MCP/2015

UPDATE

NEWS OF BETTER PACKAGING

FOCUS

Packaging solutions for life science and healthcare products offer maximum flexibility

FURTHER TOPICS

Automation as a great opportunity
Luc van de Vel, Senior Manager of the MCP business unit, explains in an interview, which process stages can sensibly be automated

Maximum process reliability
Chamber machines with permanently heated sealing bar

MULTIVAC

Dear Reader,

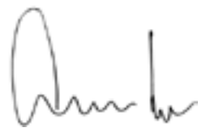
In recent years, we have built up an organisation in our MCP business unit (Medical Devices, Cosmetics and Pharmaceuticals), offering individual customer solutions for the automated, GMP-compliant packing of medical items, pharmaceuticals and biotech products.

Today our product portfolio comprises not just packaging machines, but also automation, labelling and marking solutions, which meet the widest range of requirements in the life science and healthcare industry. In addition to this, we also offer services such as calibration and qualification of our packaging solutions as well as procedure validation. New packaging solutions can be tested, or machine acceptances and initial sample productions carried out, in our cleanroom at our headquarters in Wolfertschwenden.

So that we can optimise the service to our customers even further, we will continue to invest in future in the expansion of our resources and equipment portfolio in the MCP business unit.

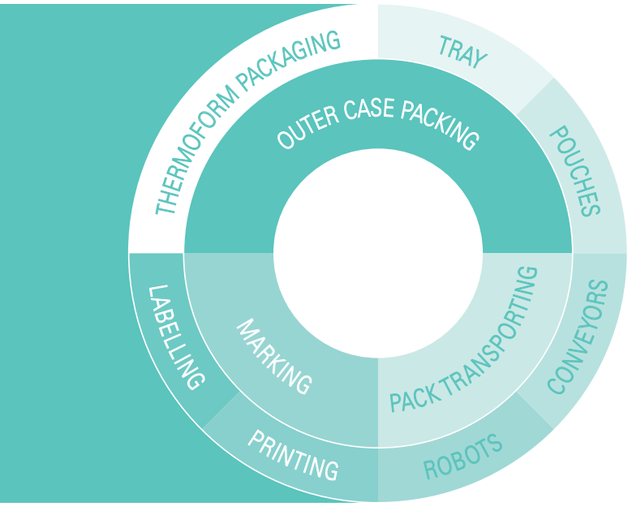
The highlights in this year's trade show calendar include ACHEMA and COMPAMED. There, we will be showcasing innovations covering all aspects of the packaging, inspection, labelling and marking of medical and pharmaceutical products. Among the exhibits will be a new compact thermoforming packaging machine for packing products in small batches, as well as a thermoforming packaging machine in the MULTIVAC Clean Design™ for packing sterile medical items to GMP standards.

We have put together these and other topics for you in our first UPDATE edition focusing on the life science and healthcare industry - I wish you a lot of enjoyment while reading it.



Yours sincerely,
Hans-Joachim Boekstegers

< **Hans-Joachim Boekstegers** | Managing Director and CEO of MULTIVAC



FOCUS

FURTHER TOPICS

INNOVATIONS & PRODUCTS

PACKS FROM AROUND THE WORLD

CONTENTS

BEYOND PACKAGING

DID YOU KNOW?

Thermoforming packaging machines in the MULTIVAC Clean Design™ are designed for the special requirements of the pharmaceutical industry and they support a packaging operation that complies with GMP. Thermoforming packaging machines in the MULTIVAC Clean Design™ lead the field, particularly in regard to packaging quality, process reliability and cleanroom compatibility.

MULTIVAC BELGIUM ORGANISED AN OPEN HOUSE EVENT

Guests very welcome: From 2 to 20 March, MULTIVAC Belgium opened its doors for the second time to visitors for an Open House Event. Following a successful event that took place last year, customers and interested parties were invited this year over a period of three weeks to visit the showroom at any time and to learn about the latest developments from MULTIVAC. The focus was on the R 085 thermoforming packaging machine, the T 300 Skin and T 600 traysealers, the BASELINE L 300 labeller and various chamber machines, which all demonstrated the many different possibilities for meeting a wide range of customer requirements.

INTERNAL RELOCATION AT MULTIVAC RESALE & SERVICE

Internal relocation and reorganisation: MULTIVAC Resale & Service, the Service Center for second-hand machines, overhauls and conversions, relocated its departments in the Spring of this year. Due to the expansion in recent years, it has become necessary to reallocate the production areas. Storage halls 4 and 5 have already been converted to production halls. The manufacture and overhaul of dies, together with PTFE coating and wiring, have been brought together in the "Die assembly department" in Halls 4 and 5. Machine pre-assembly and final installation have been merged into the "Machine construction department" in Halls 1, 2 and 3.

MULTIVAC CHILE AND MULTIVAC BOLIVIA MOVE INTO NEWLY REFURBISHED PREMISES

Conversion completed: The daughter company in Santiago de Chile was modernised in 2014. As part of this, the major part of the company premises was redesigned. Not only were existing areas renovated during the conversion, but also new workplaces and communal areas were created. The work was completed in December 2014. The building was equipped in 2006 for around 20 staff, and it now offers space for 62 people, as well as an optimised warehouse area. Conversion also took place in October 2014 at MULTIVAC Bolivia in Santa Cruz de la Sierra. The Bolivian subsidiary has a showroom, spare parts warehouse and a number of workplaces over a total surface area of 100 square metres.

MULTIVAC SYMPOSIUMS FOR THE LIFE SCIENCE AND HEALTHCARE INDUSTRY

Lectures, workshops and networking: In 2014, in association with other market participants, the MCP business unit (Medical Devices, Cosmetics and Pharmaceuticals) organised various technical symposiums for interested parties from the life science and healthcare industry.

