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23 Why IFS and HACCP…?
So that you can sink your teeth into something good without worrying about the consequences!
Dear Readers,

The business year 2003 did not always progress to the liking of the majority of us – particularly concerning the global economy. However, better times are being forecasted. For instance, German Chancellor Gerhard Schroeder said at the end of March that Germany “is in a much better position than before; investment activity is picking up, economic stagnation has been overcome.” Going by these statements, regardless of the political forces that govern today’s or tomorrow’s political activities, we can hope that the upturn in the economy is here to stay – and not only in Germany. The company and our customers themselves should experience a more satisfying business year and be more inclined to invest.

We at Sartorius would like to demonstrate yet again that we focus on our customers and their needs by entering into direct contact with them at two international trade shows, the Interkama (April 19 – April 24, 2004 in Hanover, Germany) and the Analytica (May 11 – 14, 2004, in Munich). These trade fairs offer an excellent opportunity to unveil our latest developments in order to give you ideas about new methods and simplified processes. We are just as interested in hearing about your experience and the particular innovative ideas you have concerning applications in order to integrate these into our product developments. Therefore, we would like to cordially invite you to visit us at our booths.

In this new issue of “WeighAhead,” you will find interesting application reports besides articles featuring our new products. For example, you can read on page 7 that the OBSERVER is a breakthrough in metal detection technology for aluminum-packaged products. The life of an indigenous bird – the common swift that is a protected species here in Europe – is being studied using the latest technology at the Humboldt University of Berlin. To find out why a Sartorius precision balance plays a significant role in this technology, just turn to page 26. The Danish company Unomedical uses Sartorius know-how in weighing technology in quality control of vacuum-packaged infusion sets for diabetics. For more details, see page 22.

In this editorial, I would also like to thank you for your interest in “WeighAhead” and for your loyalty in staying with us. After 2 ½ years of being responsible for our Sartorius customer journal, I now must say good-bye to this tremendous company and to a fascinating job assignment, and pass on the baton to my successor – Ms Jessica Goedecke. Please feel free to contact her and send her your articles, comments and suggestions.

Sincerely

Christiane Schulze
Marketing, Mechatronics and Editor of “WeighAhead”

Jessica Gödecke
Marketing, Mechatronics and New Editor of “WeighAhead”

Editorial

Interkama
April 19–24, 2004, Hanover, Germany
Hall 6, Stand F03

Analytica
May 11–14, 2004, Munich, Germany
Hall A3, Stand 421/520

Intervitis/Interfructa
May 11–15, 2004, Stuttgart, Germany
Hall 4.0, Stand 318

Are you curious? Would you like to subscribe to our journal? If so, just fill out the fax form card on the last page of the journal and fax it to us.

We value your opinions. Do you have any constructive criticisms or ideas?

If you do, please e-mail them to me at: Jessica.Goedecke@sartorius.com
You can also reach me by telephone at +49.551.308.1695.
One of the most important aspects of any weighing process is the precision of measurement. Another key parameter – and one that may seem contrary to the first – is the speed of weighing operations. Fast response times mean short measurement times for individual weighing operations; this is one of the major strengths of Sartorius weighing technology. Throughput rates higher than 40 weighing operations per minute, however, cannot be realized through ultra-fast response times alone.

We have customers that place this kind of demand on their process systems, demonstrating once again that in some processes, both precision and speed (i.e., high sample throughput rates) are essential for an efficient weighing process.

Sartorius has a solution that is simple and transparent: Parallelization.

The example shown here involves the use of multiple weigh cells, positioned for optimum use of space, to perform 8 weighing operations at the same time. This means an 8-fold increase in sample throughput rates!

The photos provide a closer view of the equipment setup. In a central area of the production line, eight load receptors were installed just below the work platform for parallel weighing of glass vials. Eight vials are positioned on the weigh stations simultaneously by robot arms, and returned to the line after about 1 second.

The weighing systems used here have a resolution of 1 mg. The selection of weighing capacities and resolutions can be modified in accordance with individual customer requirements.

This solution provides a vivid example of how optimum results – in this case, more than 60 weighing operations per second! – can be achieved by combining our expertise in mechanics, electronics, software and automation.

The example presented here shows only one facet of the many solutions that are possible. Other weighing capacities, resolutions, levels of parallelization and different sample vessels and sample conveyors are just a few of the parameters that can be varied.

We would be happy to help you implement your requirements, too!

Reader Service Code: 062
Acid or base?

The new Sartorius PB-11 Basic Meter measures pH and redox potential

The PB-11 laboratory pH meter replaces the proven PB-20 from Sartorius. This new meter is an easy-to-operate measuring instrument for determining the pH or redox potential (ORP), and can also be used for ion selective measurements based on voltage measurements.

The PB-11 Basic Meter features all the properties that one can expect of a simple, but modern laboratory pH meter. These characteristics include:

- Automatic buffer recognition during calibration
- Automatic temperature compensation
- Display with stability icon next to the result
- Simultaneous display of the measured value and temperature

In addition, it offers:

- Rugged construction and good protection against the intrusion of water and dust under laboratory conditions
- Automatic electrode checking during calibration, and display of the electrode slope, giving users the peace of mind that they are always working with an electrode that is in good condition
- Allows a large degree of independence in the selection of calibration standards, since the temperature–pH curve of 16 commercial buffers is available for the automatic temperature compensation function
- Easy operation that practically eliminates operating errors
- A large display that uses easy-to-understand, language-independent icons to provide information about the instrument’s current operating status, for example, calibration procedure or calibration results

The standard equipment that comes with the PB-11 includes the proven PY-P10 pH combination electrode from the Sartorius product line. This pH electrode that is refillable with electrolyte is rugged and suitable for many laboratory applications. It is enclosed in a highly mechanically and chemically stable plastic body and has a synthetic fiber junction. The integrated temperature sensor allows the user to benefit from all the advantages of automatic temperature compensation for calibration and measuring results.

The PB-11 has the same measuring range and resolution for direct voltage and pH measurements as its predecessor, the PB-20. The temperature measuring range is –5…105°C. The accuracy of voltage measurements has been enhanced from ± 0.3 mV up to ± 0.2 mV. The PB 11’s temperature measurement accuracy has been improved to ± 0.2 K.

All in all, the new PB-11 is a reliable and easy-to-operate meter suitable for laboratory routines, featuring an optimal price/performance ratio.

Overview of technical specifications:

<table>
<thead>
<tr>
<th>Measuring range</th>
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</thead>
<tbody>
<tr>
<td>Voltage in mV</td>
<td>–1800 ... +1800</td>
</tr>
<tr>
<td>pH value</td>
<td>–2 ... +20</td>
</tr>
<tr>
<td>Temperature in °C</td>
<td>–5 ... 105</td>
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<table>
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<th>Resolution</th>
<th></th>
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</thead>
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<td>Voltage in mV</td>
<td>± 0.1</td>
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<tr>
<td>pH</td>
<td>± 0.01</td>
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<tr>
<td>Temperature in K</td>
<td>± 0.1</td>
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<table>
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<th>Accuracy</th>
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<td></td>
<td>from &lt; –400 mV and</td>
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<td>&gt; +400 mV)</td>
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<tr>
<td>pH</td>
<td>± 0.005</td>
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<tr>
<td>Temperature in K</td>
<td>± 0.2</td>
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</table>

Reader Service Code: 063
Are you “S.U.R.E.”?

