



SIKORAEXTRA

Hose and Tube Magazine

SIKORA EXTRA
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X-ray technology ensures quality

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Multi-layer composite pipes – combined, these pipes have a length of almost 3 times the distance from the earth to the moon and back.

IT'S TIME TO SAVE MONEY.

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Dear customers, colleagues and business partners,

Whether we are talking about international politics, the stock and financial markets or the manifold production plants all over the world – the topic of “Savings” is everywhere and we can’t imagine the daily business without it. “Saving” is also a major topic for SIKORA. Our measuring, control inspection and sorting devices help you to save time, resources, planning, administration efforts and naturally, costs.

How to save time for example is explained in our article regarding the innovative TIGER LASER 6010 XY. The diameter measuring system detects product irregularities with a measuring rate of 500 kHz and therefore 100 times faster than the LASER 6020 XY. The TIGER LASER 6010 XY provides an extremely high detection probability even for higher line speeds.

Additionally, learn how to successfully integrate SIKORA X-RAY 6000 measuring systems during the production of stranded products in our leading article on “Multi-layer composite pipes”. Resources can be saved during the start-up phase as the gauge head is installed directly after the extruder which, makes defective production impossible.

Furthermore, the display and control devices of the SIKORA ECOCONTROL series enable a precise control of the production and therefore, offer the best possible result.

Have you heard about our individual maintenance program? Save time for complex planning regarding the re-ordering of spare parts or administrative efforts for the organization of training – SIKORA can take care of your devices and employee training. What we are offering in detail is explained in the SIKORA EXTRA area “Service”.

You would like to know more about cost savings with SIKORA devices? Feel free to contact us at any time. We advise you individually, target oriented and with long-term experience – we help you to find possibilities to optimize your production process.

Enjoy reading!

Sincerely,

Dr. Christian Frank
CEO of SIKORA AG

Harry Prunk
Member of the Board of SIKORA AG

MULTI-LAYER COMPOSITE PIPES CIRCLE THE EARTH 53 TIMES

X-ray technology ensures quality during production

■ 2,189 million meters of multi-layer composite pipes were manufactured worldwide by over 150 manufacturers in 2013. Combined, these pipes would circle the earth 53 times, or have a length of almost 3 times the distance from the earth to the moon and back. 10 years ago, the worldwide production volume was about 690 million meters. The trend for the coming years is pointing up. At the same time, quality requirements for products are increasing and cost must be decreased.

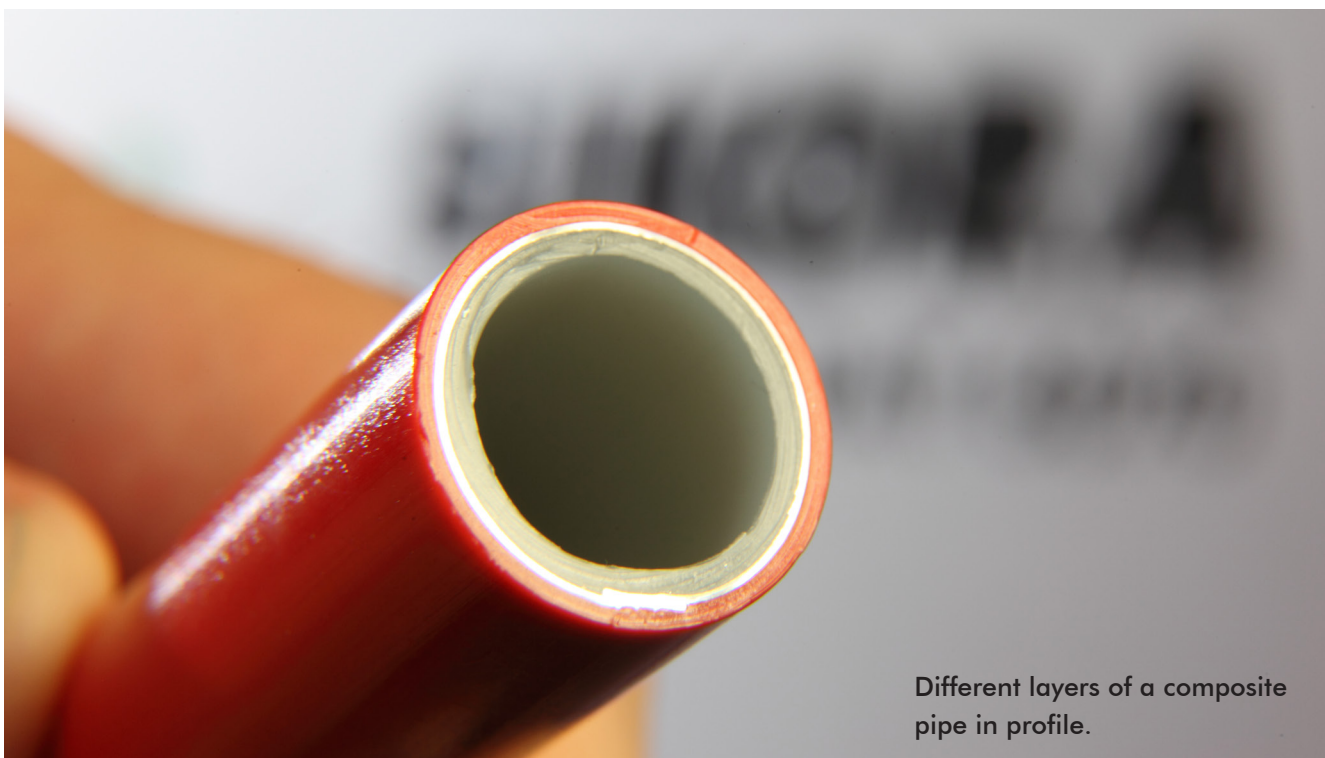
Since 1970, lead pipes have not been used for drinking water in the building services sector, due to toxicity. So far, they have been replaced by copper