The events took place in China, Malaysia, Thailand, Russia and Mexico. On the agenda were technical presentations and workshops covering all the latest trends and developments in the sector - with a focus on innovative packaging solutions, packaging materials and sterilisation. The participants also greatly appreciated the opportunity to exchange technical knowledge and to network with other representatives from the sector.

THE MULTIVAC FACTORY IN LECHASCHAU CELEBRATES ITS 40TH ANNIVERSARY AND OPENS A NEW TRAINING CENTER

Double reason for celebrating: On the occasion of its 40th company anniversary, MULTIVAC Maschinenbaugesellschaft in Lechaschau issued an invitation at the beginning of November to a celebration, as part of which the newly constructed Training Center was officially inaugurated. The new building has a surface area of 1,000 square metres, and it has enabled the apprentice workshop and laboratory for mechatronic technicians to be extended. This means that 20 additional training places can be offered. "It is our aspiration to meet the constantly rising demand in the high-technology area with our own personnel. It is for this reason the training of our own skilled technicians has always had a high priority for us", says Andreas Schaller, CEO of MULTIVAC Maschinenbaugesellschaft in Lechaschau. "We want to enable our apprentices to have a training qualification in state-of-the-art workplaces. Thanks to the newly constructed Training Center, we can optimise the training opportunities and offer additional apprenticeship places".

MULTIVAC DONATES TOMBOLA PROCEEDS TO SOCIAL INITIATIVES

In 2015 MULTIVAC also donated the proceeds from its traditional Christmas tombola to two charitable associations in the Allgäu. Christian Traumann, CFO of MULTIVAC, handed over the donation at the end of March at the company's headquarters in Wolfertschwenden.

The donations, in the total amount of 3,500 euros, benefited the Allgäuer Hilfsfonds e.V. aid fund and the regional Allgäu branch of the accident assistance organisation, Johanniter-Unfall-Hilfe e.V. The two organisations were suggested by the MULTIVAC Works Council. Crucial to this decision was not only their regional presence, but also the fact that they do not receive any state aid for their charitable work. "We would like to recognize and support the important work of these social initiatives with our donation. They become involved in many different ways on behalf of people in our region, who have fallen into hardship and need help," says Christian Traumann.

Handing over the tombola proceeds (from left to right):
Jessica Ihm, MULTIVAC's youth and apprentice representative; Peter Hausmann, Chairman of MULTIVAC's Works Council; Markus Adler, member of the regional board of Johanniter in the Allgäu; Christian Traumann, CFO of MULTIVAC; Katharina Lang, MULTIVAC's youth and apprentice representative; Simon Gehring, Treasurer of the Allgäuer Hilfsfonds; Manfred Schafroth, Head of Personnel at MULTIVAC

TEN YEARS OF MULTIVAC IN SOUTH AFRICA

Anniversary celebrations: Together with selected media representatives, customers and suppliers, MULTIVAC South Africa celebrated ten years of its existence at its headquarters in Heidelberg in South Africa, in April. The daughter company has grown continuously in the last decade, and today it is also represented by subsidiaries in Cape Town, Durban and Namibia. "We owe our success in South Africa primarily to our committed staff, who always offer our customers an outstanding service", summed up Alex Ferguson, Managing Director of MULTIVAC South Africa.

Turning the first spade of earth at an official ceremony for the new Logistics Center (from left to right):
Daniel Schmid, architect at ds-architektur und stadtplanung; Christian Traumann, CFO of MULTIVAC; Karl Fleschhut, Mayor of Wolfertschwenden; Michael Kolbe, Minister of the Evangelical Church Community of Woringen; Hans-Joachim Boekstegers, CEO of MULTIVAC; Hans-Joachim Weirather, Chief Administrator of the Unterallgäu district; Guido Spix, CTO of MULTIVAC; Peter Groll, Managing Director of Kutter

MULTIVAC UK STARTS A LARGE CONVERSION PROGRAM

Improved equipment for more customer benefit: MULTIVAC House in Rivermead Swindon has been revamped several times since the company first moved into it in the late 1980's. As part of a new modernisation program, which has been running since February 2015 and which involves an investment of two million pounds, a facility is to be created that is unique within the UK packaging industry. After the conversion has been completed, the premises will have facilities that no other market participant currently has. The first phase of conversion is due to be completed in July 2015.

As part of this phase, the training facilities will be expanded with an investment of around one million pounds. Among other improvements, this will include the equipping of upgraded training rooms and a dedicated room for practical training, as well as providing these with the latest audio-video technology.

The Innovation Center will also be equipped with a dedicated test kitchen, extended trial and demonstration areas, and a chilled packing room. This room will significantly expand the options for carrying out packaging tests. It will be possible to completely control the room temperature, and there will also be a hygiene gate like those that are typical in the food sector, as well as a changing room and a cold store for food. This means that the room will also be able to be used for shelf life tests and for producing sample products that can be consumed.

The second phase of the conversion program will see the revamping of the offices for a growing number of staff. In future MULTIVAC UK is planning to regularly open its doors to visitors, who will be able to learn all about the MULTIVAC products on offer.

MULTIVAC BUILDS A NEW LOGISTICS CENTER IN WOLFERTSCHWENDEN

Realignment of the logistics concept: At the end of October, the MULTIVAC Management Board turned the first spade of earth at an official ceremony for a new Logistics Center in Wolfertschwenden. The investment amounts to 11.9 million euros. The Logistics Center will have a surface area of 5,400 square metres, and it will be equipped with the latest and most efficient warehouse systems. Completion is planned for the end of 2015. "With this investment, we want to further optimise the spare parts supply to our 17 European daughter companies", explains Hans-Joachim Boekstegers, CEO of MULTIVAC. "One of MULTIVAC's success factors is the fact that we provide a seamless spare parts supply worldwide for our installed machines. When the new Logistics Center comes into operation, we will be able to further optimise the availability and delivery times for our spare parts. At the same time there will be benefits in the supply of materials for the manufacture of our packaging machines here at the Wolfertschwenden location." The new Logistics Center is the first step in the realignment of the logistics concept, and further centers in other regions are in the planning stage.