New function for dynamic display of the uncertainty of measurement

The new S.U.R.E. (Show Uncertainty – Reduce Errors) function built into Sartorius premium balances provides a dynamic display of the uncertainty of measurement for the purposes of calibration through the German Calibration Service or DKD (DKD=Deutscher Kalibrierdienst). This function enables users to continuously monitor the accuracy of their weighing procedure, in line with the motto “Show Uncertainty – Reduce Errors.” As a result, Sartorius has breathed new life into the DKD certificate with the goal of making it easier for users to determine the uncertainty of measurement or process accuracy of an initial sample weight without having to go to the trouble of calculating it from a diagram.

Once again it is evident that a calibration certificate is not just a “dead piece of paper” but a document containing relevant information to support the demands of monitoring testing and measuring equipment.

The entire GENIUS series features the S.U.R.E. function, which enables the uncertainty of measurement conforming to the data in the DKD certificate to be displayed continuously for every weight. Data determined by service technicians directly at the setup location in accordance with DKD guidelines are stored in the balance and the function is activated. Via the menu, the user can opt to have results shown as text or as an analog readout.

The user can select the option to display either the absolute and relative uncertainty of measurement or the process accuracy.

To illustrate, the diagram below shows the result of a DKD calibration procedure performed on a GENIUS ME235S semi-microbalance with a maximum capacity of 230 g and a scale interval of \( d = 0.01 \, \text{mg} \).

According to DKD guidelines, determination of the total uncertainty of measurement \( U \) is defined by the following equation:

\[
U = a + b \times I,
\]

where

\( I = \) net weight displayed on the balance; 
\( a, b = \) parameters that were determined through calibration.

In the concrete example using an ME235S balance mentioned above, the uncertainty of measurement \( U \) for a certain net weight \( I \) results from the following formula:

\[
U = 0.034 \, \text{mg} + 9.84 \times 10^{-6} + I
\]

When parameters “a” and “b” are entered, the balance automatically calculates the corresponding absolute uncertainty of measurement \( "U" \) or relative uncertainty of measurement \( U^* = \frac{U}{I} \) for every weight. Via the “k” factor, the process accuracy \( P = k \times U^* \) allows the user to take into account influences on the accuracy of his or her process that could not be considered during calibration. There is also an option for displaying the process accuracy. For example, if the required process accuracy were 1%, it would no longer be attained for weights smaller than 10 mg in the example shown in the diagram. In this case, the process accuracy displayed on the balance or documented in the record would exceed the required value of 1% and indicate to the user that the weight on the balance must be increased accordingly.

Within Europe, DKD calibration is recognized because the German Calibration Service is a member of the European Cooperation for Accreditation (EA). Sartorius currently offers DKD calibration in Germany, Austria, Switzerland and France. As the tendency toward harmonization continues to stride ahead, it is expected that Sartorius will eventually be able to offer this service in other countries. Therefore, balances and scales of the GENIUS and Masterpro LA series, as well as the new SE/ME ultra-micro- and microbalances, are already well prepared for the future.

Reader Service Code: 064
Revolutionary method for detection of metal contaminants in aluminum product packages

The Boekels OBSERVER is a pioneering product

Conventional metal detectors that are used in quality control in industry produce an electromagnetic alternating field. Any metal contaminants in the product to be tested deflect the field lines and can be evaluated as an electrical signal and thus be made visible.

Diverse disturbances adversely affect the detection accuracy attainable, however. The major disturbances are the product effect (changing conductivity due to fluctuations in moisture, salt content and/or in temperature) and the influences of metallized packages, such as aluminum-coated foil (example: potato chip or crisp packages). The latter is increasingly being used in the food and pharmaceutical industries as the diffusion-inhibiting properties of this type of packaging considerably extend the product shelf life.

So far, the only method for reliable detection of metal in aluminum packages has been X-ray technology. However, this technology is very expensive and requires elaborate safety measures to ensure protection against radiation.

By contrast, the new OBSERVER metal detector dispenses entirely with this controversial and, for the manufacturer, highly expensive technology. Without time-consuming fine adjustment, the OBSERVER delivers optimal results that are free of the effects of aluminum-coated packages and/or unstable product properties.

The unit is equipped with specially developed sensors that operate on the basis of magnetic field measuring technology. The products to be tested are first premagnetized by the OBSERVER on the infeed side of the belt during monitoring. Then the detector’s magnetic field sensor measures the remanent magnetism of any metal particles present. Moreover, the OBSERVER’s magnetic field sensor unit detects AISI 304 particles even if shearing or deformation has altered their crystal structure, as is common during a normal production run, and they have become magnetizable as a result. The OBSERVER offers all these advantages even at high conveyor belt speeds.

The OBSERVER is the first metal detector that is predestined to monitor composite packages of chips or ready-to-eat meals, yogurt cups with aluminum lids, and blister packages of tablets. Because aluminum does not have any magnetic properties, it is practically “transparent” for the OBSERVER, therefore enabling the actual final product to be tested for the presence of metal contaminants.

This new metal detector not only serves the needs of consumer protection in line with the International Food Standard (see also page 30), but also can indicate early on whether machines are defective, for example, if they release particles, before any real damage occurs. Even stainless steel particles, such as AISI 304, can be detected under specific conditions. Further applications areas besides testing aluminum-packaged products in the food and pharmaceutical industries include detection of product flow in stainless steel pipes.

Reader Service Code: 065

New metal detector: OBSERVER
Fill 'er up!
The new Combics indicators for incoming inspection and professional filling

The introduction of the Combics series set new standards in weighing technology. Combics is ideally suited for use in the pharmaceutical, chemical, food, metal and electronics industries. The many possibilities for combining Combics equipment means more than 780 basic models of Combics weighing instruments are available; pre-configured, fully functional complete scales combined from a choice of 6 indicators (display and control units) and 65 platforms (load receptor unit) in four different accuracy levels.

Combics 1 plus for incoming inspection
The new Combics 1 plus indicator is specially designed for use in incoming inspection. Based on the Combics 1 indicator, the functionality of new version has been expanded by the addition of a 10-key numeric keypad for entering user data. Furthermore, 2 “ID” keys have been added for configuring product ID codes – also called “identifiers” – specifying, for example, the type of material or the supplier name, to identify the product during processing. A major advantage of the new indicator model is the input function for entering “manual tare” values (such as a known pallet weight). Combics 1 plus indicators are ideal for optimizing any incoming inspection procedure.

Combics 3 with application kits for automatic filling
In another recent addition to the Combics series, two automatic filling application kits for Combics 3 indicators have been introduced. Automatic filling is a widely used application, particularly in the chemical, pharmaceutical and food industries. There are a number of reasons for the increasing popularity of this application, including the improved productivity thanks to higher throughput rates, higher quality through effective error prevention, 100% traceability of weighing operations, and simplified observance of documentation requirements defined by GMP, GLP, ISO9000, and other standards.