pipes but the use of these pipes is declining. The advantages of multi-layer composite pipes are obvious: They are non-corrosive, more flexible and more cost effective. In 2013 for instance, the number of aluminum multi-layer pipes produced in Asia grew to 55% – in comparison to 48% in 2010. Manufacturers of multi-layer composite pipes are striving to further increase product quality in order to stay competitive in the market. At the same time, production costs have to decrease. Measuring techniques with X-ray technology, as in SIKORA's X-RAY 6000, make both possible.

Application, construction and quality requirements

Multi-layer composite pipes are used in the building services for drinking water, heating and cooling installations, under the floor and in walls. Common diameters that can be reached are from 14mm, over 16mm up to 63mm. Specialty pipes can have diameters up to 110 mm, which are being used for water supply applications.

A multi-layer composite pipe is made of up to 5 layers: a PE inner pipe, an adhesive layer, an aluminum tape (butt welded or lap welded), another adhesive layer and a PE outer pipe. By means of a specific online quality



Different layers of a composite pipe in profile.



X-ray technology for quality control during production of composite pipes.

control during production, pipe specifications can be precisely fulfilled.

Common available technologies for quality control might be suitable for classic diameter measurement of single layer products, but are limited due to their function and dependence on environmental influences when it comes to multi-layered products.

Quality control with X-ray technology

SIKORA offers X-ray technologies, such as the X-RAY 6000, for the continuous quality control of stranded products during production. Values for the wall thickness, eccentricity, inner and outer diameter and ovality are determined online. For composite pipes, the system measures the outer diameter and wall thickness of the PE inner pipe, the aluminum layer and the PE outer pipe. These measuring values, along with the eccentricity, are displayed at the processor system numerically and graphically as pipe cross sections at eight points and allow the operator to optimally center the extrusion tool.

Thus, not only the quality of the end product is assured but the manufacturer additionally receives important data for documentation in order to optimize production processes with regard to stability and repeatability.

With the use of the X-ray measuring system, typically a reduction of $80\text{ }\mu\text{m}$ of a 2 mm wall can be achieved. This means 4% of the material can be saved. This represents a cost reduction of approx. 100,000 €/per year (extruder output: 600 kg/h, operating time: 6,000 h/per year, material costs: 1.5 €/kg). The available X-ray technology of the X-RAY 6000 series covers product diameters of 0.7 up to 650 mm. The X-ray measuring system X-RAY 6000 PRO is used in the production of big composite pipes of 63 up to 110 mm. The X-RAY 6000, for the measurement of single layer material, is suitable for composite pipes of 14 up to 63 mm. The triax X-ray is used for products of 6 up to 65 mm.