FOCUS ON DIVERSITY: PACKAGING SOLUTIONS FOR MAXIMUM FLEXIBILITY

THERMOFORMING PACKAGING MACHINES HAVE LONG BEEN ESTABLISHED FOR PRODUCTS IN THE LIFE SCIENCE AND HEALTHCARE INDUSTRY. MULTIVAC HAS DEVELOPED A COMPREHENSIVE PORTFOLIO OF THERMOFORMING PACKAGING MACHINES AND OFFERS ITS CUSTOMERS THE HIGHEST POSSIBLE LEVEL OF FLEXIBILITY.

Trend towards ever smaller batch sizes

The medical and pharmaceutical sectors have changed over recent years in several aspects. Changing regulations, shorter life cycles for products and the transition to just-in-time production have resulted in ever smaller batch sizes being produced. At the same time, the industry is developing ever more complex and sensitive products and applications, which in some cases are even tailored to individual patients. Many life science and healthcare products are therefore being packed in ever smaller batches in order to be able to meet regional and statutory specifications. These trends require thermoforming packaging machines to be capable of being converted quickly and easily to other pack formats, sllowing for short set-up times to always be achieved.

MULTIVAC can fulfil these requirements with its thermoforming packaging machines. The range extends from small machines, such as the R 081 entry-level model for packing products in small batches, right up to high-output machines, which can be augmented with additional components in a highly flexible way, such as GMP-compliant thermoforming packaging machines in the MULTIVAC Clean Design™. This machine enables the integration and arrangement of different modules to be individually designed to the individual customer requirements. In addition to this, the machine concept can be designed so flexibly that products, such as ampoules and syringes, can be packed as well as combination packs or auto-injectors. Since it is all about a quick and reproducible format change when it comes to small batch sizes, the machine is equipped with the proven drawer system for changing the forming and sealing dies. The changing of the cutting tool in the complete cutter has also been simplified, allowing the conversion time of the machine to be reduced to a minimum.

Widest range of packaging materials can be run

Flexibility should also extend to running different packaging materials. Different materials are used depending on the product requirements, such as protection against mechanical impact, moisture or oxygen, or on the sterilisation requirement of the pack: these can be rigid or flexible films, as well as paper and aluminium composites or Tyvek®.

MULTIVAC's thermoforming packaging machines can be designed in such a way that they can be used for a wide range of different packaging materials. A machine can, for example, be equipped with different cutting units for rigid and flexible films, allowing the conversion to another film material to be made considerably easier.

Flexible integration into existing production environments

Packaging lines must also be flexible when it comes to their integration into existing production environments, and they must permit individual modules to be arranged with flexibility. Particularly in the case of cleanroom environments, it is always a question of the best possible use of space.

MULTIVAC's machine concept is designed in such a way, that it can be adapted ideally to the customer's space requirements. One example of this is the fact that the machine can be delivered with a running direction from right to left or from left to right. The film unwinds and the infeed or discharge of products can also be positioned in a flexible way so that the footprint of the machine is optimised. The systems can be configured so flexibly, that the relevant modules can be installed in the cleanroom while the equipment for the subsequent procedures is located in the adjoining low-risk area.

In order to meet the requirements of products whose life cycles are becoming ever shorter, MULTIVAC's

R 081 THERMOFORMING PACKAGING MACHINE

Cut-off length (mm)	< 300
Forming depth (mm)	< 80
Output (cycles/min)	< 15
Hygiene standard	Clean Design™

GMP THERMOFORMING PACKAGING MACHINE

Cut-off length (mm)	< 600
Forming depth (mm)	< 120
Output (cycles/min)	< 20
Hygiene standard	Clean Design™

thermoforming packaging machines can be converted at any time if required thanks to their modular construction. The layout of a machine can, for instance, be designed from the start in such a way that later conversion is possible without any problems, or that modules can be added at a later date - e.g. if product loading is initially to be manual but then automated later.

Integration of identification and inspection components

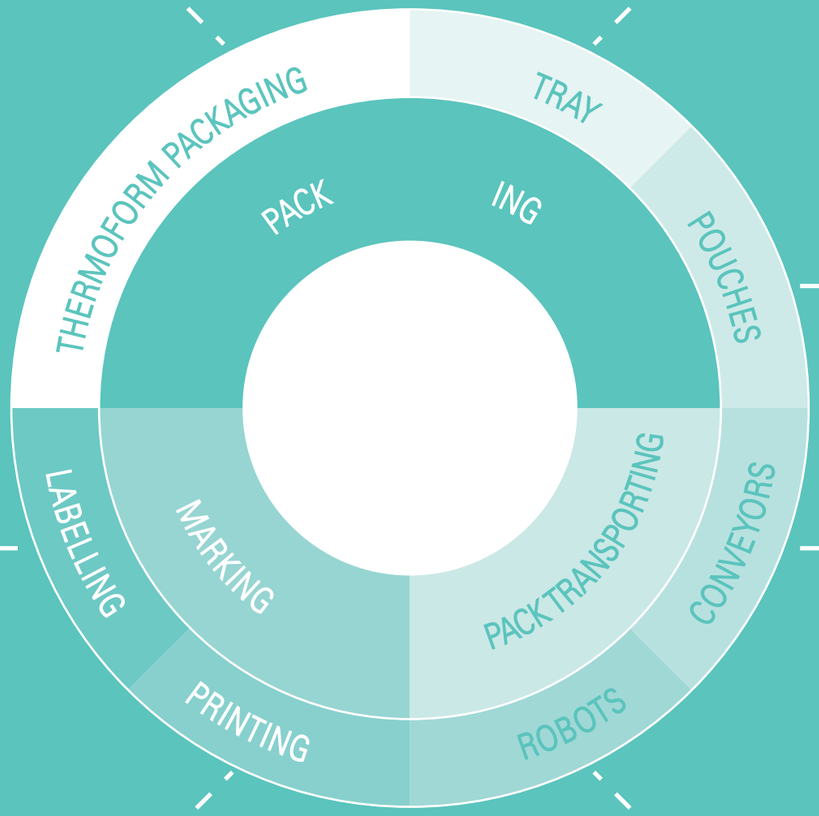
The labelling or marking of pharmaceuticals and medical or biotech products, for example printing with serial barcodes for checking authenticity or as a traceability marking, is now standard in many countries. It is therefore essential to be able to integrate components such as printers, labellers and inspection systems easily and reliably.