Combics 3 offers tailored solutions that are ideal for customers who may not require extensive weighing systems, but at the same time want to optimize their processes to keep pace with ever-stricter requirements for documentation and automation. Both application kits, “Basic Filling” and “Filling with Extras,” enable automatic single-component filling to a target weight without ordering any additional options. The Totalizing and Statistics applications also supplied with Combics 3 make it easy to generate statistical evaluations. The “Filling with Extras” application kit has additional functions, such as automatic optimization of filling valves and material flow monitoring. These features reduce filling machine downtime and reject rates. And what’s more, the Combics 3 indicator can be operated in Zones 1, 20 and 21 hazardous areas.

To learn more about the advantages of Combics, just mark the Reader Service Code below.

Reader Service Code: 066
The most advanced weight production, adjustment and calibration

Häfner weights and Sartorius mass comparators featuring ScalesNet32

The highest demands require special innovation
In 1933, Adolf Häfner founded Häfner Weights to manufacture and sell weights for common trade. As early as 1962, precision weights were added to their product line. In 1979, Häfner Weights began serial production of weights in the accuracy classes F2 and F1. In 1984, Häfner built and set up the first calibration and adjustment laboratory, which enabled weights of the accuracy class E2 to be serially manufactured at the same time. In 1986, the current managing director, Mr. Martin Häfner, took over his parents’ company. In that same year, the company became the first in the world to produce mass standards of the accuracy class E1.

Due to continually rising demands on the material characteristics of mass standards, the Häfner company began developing the first generation of the special steel HE210 in 1990. Today, HE210 steel meets the requirements of the accuracy class “E0” and provides the most important basis for many national mass standards that the Häfner company has already delivered to several countries.

In 1998, a quality management system was introduced and certified for compliance with DIN EN ISO 9001.

Accreditation as a calibration laboratory of the German Calibration Service (Deutscher Kalibrierdienst or DKD) in accordance with DIN EN 45001 (now DIN EN ISO/IEC 17025) followed in 2000. Currently, the laboratory includes nominal values up to 500 kg.

Today, Häfner is one of the worldwide leading manufacturers of weights and high-precision mass standards. E0 mass standards complement the current product line. In addition, the company specializes in custom designs in accordance with customers’ requested specifications.

Weights from Häfner provide a sense of security and trust in weighing and testing
An important component of corporate success is the assurance of product quality. In this regard, a recognized quality management system in the world of measurement and weighing is an indispensable requirement. Documented monitoring of measuring and test equipment is a component of all quality standards, such as ISO 9001, ISO 10012, ISO/TS 16949, QS9000, ISO 17025 and GLP/GMP requirements. In addition, it takes the burden off the user for providing the necessary evidence concerning product liability. This demands the assurance of measuring accuracy, reliability and availability of in-house measuring equipment, which includes measuring and test instruments (balances and scales) as well as standards (calibration and test weights).

High-precision test and calibration weights
To ensure reliable, consistent weighing or measurement results, the following rules must be followed:

• Balances and measuring equipment must be monitored and maintained by competent individuals. The technical qualities must be known.
• Balances and measuring instruments must be adjusted and inspected with test weights at regular intervals – depending on how often they are used.
• Calibration weights and test weights used must be traceable to national standards, i.e., they must be calibrated regularly.
• Test and calibration results must be documented along with the applicable uncertainty of measurement (e.g., by a test record for balances and a calibration certificate from the German Calibration Service (DKD) for weights).
• Test and calibration results must be evaluated.
• Test and calibration intervals for balances and weights must be defined and monitored by a test plan.
• Test records and calibration certificates must be kept for a sufficiently long period.

Application areas of Häfner Weights today:

• Calibration weights and test weights used in the manufacture and servicing of balances and measuring equipment in the field of weighing technology
• Important calibration/adjustment equipment and test equipment used in the chemical and pharmaceutical industries and the food and beverage industry
• Measuring instruments and adjustment/calibration and testing equipment in industry
• Mass standards for the dissemination of the mass unit in national metrological institutes; many national metrological institutes use national standards produced by Häfner Weights GmbH
• Mass standards used by authorities for legal metrology to certify balances, scales and weights
• Mass standards for calibration laboratories in industry
• Weights used for training in the units of mass, force and pressure
• Adjustment and calibration tools for special equipment used to measure tension, pressure, torque and flow rate
• Legal weighing instruments used with mechanical scales, such as bench and decimal scales

When performance is decisive

Since it was founded in 1933, the Häfner company in Oberrot, Germany, has manufactured weights for various application areas.

As electronics were introduced into weighing technology, the situation of weights fundamentally changed. Weights were transformed from weighing tools (used together with a balance) to devices used to calibrate and test balances and measuring equipment. The requirements placed on weights increased constantly as electronic weighing cells became more precise and featured higher resolutions.

Häfner recognized this and faced the challenge early on. Today, streamlining and the use of the most advanced technology have given the company a leading edge in the area of modern weight production. Each HÄFNER blank is made of special materials. State-of-the-art casting technology and high-precision CNC-processing machinery are the most important components of production. Top-level expertise and the most advanced surface processing technology guarantee consistently high precision. What follows is pure craftsmanship.

The employees of Häfner use great experience and sensitivity in crafting each weight to its specifications. Each step in the production process is constantly tested by the most accurate Sartorius mass comparators and load alternators using calibrated standards. In the process, ambient conditions are continuously monitored.

Prior to delivery, each HÄFNER weight is cleaned and tested again. Upon request, a certificate documenting the quality of the weight (e.g., a DKD calibration certificate) can be included. The level of perfection achieved is only possible through the talented craftsmanship of the employees.
Until 1998, all test and calibration results were compiled manually by Häfner Weights GmbH and later evaluated with calculation programs. As the company’s market presence grew, the time and effort required to maintain the highest level of quality standards continued to increase. Since there wasn’t any software suitable for rationalizing this data collection and documentation, Häfner Weights GmbH used its know-how to develop the software and hardware solution ScalesNet32 from a company called Maro Electronics. Together with Maro, Häfner Weights invested in the initial development, test phases and further development of this software in order to bring this system solution to its current status. From a metrological standpoint, practically everything related to the calibration of weights has been covered in the software.

This software is currently included in the Sartorius product line.

Before ScalesNet32 was used, the mass of the customer’s weight used to be determined by comparing it to a corresponding standard. In the process, measured values defined in the weighing cycle were transferred to forms. The required calculations of measurement deviations and the uncertainty of measurement were performed afterwards using the written information. The measurement deviations and uncertainty of measurement calculated were then documented on the calibration certificate.

ScalesNet32 simplifies and rationalizes calibration through the following available modules:
- Calibration of customer’s weights
- Quick comparison of weights
- Calibration of the balance
- Adjustment of the balance
- ScalesNet32 monitors the balances, standards and climate stations being used via connected sensors; the user is alerted when calibration is necessary
- Recording of ambient climatic parameters
- Generation of certificates for legal metrology, test or calibration certificates, or DKD (German Calibration Service) certificates

ScalesNet32 features a database for saving all acquired data and information. Weighing data are automatically read into the program via a data interface with manufacturer-dependent parameters. During weighing cycles, ambient climatic parameters are collected automatically. The number of weighing cycles and type of weighing (NPPN or NPN) can be selected according to classes. Weights in a set can be tested simultaneously on different mass comparators in the laboratory. The program performs a plausibility test in relation to the set of standards selected and the balance (or mass comparator) being used. This ensures that the balance and the standard are suitable for the particular accuracy class. Calibration of a weight is always related to an order or a customer, the serial number of the weight, the manufacturer of the weight, the design, features, etc., that can be attributed to the item being tested. This ensures that the weight can be unequivocally identified. The ID of the weight is stored in the database. In this way, each tested weight has its own history that can be displayed. For each tested weight, a calibration record is generated, which includes all data compiled during the test (standard, balance used, temperature, moisture, barometric pressure, etc.). Certificates for legal metrology as well as test certificates and calibration or DKD certificates are stored as Word documents, can be formatted as necessary and generated in two languages. Inventory lists for the balances and standards used are generated automatically.