The processor system displays the measuring values of the X-ray system

SIKORA AT THE FAKUMA 2015 - REVIEW

Measuring and control, inspection and sorting systems to perfection

This year, SIKORA exhibited again at the Fakuma, one of the most important international trade fairs regarding plastics, in Friedrichshafen.

Discover the displayed measuring and control devices as well as the innovative inspection, analysis and sorting technologies.

PURITY SCANNER 1

- 100% inspection and automatic sorting of plastic pellets
- Dual inspection: X-ray and optical cameras
- Detection of metallic and organic contamination down to a size of $50\text{ }\mu\text{m}$
- Sealed system
- Innovative cleaning concept
- Throughput up to several tons

X-RAY 6070 PRO 2

- Measurement of the wall thickness, eccentricity, inner and outer diameter and ovality of up to 3 different material layers
- Automatic control of the line speed or extruder rpm
- 22" wide screen or 15" monitor
- No calibration

LASER Series 2000/6000 3

- Latest CCD-sensor technology in combination with pulse-driven laser light sources for transparent and non-transparent products
- Up to 5,000 measurements per second
- Complete measuring data processing in the gauge head
- No moving parts – no calibration
- Integrated lump detector function



**LUMP 2000 4**

- 2- and 3-axis lump and neckdown detection
- Highest reliability due to Double Sensor Technology
- Fault analysis regarding type, dimension, length, number and position
- Elimination of "ghost" faults

PLAST-TEMP 6000 5

- Non-contact temperature measurement
- Easy to operate, no calibration
- Temperature display and operation directly at the device
- Free from wear
- Easy to integrate into existing lines

ECOCONTROL 6

- High reliability in all production processes
- Precise control, fast and stable
- Control to the minimum value
- TFT color monitor for a brilliant display of measuring values
- Easy, intuitive operation via touch-screen
- SPC-data for continuous quality control according to ISO 9001

REMOTE 2000 7

- Large, clear display and keypad
- Installation at any distance to the gauge head

DISPLAY 2000

- Digital display
- Selectable monitor parameters (diameter, ovality)

SIKORA SALES MEETING IN BREMEN

“Together we can achieve more”

■ This year, representatives from all 12 SIKORA offices came together for the annual Sales Meeting at the headquarters in Bremen. During this week information, ideas and experiences were exchanged, new strategies were defined together and solutions for customer requirements were found.

For SIKORA it is important to equally integrate all business units, divisions and offices in the daily business. Due to flat hierarchies and an open communication strategy, employees are always encouraged to share their ideas and visions. During the Sales Meeting, this exchange gets a special platform.

On July 13th, 2015, approx. 30 Sales Managers from offices around the world arrived at the Hanseatic City Bremen. The coming week had a tight schedule with trainings and product presentations. “For us, it is important to use the time we have with our Sales Managers on site as effectively as possible,” says Harry Prunk, member of the board at SIKORA AG. “We know what our employees achieve throughout the year and appreciate their unique experiences that are exchanged at the Sales Meeting.”

SIKORA also uses these meetings to provide the most current and precise information on products and their applications for their employees. In

this way, the work at the offices is sustainably supported and customers benefit from it. “Even after 10 years with SIKORA I still appreciate all the information and backgrounds, which are provided at the Sales Meeting, as I am able to address customers more directly and realize their wishes”, summarizes Jhonathan Ruiz, Business Development Manager SIKORA INTERNATIONAL CORP.



SIKORA Sales Team 2015

PERFECT TEMPERATURE: PLAST-TEMP 6000

Non-contact temperature measurement of plastics during the extrusion process

■ Whether household hose, automotive industry or medical technology – measuring the surface temperature of plastics during the extrusion process prevents the overheating of the material and thus guarantees the highest quality of the end product.

The PLAST-TEMP 6000

The WIRE-TEMP is a measuring system of the wire and cable industry, which is associated with reliable and precise temperature measurement. SIKORA was able to transfer the technology, which is measuring the temperature of plastics independent of external in-

fluences, successfully to the hose and tube sector. SIKORA can thus offer a stand-alone temperature measuring system for the continuous quality control during the plastic extrusion process. The system is designed for product diameters from 0.3 to 5 mm and from 5 to 50 mm as well as for surface temperatures up to 250°C.

The technology

The non-contact temperature measurement is made possible by an innovative infrared camera with built-in thermal image sensor. Measuring values are shown on an integrated display.

