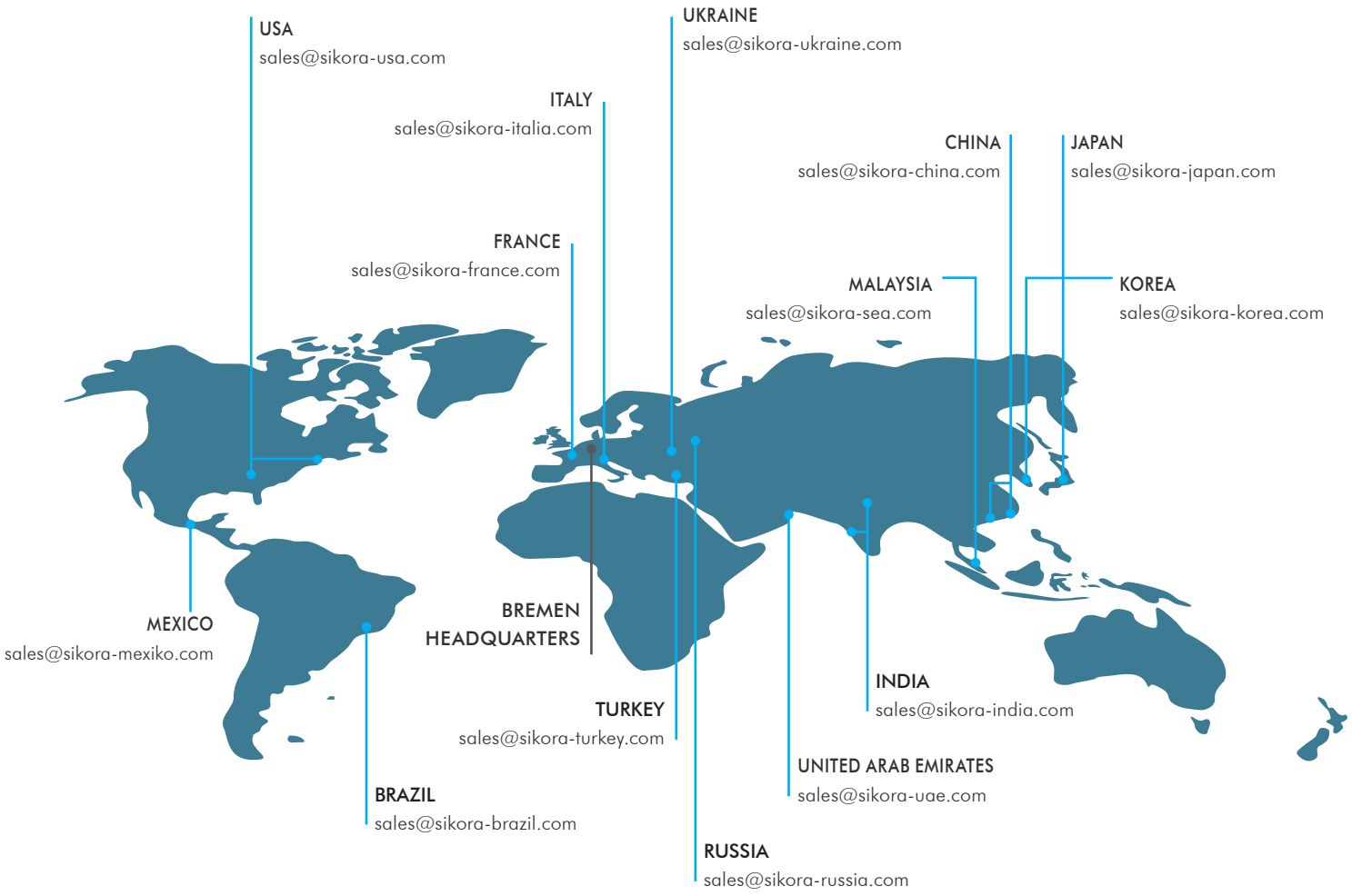

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