With ScalesNet32, you can meet the requirements of quality management, which demand that all calibrated weights be traceable to a national standard by written proof.

Reader Service
Code: 067

Sturdy service case for technical customer service representatives
ProBatch+ is a new formula and production management system with outstanding performance capabilities and a high degree of flexibility, presenting a broad range of advantages for manufacturers in the cosmetics, chemical and food industries. Unique features include easy installation and setup, as well as intuitive operation. ProBatch+ runs under Windows and uses the powerful Microsoft Access database manager for uncomplicated and reliable administration of extensive data on raw materials, formulas and production steps. Designed for optimum use with the "X-Family" series of pre-programmed batching controllers and equipped with open interfaces for other control systems, such as Siemens S7, ProBatch+ is an exceptionally efficient, dependable and highly adaptable formula or recipe management system.

Communication between ProBatch+ and the control system is implemented over OPC in compliance with ANSI/ISO S88.01 batch control standards. Dynamic data is provided through DDE and OPC for use in linked visualization systems. Data transfer to an ERP system can be realized over the SQL and ODBC database interfaces. This consistent incorporation of established industry standards makes ProBatch+ ideally suited for integration into existing systems and reduces the effort and expense of getting the program up and running.

The scripting language in ProBatch+ enables smooth, flexible implementation of customer-specific process requirements. Scripts make it easy to adapt the system quickly whenever the process is modified, without requiring complex PLC programming. Simple handling and operation add up to substantial savings of time and money. One quick training session on the ProBatch+ terminal is all that is needed for confident operation. Automated processing ensures reliability and exact reproducibility of results, and the documentation features in ProBatch+ facilitate the procedures for meeting a variety of certification requirements. The versatility and scalability of ProBatch+ guarantees a secure investment with a built-in future.

Reader Service Code: 068
Sartorius has helped a specialist potato producer reduce giveaway and comply with average weight, without reducing the speed of the spuds.

St. Nicholas Court Farms are one of the UK’s leading growers and packers of potatoes, handling more than 45,000 t every year. Established in 1959, the company now farms in excess of 800 hectares. They are also founder members of Kent Veg, an expanding group of committed potato growers based in north and east Kent. A purpose-built facility was opened in 1989, designed to handle the large quantities of produce destined for the shelves of retailers, such as Tesco and Safeway, as well as wholesalers and catering outlets.

As volumes have increased over the years, so has the requirement for automation in the pack house. In order to reduce product giveaway, they decided to move from minimum weight to an Average Weight system. With four lines handling various sizes of bag, they needed a versatile checkweighing system to handle the Average Weight calculation while increasing speed in the packing process.

Two lines handle products from 2.5 kg to 5 kg, with a second pair of lines weighing up to 2.5 kg. The bags travel at a rate of 50 per minute, so the checkweighers installed would need to be fast and accurate. Operations Director Chris Jackson also wanted a system that could later be linked to a factory data system, as part of their ongoing Quality Assurance policy. “We were looking for a robust system that was also highly user friendly. We also wanted to put metal detectors in place to ensure product quality for our customers.”

Sartorius recommended two different systems for the varying production lines. For the 2.5 to 5 kg line, they implemented 6 kg EWK2000 checkweighers, with independent DISCOVERY/C metal detectors. The EWK2000 offers a variable belt speed to adapt to the company’s packing requirements at any given time. Printers were also installed for fast and simple reporting. For the 2.5-kg lines, EWK2000 checkweighers with integrated metal detectors were used.
Andy Hallitt, Product Manager for Checkweighers and Metal Detectors at Sartorius, explained the advantages of the EWK range for this application. “The need for easy operation was key on all four lines, and of course the speed of the checkweigher, due to the large quantities of produce involved. The EWK range can be operated using only four keys, and the simple reporting gives the user real-time control over the production process. The belt speed of the EWK2000 meant that it met the requirements of St Nicholas Court Farms with room to spare.”

With the new checkweighers and metal detectors in place, Chris Jackson says the advantages were immediately apparent. “The equipment recommended by Sartorius met with our requirements precisely. We were able to reduce our target weight on the 2.5-kg bag, and at 50 bags per minute the checkweighers are quickly paying for themselves.” The company has also benefited from the additional production data now available, and reports from the staff on the packing line suggest that the new equipment has been easy to use. With the future-proof inclusion of communication interfaces in all four checkweighers, St Nicholas Court Farms are all set to continue cost effective production for years to come.

Reader service code: 069
No chance for microbes

Sartorius weighing system assists Oxoid in the production of high quality culture media

Oxoid is one of the world’s leading manufacturers and distributors of microbiological culture media and other diagnostic products. The corporate headquarters in Basingstoke, Hampshire, is the main production and administrative site, supported by a network of wholly owned sales and distribution companies in Europe, North and South America and Australia. Many other countries are supplied through specialist distributors. The Oxoid range of products is used in clinical and industrial laboratories to isolate and identify the bacteria or other organisms causing disease or spoilage.

The Basingstoke factory is responsible for the manufacture of Dehydrated Culture Media, Peptones, Antimicrobial Susceptibility Discs (used to decide which antibiotics will provide an effective treatment for a patient with a microbial infection) and a range of other microbiological and immunological tests and products. This necessitates the use of a wide range of production techniques and equipment capable of handling ton quantities of peptone down to micrograms of antibiotics. Specialist equipment on the site includes freeze driers, sterile filling lines and clean rooms, vacuum ovens, evaporators and spray driers.

A vital part of the factory is the Dispensary, where recipes are mixed to specific orders from various parts of the site. The Dispensary itself was recently moved within the factory and, at the same time, significantly upgraded to improve efficiency and adapt the setup to integrate it further with the rest of the supply chain. Part of this process was to upgrade the equipment and software used by the dispensary staff.

The main activity within the Dispensary is the accurate weighing and batching of various powders to specific recipes. The demand for a specific type of culture media, for example, is recognized, at which point a recipe will be produced and filled by the Dispensary. These precisely measured “process orders” are then passed through to various manufacturing processes to produce the finished media.

The previous system was based around paper records, but the rest of the site was moving towards an SAP-based planning system. Materials and values were entered manually during the weighing process on a standalone weighing system, which was both time-consuming and potentially open to errors. The system was becoming overly complex, and the decision was made to look at various solutions to develop a configurable and traceable system.
Sartorius was one of three manufacturers who were shortlisted for the project. The requirements were high; the new system required SAP connectivity, in-depth reporting capabilities, user friendliness, a good fit with the current processes and a reduction in data entry to reduce the potential for errors. In short, the new system was to be a weighing system with in-built quality control.