Furthermore, the PLAST-TEMP 6000 has various communication interfaces for the transmission of the measuring values to a SIKORA processor system, the line control or a laptop. For mobile diagnostics and quality control, the device can optionally be equipped with a Wi-Fi interface. All connections are perfectly protected against water, dirt and mechanical damage.



SIKORA IS ONE OF THE BEST EMPLOYERS

Prestigious 'Top Job' certificate for the Bremen based company

■ SIKORA AG was awarded with the recognized 'Top Job' certificate at the "Deutsche Mittelstands-Summit" (German medium sized companies' summit). Three factors were especially important for the commendation: the satisfaction of the employees in their work environment, their identification with the company and products as well as the quality of the leadership.

SIKORA succeeded in all of the categories and gathered additional points in the areas of culture and communication as well as internal entrepreneurship. With the pleasant working atmosphere and the open office design, the company with 200

employees worldwide encourages the solidarity and community spirit of the employees.

„We are all very proud of the 'Top Job' award“, says Dr. Christian Frank, CEO of SIKORA. “Naturally, we are going to use the 'Top Job' analysis to improve our employer qualities even further. We are doing this, because we know that committed employees are an essential success factor for our company.”

SIKORA employees are distinguished by high qualification, strong commitment and a pronounced identification with the company and its products.



Therefore, you as a customer benefit from constantly interesting innovations as well as quality and reliability „Made in Germany“.



Dr. Armin Holle
Director Research and Development, SIKORA AG

NEW DIRECTOR OF THE RESEARCH AND DEVELOPMENT DEPARTMENT AT SIKORA AG

Dr. Armin Holle about his change to SIKORA AG

■ In August 2015, the research and development team of SIKORA AG received support by Dr. Armin Holle. As director of the Research and Development department, the graduated physicist will be using his work experience of 28 years to further promote the development of SIKORA devices. In this exclusive interview, you will learn what Dr. Holle has planned for the future of SIKORA AG.

Give us a word that describes your work style.

I think my work style is best described by the fact that it is not possible to describe it with a single word.

Thanks to my calm and reflected personality, for example, the word "considerate" comes to my mind. I do not make rapid decisions. Furthermore, I do not hold on to my opinion come what may. I am always open for constructive ideas and a successful exchange of ideas.

When I am looking for the right solution, I can be very "persistent". Especially in my role, the solution does not always come over night. For me the attraction is to sink my teeth into a project and to accompany the development at every step.

My richness of ideas certainly helps. As an "inventor" I am always trying to think objectively. This way, new products and processes can be achieved sometimes by taking an unconventional route.

At last, I would like to use the word "agile". First, you have to internalize that challenges have to be tackled. Only then, can you accept a challenge with consideration and commit yourself to finding the solution and reaching the goal in an inventive way.

Which moments would you describe as the most crucial in your career?

In development, we do not live by single moments – as the name suggests something has to be developed and this takes time. I would rather call it opportunities, and to take up on opportunities made an impact on me over the years.

At the beginning of my career, I received the exciting opportunity to establish and promote the development of an entirely new technology. The challenge was to think against the mainstream and not to get distracted by already existing alternatives, and finally to achieve an internationally leading solution, whose development I accompanied at every step. This had a lasting effect on my "hands-on" approach.

Naturally, the opportunities that I received due to the acceptance of the responsibility and new tasks also played an important role.

The best opportunities in my career, however, were the many small and big inventions that made the products competitive on the market. These are the real milestones of a successful career.

How will SIKORA benefit from your knowledge and experience?

I am in the fortunate position that I have already worked in a company that went through the process moving from a medium-sized company to a far bigger one and know the single steps and requirements accompanying such a process. Furthermore, I know what lies ahead in my role as director of the R&D department. In summary, I am bringing my expertise in process development and I am planning to use it strategically.

Furthermore, in my opinion, there is always a solution to any technical challenge – you just have to identify it. Personally, I find myself creative in this regard and a company like SIKORA – being in an exciting growth phase – can only benefit from this.

What do you want to achieve at SIKORA and how would you define success?

SIKORA is characterized by a strong culture for innovation. The main reason for this is that Mr. Sikora had never been satisfied with standstill and mediocre solutions since the founding of SIKORA AG, but has provided the company with new inventions and ideas for over 40 years. Fortunately, he transferred this philosophy to the employees.