The systematically modular construction of MULTIVAC's thermoforming packaging machines enable identification and inspection solutions to be integrated and retrofitted easily. If a change is required to the pack, for example new labelling due to a statutory change, a new component can be added to the existing packaging line in a flexible way. One example of this is the UDI marking (Unique Device Identification) of medical products, which enables them to be traced and therefore aids patient safety.

Inspection systems, such as visual or mechanical monitoring sensors, also ensure that the packs contain the required content and that it is in a faultless condition. They can check the presence and position of the product in the pack, as well as the legibility and correctness of codes and text on a label. Thanks to the implementation of track-and-trace solutions, the serialisation and marking requirements for pharmaceutical products can be met in full. Security against counterfeiting is increased by the printing of a unique code, which gives traceability throughout the entire production and supply chain.

MULTIVAC's machines offer a wide range of options for the input, output and evaluation of data, as well as for integrating printers, labellers and inspection solutions into the machine control, so that the operator can operate all the components conveniently via the touchscreen of the packaging machine.

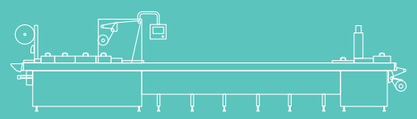
Tyvek® is a registered trademark of E. I. du Pont de Nemours and Company.

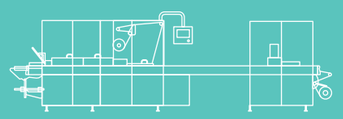



R 245 / R 535


R 145


R 081

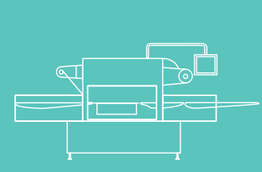

R 900


R 245 / R 535


T 200 / T 250


T 260 / T 260 C

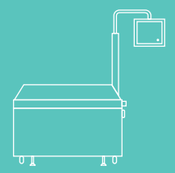

T 300


T 700 / T 800

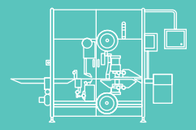

C 200TC


C 300TC


C 400TC


C 700TC


AGV TC

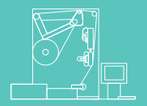

MR 3xx / MR 4xx


L 310


L 300


IL 110


STP 20

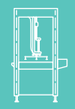

MR 2xx


TTO 05 / 10 / 20


MBS


MCS


H 052


H 100 / H 130


H 242

COMPACT MODEL FOR MEDICAL AND PHARMACEUTICAL APPLICATIONS

R 081 THERMOFORMING PACKAGING MACHINE

WITH THE NEW R 081 THERMOFORMING PACKAGING MACHINE, MULTIVAC IS EXPANDING ITS PORTFOLIO WITH AN ENTRY-LEVEL MODEL FOR PACKING PRODUCTS IN SMALL BATCHES. THIS MACHINE IS ALSO SUITABLE FOR USE UNDER CLEANROOM CONDITIONS.

The R 081 is equipped with electrical lifting units, which provide increased sealing forces and optimised distribution of sealing pressure. This enables a consistently high level of seal quality and increased pack security to be achieved.

High level of packaging material and format flexibility

The new compact model can run flexible and rigid films, as well as paper-based packaging materials and Tyvek®. Vacuum packs and modified atmosphere packs with reduced residual oxygen content can be produced.

Thanks to our proven slide-in technology, the forming and sealing dies can be changed easily, quickly and reproducibly. This means the R 081 can be used for the efficient packing of a wide range of products in small and medium batch sizes.

The R 081 is available in different nominal machine widths, enabling formats to be laid out flexibly. The machine can be equipped as an option with various printing, labelling and monitoring systems. It is also possible to have manual advance of individual cycles with a foot switch, where products are being loaded by hand.

Tyvek® is a registered trademark of E. I. du Pont de Nemours and Company.

LOW-PARTICLE CUTTING OF THE HIGHEST QUALITY

PRODUCT INNOVATION: COMPACT R 145 THERMOFORMING PACKAGING MACHINE WITH COMPLETE CUTTER

MULTIVAC NOW OFFERS THE COMPACT R 145 THERMOFORMING PACKAGING MACHINE WITH AN OPTIONAL COMPLETE CUTTER (KPS). THIS ENSURES THE THERMOFORMED PACKS HAVE A VISUALLY ATTRACTIVE CUT CONTOUR AND ARE SEPARATED FROM THE RIGID FILM IN A LOW-PARTICLE CUTTING PROCESS.

Contrary to the conventional cutting of packs, the individual cutting lines with KPS are not made in sequence one after the other, but rather in one single process stage. "Complete cutters are primarily suited to applications where rigid film is run in conjunction with upper webs made of paper or Tyvek®", says Verena Weiss, Product Manager for the MCP (Medical, Cosmetics and Pharmaceuticals) business division, explaining the advantages of this technology. "The quality of the cut edges is higher and fewer particles are released during the cutting process."