At the time there was no Sartorius equipment within the Dispensary; however, Sartorius did hold the servicing contract for the balances on site, and Sartorius equipment was commonplace in many labs. Within the Oxoid site was a variety of laboratory weighing equipment, including analytical balances, top pan balances used for parts counting, as well as moisture analyzers which are used as part of the quality testing system.

Mark Walker, Project Manager for the Oxoid Engineering Department, was in charge of the Dispensary refit for Oxoid, and explained what made the Sartorius solution stand out. “It was hard to say which the most important requirement was, as it was vital that we weigh efficiently, quickly and accurately. The Sartorius system allows us high levels of connectivity with our own IT systems and fits in with our own methods and practices, so it was easy for the end users to adapt to.”

The Sartorius solution was based around a new piece of software called SartoDispense. A stainless steel PC with touch screen technology was integrated into the IT network and connected to several weighing points, a MasterPro analytical balance, a small industrial Combi scale, and a larger platform connected to a Combi indicator. The combination of platform scales and top pan balance allowed for a wide range of capacities and readabilities, giving the dispensary flexibility in terms of production volume. The Combi scales and MasterPro balance were also chosen due to their resistance to vibration and other forces which can be present in a dispensary environment. The details of each recipe are pulled into the software from a SAP database.

SartoDispense is a completely re-engineered product for the Windows NT or Windows 95/98/2000/XP environment based on Weighahead Systems (Europe) Limited’s previous DOS-based product, Control15.

This experience provided a considerable knowledge base of the practical aspects of dispensing processes and enabled the production of this new and exciting product.
Applications

Nick Parsons (Brand Manager Sartorius UK) explained some of the benefits of SartoDispense. “During the weighing process, the software automatically uploads what is being weighed and provides user-friendly graphics, of particular importance when the materials are added by hand. The system also allows for automatic calibration and forcing tare and has enabled increased efficiency as the users simply have to follow the process on the screen. Even part-weighings are catered for; a recipe can be stopped at any point and returned to later should a more urgent job arise.”

The system also allows for quality control measures, such as in-depth reporting and tracking at every stage of the process and provides a batch record for each process order. The solution is also scaleable, with the option of adding barcode reading for tracing goods-in.

Mark Walker says the system has proved itself since its implementation six months ago. “The SartoDispense software is easy to use, giving the end-user a step-by-step guide and vastly reducing the potential for errors. It’s highly configurable and even now we are not using its full capabilities, as we plan to fully integrate it with our SAP systems in the future, to simplify our stock management.”

Servicing of the system is provided by Sartorius with the option of remote servicing via the internet, and this has given Oxoid added peace of mind, as Sartorius already had a solid reputation within the company for their after-sales care.

The Dispensary can now be certain of delivering the right order at the right time, and Oxoid’s customers can be assured of the highest levels of quality in their culture media.

Reader service code: 070

1. FB2CCE-SOCE – 2.2-kg capacity balance, with readability to 0.01g and in-built self calibration
2. CW1S4-150IG-I – Combics stainless steel scale with 150-kg capacity
3. Combics CIS1 – Specially configured Combics stainless steel indicator, used to enhance the resolution of an existing 600-kg platform
4. Flat panel PC – Industrial panel mount PC with 15” TFT touch screen monitor and stainless steel bezel

A Combics Indicator is used to enhance the resolution of an existing platform
Snow-white landscapes, bitterly cold nights, car windshields encased in ice – thank goodness all that is over, here in Germany! Spring is upon us and everybody, old and young alike, can look forward to warmer weather. But just 2 months ago, a little town in Thuringia was the staging ground for the annual World Championships of biathletes. With its combination of skiing and shooting competitions, the biathlon is one of the most popular winter sports around the world.

The Biathlon World Championships took place in Oberhof from February 5 to 15, 2004. A total of 206,000 spectators populated the “Rennsteig” arena and cross-country ski runs during the ten-day event. Sports director Janez Vodicar of Slovenia, event coordinator from the International Biathlon Union (IBU), praised the excellent organization achieved by Oberhof residents. “We can only speak of this Championship in superlatives. Oberhof 2004 will set the standards for the future; we learned a lot here.”

Sartorius made an important contribution to the proper conducting of the competitions. If you followed the biathlon, you might have asked yourself what went on when the athletes disappeared into the catacombs below the arena for about 5 minutes before the beginning of each competition. This is where the athletes and their equipment were checked before each event. The first step of the procedure was to check the rifles used in the shooting competitions. Each rifle had to weigh in at 3.5 kilograms – no more and no less. Failure to meet this requirement would lead to exclusion from the competition. For this metrological inspection, Sartorius provided biathlon organizers with a Competence CP12001S precision balance. Because the CP balance delivers results so quickly, controllers knew in an instant whether the rifle on the balance filled the bill. Only the rifles found to be within the prescribed standard were awarded the official “clearance” sticker.

Liv Grete Povere of Norway, winner of 4 gold medals, was the most successful biathlete at the 2004 World Championships. She is shown here weighing in her rifle before the competition.

The Sartorius Competence precision balance CP12001S was the optimal test instrument for use at the Biathlon World Championships. All athletes had to “pass” this test.
Once a Sartorius customer, always a Sartorius customer

Vetropack expands its production systems

You may remember the name “Vetropack” from the last issue of WeighAhead. The article entitled “Hot properties” on page 15 introduced this Croatian manufacturer of glass packaging for the food and beverage industries. Vetropack was looking for a mechatronic solution that could check the weight of hot bottles - “fresh” out of the oven - at temperatures of around 500°C! After a careful evaluation of the requirements, Sartorius offered Vetropack a Combics weighing platform, made entirely of stainless steel and mounted on special heat-resistant material. The display terminal with its evaluation electronics could then be installed in another area, positioned well apart from the platform.

After comparing competitor products, Vetropack chose to install 2 of these Combics scales, planning to purchase 10 more scales in the future if these performed well. Since then, the additional 10 Combics weighing platforms plus indicators have been installed in the “hot zone” at Vetropack, and are contributing to production control on a total of 10 lines.

Thanks to the excellent and highly successful cooperation between the Support Center at Sartorius Croatia and the Eastern Europe/CIS business unit, Sartorius was able to provide optimum consultation and support for the end customer, Vetropack, who has remained loyal to Sartorius by deciding to purchase more products.

The philosophy of the Eastern Europe/CIS business unit, “Never give up an order to the competition,” has once again been crowned with success.

Reader Service Code: 071

The Combics industrial series:
for combinatorics

Sartorius Combics, a new series of industrial scales, indicators and weighing platforms, is characterized by its functionality, performance, design and user-friendly operation. Combics satisfies the preference of many customers for selecting their own basic model equipment according to their particular needs, and then choosing from the broad array of options and accessories for a 100% customized solution. This unique product line meets any individual customer requirements quickly and precisely.

To present the vast range of Combics versions in a comprehensible overview – in other words, to make it easy and convenient for you as the customer to select the basic model you want and the options you need for your weighing tasks – Sartorius has developed the Combics Selection Tool. This is a software tool (on CD-ROM) that guides you through the Combics family of products and helps you put together a Combics scale or weighing system that is perfectly suited to your weighing tasks. You purchase only the equipment that you need.

To receive your own Combics Selection Tool program CD, just use the Fax Response card at the back of this journal.

Reader Service Code: 072
The town of Herten in Westfalia is the home of HERTA, a company renowned throughout Europe in the meat and sausage processing industry.