It is my intention to continue this successful culture of innovation. First, I have to learn and understand the internal processes and procedures in order to be able to combine them with my experience. In the future, the already efficient company characteristics will be strengthened and the employees will be motivated by structured processes. Only then, one's potential can be exploited to the fullest.

When our products exceed the products of other market participants with regard to the customer's benefit and the customers realize this and are inspired by our products – this is what I call success!

What attracted you to your new position at SIKORA AG

Over the years, I have gotten a little bit stuck in old habits and the way I approach issues. The time was just right for a fresh start. SIKORA offers me the possibility to step back in time into a smaller company and to successfully take on new challenges. It is important for employees and the company to challenge one another and to consider new approaches and ways of thinking.

Moreover, SIKORA AG has all the characteristics that I am looking for as an employee. I am already looking forward to the years to come and to work in collaboration with a strong team.

Mr. Dr. Holle, many thanks for this interview!

SIKORA MAINTENANCE PROGRAM

Experience for more efficiency

■ **Reliability** – The core of the SIKORA service philosophy. With a measuring, control or inspection and sorting device from SIKORA, you ensure reliable quality and measurements for your production over many years. This is also testified by the strong availability values up to 99.98%. In order to use this reliability together with a carefree package, SIKORA offers maintenance programs that are specially tailored for your production and needs for one, three or five years.

What we offer

Within a quarterly, semi-annual or annual cycle, SIKORA service technicians take on general functional and safety tests as well as the basic cleaning, the setup check and the calibration according to measuring standards.

Nevertheless, regularly maintained devices work more reliable. A fact we will give you in writing with our calibration certificate, that you may pass on to your customers.

Your advantages

Thoughts regarding wearing parts or timely re-ordering as well as the correct installation are a thing of the past. SIKORA service technicians plan their visit at your plant thoroughly and bring all necessary parts and tools in order to guarantee a professional exchange and installation.

Naturally, we provide an intensive training for the operator and internal technicians. This way, a professional handling of the devices as well as the reduction of operating errors can be ensured.

Furthermore, you benefit from the long-term qualification of our service technicians and their experiences at plants all over the world as they will help you to find improvement potentials for your production process.

Device-specific maintenance for the X-RAY 6000

(diameter/wall thickness/eccentricity measuring system)

- Check of the X-ray intensity, safety and cooling water circuit
- Cleaning of the measuring zone and electronics
- Check of all test voltages
- Inspection of the device with diagnosis software

Calibration Statement

All calibrations are performed according to specifications of DIN EN ISO 9001. The issued calibration certificate documents trace back to national measurement standards in order to demonstrate the measurement units in accordance to the International System of Units (SI). The data given in the calibration certificate fulfill the requirements of DIN EN ISO/IEC 17025. Besides that, a clear statement about the status of the device is given as well as the fact, if the device operates according to device specifications.



Comprehensive preparations are essential for a successful installation of the device

COMBINED FORCE: TIGER LASER 6010 XY

Innovation leap in diameter measurement with the highest precision in surface inspection and visualization

■ The TIGER LASER 6010 XY is especially interesting for manufacturers of hoses and tubes with a small diameter from 0.1 to 10 mm. The Tiger Laser 6010 XY detects faults with the highest probability and reliability. Defects can be evaluated realistically due to the unique visualization of the product surface with one of the devices of the ECOCONTROL series.

The classic and high-end diameter measuring devices of the SIKORA LASER Series 2000 and LASER Series 6000 are already used and valued by many manufacturers of the hose and tube industry for product diameters from 50 μm to 500 mm or 0.2 to 78 mm respectively. With these devices, not only the product diameter can be measured but they can also detect lumps and neckdowns on the product surface.

Now SIKORA is taking it a step further. The TIGER LASER 6010 XY is operated with two high-resolution image sensors, as they are common in digital cameras. Therefore, a measuring rate of 500,000 measurements per second is possible. The measurement and inspection of the product is carried out on two measuring planes, which enables a reliable inspection of lumps and/or neckdowns of the surface profile of the product.

The main focus when developing the TIGER LASER 6010 XY was on speed.

An example

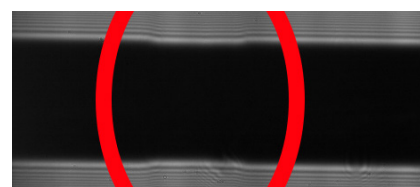
The LASER 6020 XY offers a measuring rate of up to 5 kHz. This ensures an interval of 2 mm between two measurements at a line speed of 600 m/min (10 m/sec).