Complete cutter operation depending on the production output

There are several possibilities for the layout of the complete cutter operation, depending on the cycle output of the machine: in the case of low output, the packs are cut out individually "one by one". This operation has the advantage of no trim waste between the packs. In the case of medium output, the complete cutter cuts out all the packs in one track at the same time. They are then subsequently converged. The third possibility is to separate several pack tracks and rows at the same time with one complete cutter. This operation is usually used for higher production outputs.

Tyvek® is a registered trademark of E. I. du Pont de Nemours and Company.

PACK SENSITIVE PRODUCTS SECURELY

PRODUCT INNOVATION: COMPACT TRAYSEALER FOR SMALL BATCHES

MULTIVAC HAS DEVELOPED A COMPACT VARIANT OF THE T 260 TRAYSEALER, WHICH IS SPECIALLY DESIGNED FOR PACKING SENSITIVE PRODUCTS IN SMALL BATCH SIZES. THE USER-FRIENDLY PACKAGING SYSTEM IS SUITABLE FOR CLEANROOM USE AND ENSURES THAT THE PACKAGING PROCEDURE IS SECURE, REPRODUCIBLE AND TRACEABLE.

The compact model, which is mobile and can therefore be used very flexibly, is designed for a wide spectrum of trays. The GMP-compliant stainless steel construction meets all the requirements of the medical and pharmaceutical industries with regard to cleanroom compatibility and ease of cleaning. Thanks to its small space requirement, the T 260 is also ideally suited to use where space is limited. The loading and unloading of the T 260 can also be automated as an option.

Increased pack security

The new model offers a high level of measurability and reproducibility which means it contributes significantly to process reliability. It can also be calibrated and validated. The sealing die ensures controlled sealing pressure with high sealing forces and precise temperature distribution.

MULTIVAC's proven IPC control enables the entire packaging procedure to be monitored and controlled, as well as enabling scanners and printers for data communication to be integrated. Critical parameters such as sealing pressure, cooling water and temperature are monitored permanently by sensors. Batch data is documented in the batch report in the form of clear data recordings. The process sequences are visualised on the user-friendly HMI.

Quick format changes can be achieved reliably and without problems, allowing the T 260 to be used for the efficient packing of a wide range of products in small and medium batch sizes. In order to make the quick and ergonomic die change even easier, MULTIVAC offers an appropriate die changing trolley, which can be equipped as an option with a service unit.

AUTOMATION AS A GREAT OPPORTUNITY

The degree of automation in packaging procedures has a significant influence on their efficiency, reliability and traceability. Luc van de Vel, Senior Director of the MCP business unit (Medical Devices, Cosmetics & Pharmaceuticals), explains in this interview how individual process stages can be automated sensibly, and which solutions MULTIVAC offers its customers in the area of automation.

Mr van de Vel, which topics are the focus of your MCP business unit today?

Product protection, pack functionality, process reliability, traceability and transparency have the highest priority when it comes to packing sensitive and high-value life science and healthcare products. The packaging machine itself is a central constituent part in an increasingly more complex system solution, which can be complemented by perfectly matched infeed systems, handling solutions, labelling and printing systems, as well as inspection solutions. Running parallel to this, the requirement for frequent format changes and the increasing individualisation of pack content and marking demand a high level of flexibility.

Before we look at the individual needs of your customers, let's first cast a glance at the products themselves. Which products are typically packed on automatic packaging solutions?

Our machines are perfectly designed for packing sterile medical products, such as syringes, implants, infusion sets, catheters, drapes, dental drills or stents, and also of course for running the special packaging materials that are necessary for these products. Our packaging solutions can also automatically pack highly sensitive pharmaceuticals and bio-pharmaceuticals in ampoules, vials or injectors, as well as diagnostics and clinical research products.

Which parts of the packaging procedure are particularly suitable for automation, in your opinion?

It is primarily in the areas of product loading, orientation and transport that significant potential for optimisation can be exploited, even if many users consider it very sensible to be able to also manually load or add products where required. Flexible gripper systems can be designed for the widest range of products, and they can transport these without damaging them - an important factor when it comes to quality and process reliability. It is always a question of preventing mechanical and visual damage to the product and the packaging, as well as to the labelling or flag label. An undamaged print image is also essential for the legibility of codes and information on labels. The grippers ensure there is optimum orientation and placement of products in the pack cavity. If despite this, faults still occur, for example if one part is missing or several products are gripped at the same time, then this can quickly be corrected.

< **Luc van de Vel** | Senior Director of the MCP business unit (Medical, Cosmetics & Pharmaceuticals)

High demands are placed on packaging machines in this sector ...
Flexibility, process reliability and cleanroom compatibility are among the most important aspects. Thanks to their design and the materials used, our packaging machines meet all the relevant quality requirements. All areas are easily accessible, and their smooth surfaces and rounded edges make reliable cleaning easy. Customers also expect the machines to be designed in such a way that products are not lost. The circulation of particles during the packaging procedure must also be prevented. This means there must be stability, even in movements and minimal vibration during machine operation.

Are needs-based reject functions particularly important?
Yes, since in the area of sensitive medical and pharmaceutical products, it is essential to check and count the rejects and then eject them from the procedure before the loading operation takes place. The ejection system should follow the "good philosophy" principle, and the entire procedure should be accompanied if possible by intelligent mechanisms, such as fail-safe. It is also essential to have lockable film trim containers outside the machine for security reasons.