The history of the HERTA company, which today is under the umbrella of the Nestlé Group, reaches back to 1897 when Ludwig and Wilhelmine Schweisfurth processed only the best and freshest meats in their butcher’s shop, using their own recipes. Even way back then, they offered their wares at customer-friendly prices. This small business concept quickly became the recipe for success.

Products from Herten soon become known beyond the city’s borders, and the small family business expanded rapidly. Machine production was introduced in 1902, laying the cornerstone for the future. After the currency union and the founding of the Federal Republic of Germany, HERTA started up a rapid-delivery service, bringing chilled sausages and meats fresh to the consumer with their own fleet of automobiles. Business was conducted through subsidiaries, and an array of commercial partners quickly established widespread acceptance of the HERTA brand.

On the occasion of the 50-year anniversary of its founding, the company was “baptized” HERTA, a name derived from the name of its home town, Herten. As part of the anniversary celebrations, 2,000 young women named “Herta” sent their birth certificates to Herten, and one was chosen to be the “godmother” of HERTA and spokeswoman for the company.

With the Economic Miracle of the 1950s, electric refrigerators became common household appliances throughout West Germany, and HERTA started marketing fresh-packaged sausages and meat products. Their growing customer base welcomed this innovation. HERTA’s slogan became famous in Germany: “HERTA – wenn’s um die Wurst geht.” This is a play on the widely-used German expression, “The meat is what matters,” which means “It’s all or nothing” or “The stakes are high.”

The company philosophy of both HERTA and Nestlé is to maintain the best possible relations with suppliers. Together their motto is: “Treat suppliers the way you hope to be treated by your own customers!” HERTA actively encourages competition between potential suppliers, and expects a high level of expertise at acceptable prices.

Sampling half-ring sausages in the boiled sausage department
This philosophy also forms the basis of cooperation with Sartorius. For years, HERTA has been using the Sartorius ProControl for Windows (SPCfWin) system for average weight control of their prepackaged meat and sausage products. In 2002, it was time to expand the system – not for prepackaged products, however, but for HERTA’s in-process control. The goal was to set up networked weighing stations at various points on the production line to check samples at early stages, long before the finished product is packaged. This way, the company can ensure that prepackaged products do not exceed the upper or lower tolerance limits for nominal fill weights and that production costs are reduced by ruling out the occurrence of reject quantities. The data collected from the weighing operations can easily be monitored and evaluated on a central computer.

The staff of the in-house weighing workshop at HERTA, under the management of Karl-Heinz Klimpel, knew exactly what they wanted in their new scales: high-performance, rugged, durable construction and easy cleanability. They also had to keep in mind the standard HERTA prerequisite: overall production costs, including acquisition and maintenance costs, must be kept as low as possible. These strict requirements could not be readily met by any of the available products. Sartorius and HERTA worked together in close collaboration to create a new product that meets all of HERTA’s requirements perfectly.

This new scale, made entirely of high-alloy stainless steel in accordance with the strict standards set forth by EHEDG*, was born of the expertise and experience of both partners and is now available to all our customers. Subsequent successes with this product have proved that we chose the right path. Sartorius would like to thank all of the parties involved in this tremendous cooperative effort!

*) EHEDG stands for European Hygienic Equipment Design Group.
The EHEDG recruits its members from the food industry and its suppliers, and from the Chair of Process Engineering of Disperse Systems at the Technical University of Munich, Weihenstephan.
The EHEDG has set itself the task of translating HACCP guidelines into concrete standards for the manufacture of hygienic equipment, systems and processes.
Applications

Vitally important infusion sets for insulin users

Unomedical manufactures single-use devices for patients and hospitals

Client: Unomedical A/S

Area: Unomedical is a global company committed to engaging in a mutually beneficial partnership with healthcare professionals and their patients. Unomedical provides high-quality and reliable healthcare solutions to improve patient treatment and care and the safety of medical products used by professionals worldwide.

The Unomedical company specializes in the development, manufacture and distribution of single-use devices to hospitals and other healthcare providers around the world. The quality of their work is ensured by their dedication and profound insights into the needs of both patients and professionals.

Nordic Capital, a private equity investment firm, owns Unomedical.

Unomedical has long been accustomed to working in a regulated world with regard to markets, products, and production. This fact was asserted by the decision to certify the quality control systems in each of their business units according to ISO 9001 and later, EN 46000. Early certification by respected notified bodies, such as BSI, G-Med, TÜV and TGA, was the first step toward gaining the right to affix the CE label to their products from the moment the EU Medical Devices Directive (MDD) first went into effect in 1995. Their strategy was successful and the CE-certification process was carried out on schedule. As a result, Unomedical was among the very first companies in the world to be granted permission to CE-label its products.

Today, Unomedical has organized its quality assurance tasks to meet the needs of both customers and public authorities; for example, by using SPCfWin in combination with high-precision scales from Sartorius. Moreover, their QA systems have been designed to permit future adaptation by their affiliated companies, with regard to both global and local requirements.

The corporate RA/QA department at Unomedical constantly monitors developments in all of the markets in which Unomedical is active. It initiates and carries out strategic development projects through cross-organizational teams worldwide. Unomedical’s corporate RA/QA department also serves to ensure that all business units within the Group act in a uniform manner in their relations with authorities, suppliers and customers. This, in turn, enables them to present themselves as a single, unified company the world over, wherever people deal with Unomedical.

Finally, cooperation between Corporate RA/QA and each business unit’s QA department allows Unomedical to enjoy the best of both worlds – combining economies of scale with quick local response in meeting the needs of their customers.

The product to be monitored:

Different sizes of vacuum-packed infusion sets for insulin users.

The task: Jydsk Vaegtfabrik was contacted by Unomedical A/S to come up with a solution to meet the following demands:

- Automatic checkweighing of complete products in the range of 50 – 250 g
- Automatic ejection of one product in every 25 to 200 (user-selectable) that pass the rejector, for a manual completeness check
- Storage and recall of all data
- Resolution: +/- 0.1 g

The four packing lines are outside the clean-room area.

The solution: At the beginning of the project we considered using Boekels checkweighers, but because of the special function demands on the system, we came up with a special solution. In cooperation with Sartorius headquarters in Germany, we developed a system configuration to meet the customer’s demands as outlined in the diagram on this page (left column).
The system consists of the following components:

- One central computer running SPCfWin to store and recall the production data
- Four lines connected to the central computer via Sartonet; each line connects an isi30 display and control unit and an IS6CCE high-resolution platform

To have it work as a fully automated system, the above components were installed in combination with:

- A control box with OMRON PLC built in, an emergency push-button and keys with lights to indicate power-on and start of the belt
- Belt conveyors preceding the scale, on the scale and after the checkweigher, all motor-driven

Approximately one month after the final order was placed, Unomedical visited our factory, where they made their first and only inspection of the first of four systems to be delivered. Only some small modifications had to be made, and the system was accepted for delivery and installation.

Description of the system: Currently, the system operates in semi-automatic mode; operators position the boxes of infusion sets on the first belt manually (this belt has no rejector). In the near future, Unomedical is planning to develop an automatic system for this function.

As a requirement for manual checkweighing of the sets, 25 was defined as the smallest unit and 250 as the largest one. Currently, the system is operated with a set of 50 units. If subsequent checks statistically verify this as a reliable process, we will set the limit higher. Should the process deliver critical results, we can lower the limit, e.g. to checkweighing a set of 25.