At a measuring rate of 500/sec, the TIGER LASER 6010 XY is recording 500 images of 1,000 lines. This corresponds to 500,000 measurements per second (500 kHz) for the lump detection.

Consequently, the TIGER LASER 6010 XY detects product irregularities 100 times faster than the LASER 6020 XY. Therefore, the device ensures a high detection probability of the smallest lumps and neckdowns.

The interval between two measurements with the TIGER LASER 6010 XY is only 0.02 mm at the same line speed of 600 m/min.

The clearly structured visual display, which hose and tube manufacturers can retrieve in combination with SIKORA's processor systems ECOCONTROL, is another advantage of the TIGER LASER 6010 XY. Due to the visualization of the product surface, irregularities can be evaluated better and faster in order to intervene specifically in the production process. Thus, complex rewinding processes can be avoided.



Visualization of the measurement of a pipe with a diameter of 2.5 mm and a neckdown of 50 μm



The TIGER LASER 6010 XY – highest precision and impressive speed

KNOWLEDGE: TOTAL COST OF OWNERSHIP

Where purchasing pays off

■ The decision for larger investments in production lines always starts with an extensive research. Next to technical aspects, further factors such as expected quality, reliability and durability of the capital goods as well as the service provided by the manufacturer have to be taken into account. Nevertheless, all costs starting after the purchase are of special interest.

Those costs consist of several single positions, which are best visualized in a "Total Cost of Ownership" matrix. Here, all costs from the purchase to the scrapping can be entered and are considered.

Savings using the SIKORA technology

If you decided for a measuring, control, inspection or sorting device of the SIKORA AG, unplanned downtimes are, due to the fact that no moving parts have been used, almost excluded. Furthermore, the installation and commissioning will be performed by a qualified service technician. Our employees have gathered experiences for years, which they are willing to share with you in order to find the best operation site for the devices. That decreases times for planning and technical service for you.

Aquisition costs	Operating costs
<ul style="list-style-type: none"> Purchase price 	<ul style="list-style-type: none"> Spare parts Planning (Commissioning and Maintenance) Training of employees

Rough concept of a „Total Cost of Ownership“ matrix

A SIKORA service technician will not leave a customer until the training of all responsible employees regarding attendance and operation of the devices is completed. That guarantees not only the optimal operation of the devices in your production – trained employees need less time for "Learning on the Job".

Amortization

Using the "Total Cost of Ownership" matrix for the example of the SIKORA LASER Series 6000, it becomes clear that the proportion of aquisition costs compared to operating costs is strongly decreasing.

As SIKORA systems measure with the same precision as on the first day without any additional calibration and often don't need spare parts, the investment is amortized already after a short time. Alternative technologies, which might be less expensive at the purchase, often cause higher operating costs for spare parts as well as maintenance.

But the highest savings made possible by the SIKORA technology concern the end product. Best quality and repeatable process stability in the line – That pays off!



RAFFLE

SIKORA Anagram

The answers have been mixed up a little bit. Put the letters in the right order and find the correct solution.

1. Which annual meeting for sales manager of all SIKORA Offices takes place at SIKORA's headquarter in Bremen?

MITGELASSENE

2 **10**

2. Which award has been presented to SIKORA in 2015?

BOPTOJ

1 **9**

3. Who ist the new director of the research and development division of SIKORA AG? Dr. ...

MALOHERINL

3 **8**

4. Which SIKORA device measures the temperature reliably and precisely?

AMSPTELTP

7 **5**

5. Which factor should be considered when calculating the „Total Cost of Ownership“?

QAIIDEVCULFESRIE

4 **6**

Solution:

1 **2** **3** **4** **5** **6** **7** **8** **9** **10**

If you know the answer, send an e-mail until November 13th, 2015 to:

communications@sikora.net

The prize is one of three High-performance-Powerbanks "EasyAcc Monster" with 20.000 mAh! (Picture similar)



Each correct answer takes part in the raffle. Employees of SIKORA AG and SIKORA Holding GmbH & Co. KG and their relatives are not allowed to participate. Each player can only participate once. We value the first e-mail, all subsequent e-mails will be considered invalid. The legal process is excluded.

Good luck!

The correct answer of the last raffle was:

ECOCONTROL

Congratulations to the winners!

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