The permanent, seamless measurement and traceability of all the relevant process parameters are of central importance. Can you briefly outline the scope of the requirements and the possible solutions for these?
Counting systems for infeed, outfeed and ejection form the basis for a transparent packaging procedure. Vision systems can be used for presence checking, as well as code readers for functional monitoring of one- or two-dimensional codes. It is primarily the unique marking and identifiability of products over the entire added-value chain that is currently of enormous importance to companies in the pharmaceutical industry. The medical sector will also have to get to grips with this topic in future. This is because their products will also have to be marked in a staged process up to 2020 to comply with the law, as part of the mandatory worldwide introduction of UDI control (Unique Device Identification) based on the risk factors of the particular product.

Your customers are also presumably focused on GMP conformity?
Absolutely. A GMP-compliant quality management system is enormously important for the pharmaceutical industry, just as it is for manufacturers of medical products. It serves not only to meet statutory requirements but also to safeguard patient safety. Even the smallest deviations from the standards can have fatal consequences and endanger the health of consumers.

When it comes to the functionality and ease of operation of packaging machines, which aspects do you, as a manufacturer, have to take into consideration?
Here, the arc extends from issues such as even machine movements, through "run-empty" functions (i.e. the possibility of completely running the machine and infeed empty), right up to possible buffering in the event that the machine stops abruptly. Our customers are also exacting, when it comes to the subject of synchronisation: start and stop, overloading, automatic mode and manual, as well as "end-of-line" modes are all standard requirements. Just as is an IPC function (In Process Control), since it is beneficial in such highly industrialised environments to be able to remove samples without breaking into the packaging procedure directly and having to interrupt this.

Are there general requirements for the medical and pharmaceutical sectors?
The first priority is validation, since it has vital importance for every company. We, at MULTIVAC, offer a practically based package, which complies with GMP, GAMP5 and ISO guidelines, and which includes a validation plan, risk analysis, functional specifications, installation and operation qualification, as well as computer validation and local support. Other features are comprehensive service, reliable analysis of possible faults and effects, as well as detailed documentation of all parameters.

Mr van de Vel, you spoke about the various possibilities for automating the packaging procedure. Could you give us three examples of applications for product infeed?
One possible solution would be, for example, a bowl feeder. Products such as plastic syringes, needles or plungers are presented horizontally in one- or multiple-track formats. Another solution, on the other hand, is a transport conveyor on which loose products come to the packaging machine on a belt. Each product, such as a syringe, is then fed for manual loading in a carrier on a holding device or intermittent belt.

And last but not least, we should not miss out on a fully automated example ...
One such example that has already been implemented is a catheter pack where the products are loaded automatically into the cavities of the thermoformed packs:
After the lower web has been formed, a label with all the relevant information is applied to the underside of the pack cavity. The products, which in this case are a catheter and sachet, are presented one after the other in the loading station by means of a carrier. Suitable grippers, which are equipped with suction cups, then pick up the products and place first the sachet and then the catheter precisely into the pack cavity. A label for opening the pack is applied to the upper web before the pack is sealed. Pre-sealing ensures the catheter can not slip around in the pack. The upper and lower webs are then sealed, before the catheter packs are subsequently separated by a complete cutter. Finally grippers hold the packs under control while they are placed precisely into boxes.

Mr van de Vel, thank you very much for talking to us.

MAXIMUM PROCESS RELIABILITY: CHAMBER MACHINES WITH PERMANENTLY HEATED SEALING BAR

^ C 200TC

^ C 300TC

^ C 700TC

^ AGV TC

C 200 TC AND C 300 TC CHAMBER MACHINES

The C 200 TC and C 300 TC chamber machines have a usable sealing bar of 380 mm and are designed for products with a height of up to 100 mm.

As an entry-level model, the C 200 TC is equipped with the MC-10 machine control which fulfils all the standard requirements.

The C 300 TC uses the IPC control in conjunction with a HMI 2.0 user interface, which can be operated intuitively via a touchscreen. The integrated recipe memory and an optionally available RFID system for automatic recognition of the pouch holder increase the process reliability of the C 300 TC.

C 700 TC CHAMBER MACHINE

With a sealing bar length of 900 mm, the C 700 TC is the largest MULTIVAC chamber machine with TC sealing. Its chamber depth is 450 mm and it is suitable for products with a height of up to 120 mm. The IPC control can be extended with various additional functions, such as software for electronic recording and signatures to meet the requirements of FDA 21 CFR, Part 11.

AGV TC CHAMBER MACHINE

MULTIVAC also offers a chamber machine in the AGV TC, which is suitable for packing products vertically in film pouches. The filled pouches are placed on a roller conveyor in the chamber, keeping them from tipping over, meaning nothing can fall out of the pouch during the packaging procedure. The roller conveyor in the 600 mm wide chamber can be set to heights between 400 and 600 mm, allowing for quick and easy adjustments to different pack sizes. The sealing bar length is 500 mm.

For customers packing medical items and pharmaceutical products in film pouches, MULTIVAC offers GMP-compliant chamber machines with permanently heated sealing bars, ensuring a constant sealing temperature is maintained, and enabling a high level of process reliability and reproducibility to be achieved. MULTIVAC has expanded the portfolio of chamber machines with permanently heated sealing bars by an additional four models, fulfilling different requirements in regard to pack size and equipment options.

The most important requirement of packs for sterile medical items and pharmaceutical products is reliable protection against external influences. When packing in film pouches, it is necessary to have an unimpaired and permanent seal seam in order to maintain the sterility of the packed items.

The chamber machines, specially developed for the medical industry, ensure a high level of process reliability is achieved, and they are ideally suited to products, which are packed in small batch sizes. Typical products are implants, sterile medical products, diagnostics and other medical items, which must be packed under vacuum or in a modified atmosphere with controlled oxygen content. The chamber machines can seal a wide variety of pouch materials, including film and aluminium, as well as film composites with paper or Tyvek®.