We would like to thank our local sales partner, Mr. Peter Abrahamsen von Jydsk Vaegtfabrik, for successfully implementing this system at Unomedical.

Reader Service Code: 073
The Dieffenbachia is a plant better known by the name “green lung” or “dumb cane.” It comes in a variety of leaf shapes and colors. For fresh color accents in a home, the types with small leaves are ideal. But if you value fresh air in your home, select the types with large leaves instead. Dieffenbachia comes originally from Central America and the northern area of South America. It was named after the master gardener Dieffenbach of Schoenbrunn Palace in Vienna in 1830.

It’s a well-known fact that the Dieffenbachia is poisonous. During slavery, disagreeable witnesses were temporarily silenced by a lashing with dumb cane.

Yet the popularity of this potted plant, which belongs to the Araceae family (aroids), still hasn’t waned.

Excerpt: This polymorphic family is comprised of over 100 genera with about 900 species, from which the overwhelming majority (approx. 92%) are found in the tropics (predominantly as epiphytes in shady rainforests or on riverbanks). In colder zones, Araceen (aroids) are completely absent. For houseplants we predominantly cultivate the calla lily from Capland (South Africa), the speckled calla from Mexico, whose leaves have holes, and the biologically interesting Sauromatum species from East India. Numerous species are cultivated for their magnificent leaves (caladium, anthurium species, Dieffenbachia picta Schott from northern Brazil, etc.). Many Araceen are lactarious and have spicy or toxic substances that can be removed through cooking or roasting. Different species of rhizome, which are rich in starch, provide an important source of food in the tropics; others are used for their medicinal qualities to treat snakebites, among other things.

Elstgeest Potplanten, a company with its headquarters in Holland, has specialized for over 20 years in the production and “rejuvenation” of Dieffenbachias. Elstgeest is the Number One supplier in Europe. Since then, millions of cuttings, technically referred to as stecklings, have left the company in the best condition. In many variations, both young plants and “finished products” (in other words potted plants) have been bred by Elstgeest.

André Elstgeest founded the company in 1935 as a flower and plant cultivation business. In addition to practicing freeland cultivation of bushes and cut flowers, Mr. Elstgeest built a 200 m² greenhouse for bulbs. Today, this modern and spacious complex encompasses 20,000 m², and the Elstgeest company raises over 20 different types.

To optimally prepare the stecklings for further growth, their size and weight must be checked. Growing sales prompted the younger Mr. Elstgeest – managing director of the company – to look for a modern solution to replace manual inspection of the stecklings.

The Dieffenbachias transported on this auxiliary conveyor belt fall within the tolerance range. They will now be packaged for sale.
Today, a Boekels checkweigher "manages" the largest part of this process. The stecklings are divided into four weight classes: the categories "heavy" and "light" – with tolerance limits at the top and bottom of the range – and the classes "too heavy" and "too light" (no longer within the tolerance range). Plants that fall into the latter group are not suitable for further planting. Together with Elstgeest, Boekels – a member company of the Sartorius Group soon to be called Sartorius Aachen GmbH and Co. KG – developed a concept that involves a checkweigher as the central distribution station. First, an employee places stecklings on a conveyor belt that is connected to the checkweigher. The weights of the stecklings are determined here and – if they meet the weight requirements – they are transported onto another conveyor. This is done by a rotating mechanism equipped with brushes (which can be installed upon request) that directs the stecklings from the main conveyor belt onto two auxiliary conveyors (see 2nd photo below). The conveyors run directly to the units where final packaging of the stecklings is completed. If the conveyors are full at any time, a sensor detects this and the entire system stops automatically. This ensures that valuable Dieffenbachia stecklings do not become "stacked" on top of each other or fall from the conveyor belt. 

Following weighing, stecklings classified as too light are automatically "swept" off of the conveyor by a stream of compressed air. Plants that are considered "too heavy" continue on to the end of the conveyor and can still be used for other purposes. Currently, the system transports 70–90 stecklings per minute via the checkweigher. The system is designed to accommodate a maximum capacity of 110 plants per minute and is therefore "future-proof."

Mr. Elstgeest Junior, the current managing director, is very happy with the system: "With the Boekels checkweigher, we have been able to optimize and accelerate our production process. The system has functioned excellently and accomplished the necessary tasks from day one."

Reader Service Code: 074
Unexplored mysteries in reproductive biology –
In pursuit of the hidden family life of the common swift

The most elegant acrobatic fliers among our native birds are arguably the common swifts (Apus apus), which as insect hunters are extremely well adapted to life in the open skies. However, many details of the breeding biology and behavior of these unusual birds, which are a protected species, have not yet been explored. Several authors also describe a dramatic reduction in breeding populations of up to 50%. To be able to prevent a reduction in population, detailed knowledge of breeding biology is indispensable. However, common swifts spend most of their lives in the air and must fly approx. 10,000 air miles each year just to get to their winter quarters in Africa. With their long, sickle-shaped wings, the birds achieve top speeds of 180 km/h. As typical breeding birds of urban habitats, common swifts can also be sighted in the city of Goettingen during the summer months, and are available for scientific studies in breeding biology only during this brief period.

Through the financial support of sponsors, it has now been possible to fill several gaps in our knowledge about the breeding biology of the common swift as part of a pilot study at Humboldt University of Berlin. But there still remain many questions to be answered.

The pilot study was conducted at the Museum of Natural History, a central institute of Humboldt University. While breeding and rearing the young in 2003, a first attempt was made to create a continuous record of the daily and feeding activity of a common swift pair by using electronic measuring devices. A nesting box was equipped with a precision electronic balance from Sartorius AG, an LP2200 with 10-mg readability. The balance continuously recorded the body mass of the adult birds as well as the amount of food intake. Simultaneously, the entrance to the box was monitored with a transponder antenna, which identified each of the adult birds. Every two seconds, a special measurement program recorded synchronously all incoming weight and transponder data. The nesting box temperature was measured daily using an electronic thermometer. In addition, the activity in the breeding cavity was monitored using an infrared camera, transmitted to the Internet and recorded. A selection of photographs taken in 2003 can be viewed at http://museumwww01:55081/user/home-page/test/ppt_home.asp?name=ruediger.becker. This year (2004), the web camera will be there live beginning in early May.

By means of this special measurement system, it was possible to investigate the breeding behavior, feeding frequency and amount of food consumed by each of the adult birds. Parallel to automatic nesting box monitoring, the development of the young birds was recorded in a 24-hour cycle by weighing and photographing.

Based on the detailed data material and interesting photographs of the behavior of the birds, the project managers at the Museum of Natural History and the University of Berlin evaluate the pilot project as extraordinarily successful. The project was also very favorably received by environmental organizations, e.g. NABU (German Nature Conservation Society) and by the general public.
EU expansion
Effects on balances and scales verified for legal metrology

When the countries comprising Poland, Hungary, the Czech Republic, Slovakia, Slovenia, the Greek part of Cyprus, Malta, Lithuania, Latvia and Estonia join the EU as full-fledged members on May 1, 2004, EC directives will apply throughout these countries as well. These directives include the ones relevant to us on electromagnetic compatibility (EMC), low voltage and on verification of non-automatic weighing instruments, among others. These directives apply to production and sales and marketing.

Concerning the directive on non-automatic weighing instruments, the following will apply in all the new EU members besides the member states:
- All existing EC type-approval certificates issued for Sartorius AG and GWT in Hamburg, Germany, will be recognized.
- Initial verification performed by Sartorius in production or by one of our authorized representatives on-site for Sartorius weighing instruments can now be extended to the new member states.
- The WELMEC gravity concept for adjusting an instrument to the gravity zone (acceleration of gravity) of the intended place of use (with specific reservations) will apply.
- The places of use in which weighing instruments verified for legal metrology are needed are identical in all EU countries; i.e., national type approvals no longer need to be applied for in the respective new member states. Instead, weighing instruments verified by Sartorius are also considered verified for legal metrology in these countries without having to involve the authorities. Please note, however, that not all staff who work at government offices in these countries are familiar with this arrangement!

If national type approvals exist for our -0CE equipment manufactured for these countries, such approvals need no longer be used, and new verification marks no longer have to be affixed on-site on the national type-approval certificates. Our verified equipment versions that are generally provided and defined for the EU are permitted to be operated in legal metrology in the new member countries. The only requirement is that the seals may not be broken.

For more information, please contact Mrs. Veronika Martens at Sartorius AG (phone in Germany: +49.551/308-3387)
Private enterprise leads the way in promoting new jobs

Jessica Schanz completed her training as a physics laboratory assistant at the German Institute of Physics and Legal Metrology (PTB) in Braunschweig. In 2003, she found a special sponsor: the German scale industry is financing her job for one year. In response to spending cuts by the German federal government, the scale industry is setting an example for the initiative of private enterprise.

The German scale industry has enjoyed many years of successful collaboration with the PTB in matters concerning legal metrology, particularly in the field of mass. The news of drastic cuts in federal funding burst upon the industry right in the middle of the 25th PTB symposium, which addressed the theme: “Metrology in Weighing Technology: Yesterday, Today and Tomorrow.” The announced spending cuts will affect the more than 150 trainees at the PTB and, as a result, not one of them can be certain of finding a job at the PTB on conclusion of their training.

The scale industry reacted spontaneously to this disastrous news. The executive board of the German Engineering Federation (VDMA) decided to fund a position at the PTB for one year for a graduate of the PTB training program. On December 5, 2003, the check was presented that would sponsor the chosen laboratory assistant, Jessica Schanz, for one year. On the one hand, this funding from the scale industry is intended to open up future prospects for qualified young technicians. On the other hand, the industry hopes to see the PTB, and especially its weighing technology working groups, maintain their decisive role in metrological certification and legislation publishing in Europe and around the world, in spite of federal spending cuts.
Linking the kilogram to atomic mass

By means of the PTB’s gold ion experiment, the atomic mass of gold was determined in the basic SI unit, the kilogram. In future, this experiment might lead to a change in the definition of the kilogram, in that the kilogram may no longer be related to a prototype, but rather to an atomic mass and thus refer to a physical constant.

Comparisons between international and national kilogram prototypes as well as the reference standard of the French “Bureau International des Poids et Mesures (BIPM)” have shown that, over the last 100 years, changes in mass have occurred in the range of 50 µg. Thus, a change in the mass of the international kilogram prototype cannot be ruled out either. In order to demonstrate these changes, it is necessary to have a sufficiently accurate comparison of the kilogram in relation to a physical constant. Therefore, the aim of the PTB’s ionic accumulation experiment was to determine the link between the atomic mass unit and the kilogram with a relative uncertainty of approximately 10⁻⁸. This knowledge would pave the way for a new definition of the kilogram.

In the experiment, ions from an ion beam were captured in an ion collector. During this process, the amperage of the ion beams and the accumulation time were measured, and the mass of the ions accumulated was determined. Based on this information, in addition to the known relative atomic mass and elemental charge, the atomic mass unit could be established. An ionic current of around 10 mA should accumulate a mass of 10 g of a heavy element – a process that was to take about 6 days.

In the first accumulation experiment, gold ions were collected on a gold-coated quartz balance in order to determine the atomic mass of gold in the basic SI unit kilogram with a deviation of 0.6% from the expected value and with an uncertainty of 1.5%. The accumulated mass was approximately 0.5 mg at an ionic current of 0.01 mA and an accumulation time of eight hours.

To increase the ionic current, a new setup was meanwhile used to generate total ion beams (xenon and gold) with an amperage of over 60 mA, although the percentage of gold ions was only equivalent to an amperage of 0.8 mA. Since this amperage was still insufficient, a new ion source will have to be used in future, in which a bismuth ion beam is generated using a furnace. Presumably, it will be possible to achieve the required amperage of at least 10 mA. The intent is to determine the mass of the accumulated ions using a symmetrical, equal-arm beam balance in a vacuum. This balance was developed at the PTB and is undergoing testing. The aim is to improve the current standard deviation of the balance from 3×10⁻⁹ kg to less than 1×10⁻¹⁰ kg. This should make it possible to determine the mass of approximately 10 g of accumulated bismuth with sufficient accuracy.

We would like to thank the PTB for giving us their kind permission to publish this article from “PTB news 03.3.” The author is Dr. Michael Gläser; phone in Germany: +49-531.592-1110; e-mail: michael.glaeser@ptb.de

Plan view of the experimental setup. Note the ion source and the mass separator (blue) in the background.
Why IFS and HACCP…?

So that you can sink your teeth into something good without worrying about the consequences!

Eating and drinking holds body and soul together... ...but can also make you ill.

In satisfying one of our most elementary basic needs, eating and drinking, we assume in the "civilized" world that we can completely trust in the quality of foods and beverages we buy or are served.

However, food scandals of the past years have clearly demonstrated that this is far from something we can take for granted. Nitro- phene in animal feed, glass fragments in baby food and BSE contaminated beef are just a few examples that have shaken the confidence of consumers and caused lasting economic damage to the industrial plants affected.

By far, the majority of food sales are rung up by discount markets and food chains. Strictly in quantitative terms, these are the sources entailing the greatest risk of distributing contaminated food. Given the growing number of new trade names and brands of food products, incidents of food-borne illnesses traced to these products naturally ruin the image of the stores distributing them and not the producers, as they usually remain in the background. However, the manufacturers themselves are the ones who are fully liable for the quality of their products.

It is all too understandable that in Germany, for instance, the Association of German Retailers is using its purchasing clout and establishing systems to ensure 100% quality assurance for hygienically impeccable production of foods.

As early as the mid-70s, the Food and Drug Administration in the USA adopted food safety programs called HACCP (Hazard Analysis and Critical Control Points). These concepts have also been applied in Europe for many years and represent a genre of "Good Manufacturing Practice" for the food industry. Independent institutes, besides veterinary testing laboratories affiliated with governmental agencies, have specialized themselves in monitoring the food safety of food and beverage production plants.

So far, the most widespread audit standard on the European continent is the British BRC, which the Association of German Retailers has further developed during the past two years. The result is the IFS – the International Food Standard. Since the beginning of 2004, the international retailer ALDI, for example, has only been accepting suppliers who have the IFS certificate.

The introduction of this new standard in the food industry has caused a considerable stir, but ultimately this method is in the interest of every individual consumer.

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