Temperature controlled sealing bar for reproducible seal quality

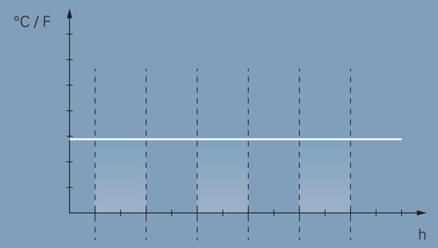
The suffix "TC" for chamber machine models with permanently heated, temperature controlled sealing bars stands for "thermo controlled". The temperature controlled sealing bar with these machines is a guarantor of a reliable packaging procedure and reproducible seal quality. All machines in the TC series can be calibrated and also validated, as well as meeting all relevant GMP, GAMP5 and ISO guidelines.

These machines are suitable for cleanroom use and are characterised by their closed housing with smooth surfaces for easy cleaning. They can also be used flexibly with a wide range of pouch materials. All models can be used to produce vacuum packs and modified atmosphere packs with controlled oxygen content. All the models in the TC series can be equipped with additional components, such as a barcode scanner or label printer.

The C 400 TC chamber machine and the C 500 TC double chamber machine have long been available for the packaging of medical products. Now MULTIVAC has expanded the portfolio with the C 200 TC, C 300 TC, C 700 TC and AGV TC chamber machines, in order to be able to meet the requirements of its customers even more efficiently.

OVERVIEW: SEALING SYSTEMS FOR POUCH PACKS

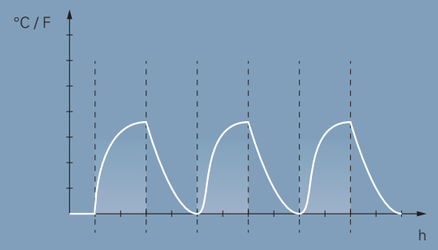
PERMANENTLY HEATED SEALING BAR (TC)



The **permanently heated sealing bar** (TC) is characterised by direct and permanent monitoring of the temperature of the sealing bar. The required sealing temperature can be defined in the machine control. The temperature is measured and controlled by two sensors, which keep it within a defined tolerance. This enables the sealing process to be monitored and controlled as well as being calibrated and validated.

ALTERNATIVE SEALING SYSTEMS WHICH CANNOT BE ENTIRELY VALIDATED AND CALIBRATED

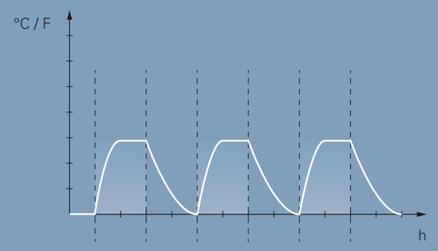
IMPULSE SEALING



Impulse sealing is usually installed in chamber machines, which are used in the food sector. The heated sealing bar is pressed onto the film pouch so that the sealing layers on the inside of the pouch fuse with each other. While the temperature in the heating band falls again, the mechanical pressure on the film pouch is maintained. This enables a stable seal seam to be created. However, temperature regulation is not possible.

Limits to the system: The process can neither be regulated nor calibrated. In addition to this, greater heating of the sealing bar in non-stop mode can lead to altered sealing results.

TEMPERATURE CONTROLLED IMPULSE SEALING (TI)



In the case of temperature controlled **impulse sealing** (TI), the system determines the temperature in the heating band by means of permanent resistance measurement and it controls this through adjustment of the current strength. Different temperature profiles can be created and saved in the machine control. This enables temperature controlled impulse sealing to deliver a higher level of reproducibility than impulse sealing. However, it can not be calibrated to the full extent.

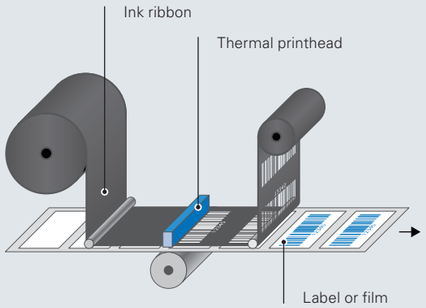
LABELLING AND MARKING SOLUTIONS FOR MEDICAL ITEMS AND PHARMACEUTICAL OR BIOTECH PRODUCTS

RELIABLE LABELLING AND PRINTING OF PACKS OF EVERY TYPE, SHAPE AND SIZE

THANKS TO ITS EXTENSIVE RANGE OF PRODUCT SOLUTIONS, MULTIVAC MARKING & INSPECTION HELPS USERS IN THE MEDICAL, PHARMACEUTICAL AND BIOTECH SECTORS TO MEET THE REQUIREMENTS OF THE RELEVANT LAWS AND QUALITY STANDARDS.

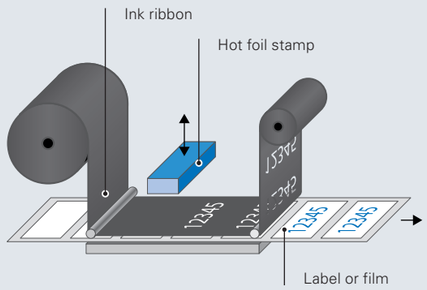
MARKING TECHNOLOGY

Thermal transfer printing



Print image

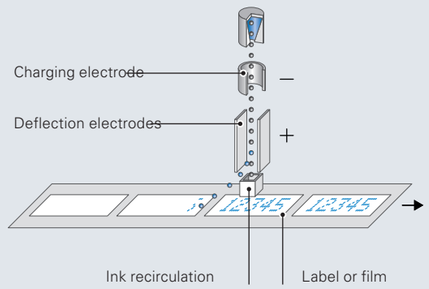
Hot foil printing



12345

Print image

Inkjet printing



12345

Print image

High-quality labelling and marking of pharmaceutical, medical and biotech products is becoming standard in a growing number of countries. Appropriate laws and regulations provide protection for patients by eliminating the possibility of mistakes, tampering and counterfeits, while ensuring clear identification and traceability along the entire supply chain. The labelling and marking systems, which are used in the manufacture of these products, must therefore fulfil very high requirements, when it comes to process reliability, ease of cleaning and reproducibility.

MULTIVAC Marking & Inspection, the Center of Excellence for labelling, marking and inspection technology within the MULTIVAC Group, has been implementing these specific sector requirements in close cooperation with customers for more than 40 years. Regarding its labelling systems, the range of products extends from cross web labellers, through transport conveyor labellers and link chain labellers, and right up to box labellers. These systems can be integrated in automated packaging lines or operated as stand-alone solutions. In addition to this, MULTIVAC Marking & Inspection also offers solutions for a wide range of printing applications, in which all the standard printing technologies such as hot foil, thermal transfer and inkjet are used.

The machines from MULTIVAC Marking & Inspection meet all the GMP quality standards. One of the many contributing factors is their design, with the rounded edges and smooth surfaces, which make cleaning easy. Their operation is completely integrated in the HMI 2.0 user interface, which is used on MULTIVAC's packaging machines. The linking of all processes in one packaging line, which is controlled centrally via one interface, makes overall operation more intuitive and efficient: for example, when a recipe is selected at the packaging machine, the configuration and print layout for the labeller are also loaded automatically. Such combined processes contribute to avoiding errors.

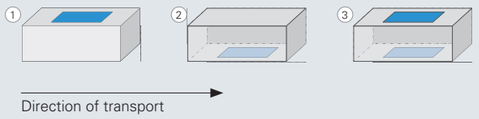
Additional benefits of this in-depth integration are easier cleaning, since the labeller's own control terminal and the necessary cables are not required, and also the automation of a large number of procedures. This is of particular significance given the increase in smaller batch sizes. The machine control ensures that there is constant process monitoring, data acquisition and traceability of the procedures. This means that every machine cycle can be read individually. These functions guarantee consistently high product quality and seamless quality assurance, as well as the track-and-trace function for meeting the serialisation and marking requirements of individual countries. The MULTIVAC HMI 2.0 guides the user intuitively through the processes, and it offers access levels via password protection in compliance with pharmaceutical industry standards. Protocolling in accordance with CFR 21 Part 11 is available as an option. The documentation of the procedure stages and their results is carried out in accordance with DQ, IQ and OQ, and there is a Factory Acceptance Test with documentation, as well as a Site Acceptance Test and PQ with documentation.

Solutions for thermoforming packaging machines: cross web labellers and direct web printers

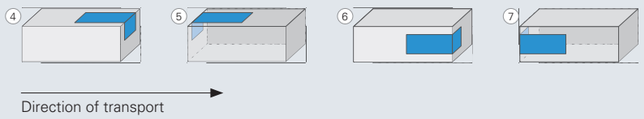
It depends on the packaged product and the type of packaging chosen, as to which labelling or marking system is used. In the case of thermoformed packs, cross web labellers are frequently used and are installed directly on the packaging machine. They apply labels with

DIFFERENT LABEL POSITIONING

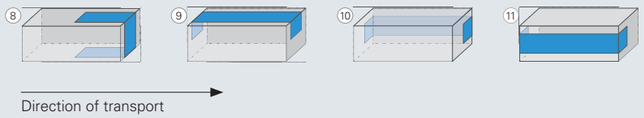
Labelling above/below



L labelling

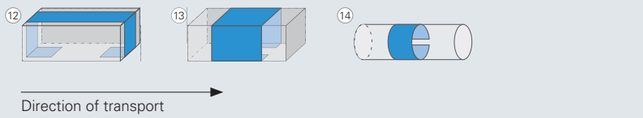


U labelling



C labelling

Wrap-around labelling



great accuracy to thermoformed packs - in the desired designs and formats, and they also print onto the labels if required. Thanks to their modular construction, these systems can easily be fitted onto all thermoforming packaging machines. MULTIVAC Marking & Inspection has continued to improve all aspects of its labellers, without changing the proven design principle. Examples of these improvements are empty pack detection (no product, no label), the track and trace function and pin pusher plates, which adapt perfectly to uneven product surfaces.

The security and convenience functions of the cross web labellers (e.g. empty pack detection, operation via the control terminal of the MULTIVAC packaging machine) are also available on the direct web printers. The design of all the printing systems has been matched completely to the design concepts of MULTIVAC's packaging machines. This applies to the protective devices, as well as to the hygiene design.

Machine example: MR296 direct web printer on a R 245

Many customers have equipped their R 245 thermoforming packaging machine with the MR296 TI direct web printer for printing the upper web. This combination is a cleanroom-compatible packaging solution, which offers complete process reliability and is specially tailored to applications in the medical and pharmaceutical sectors. The MR296 TI direct web printer with its thermal inkjet printer is ideally suited to multi-track packaging solutions. The information is printed directly on the packaging film of the product by the HP thermal inkjet process. This produces an exact print image.

The MR296 TI is equipped with a Wolke m600 printing system. HP thermal inkjet technology enables perfect coding on both paper and Tyvek® in a resolution of up to 600 dpi. Some of the benefits of HP thermal inkjet (TIJ) technology are minimal set-up times, low maintenance and long service intervals. The cartridges in the printer are very quick and easy to change. Operating in conjunction with the MR296 TI, the printing heads are sealed in the automatic parking position. This prevents the water-based and environmentally-friendly ink from drying out. The cleaning function also ensures, that the printing head secretes individual drops of ink in a selected position shortly before the actual printing, and in this way the press-on performance of the print head is improved after a printing pause.

Stand-alone solutions: conveyor belt labellers and link chain labellers

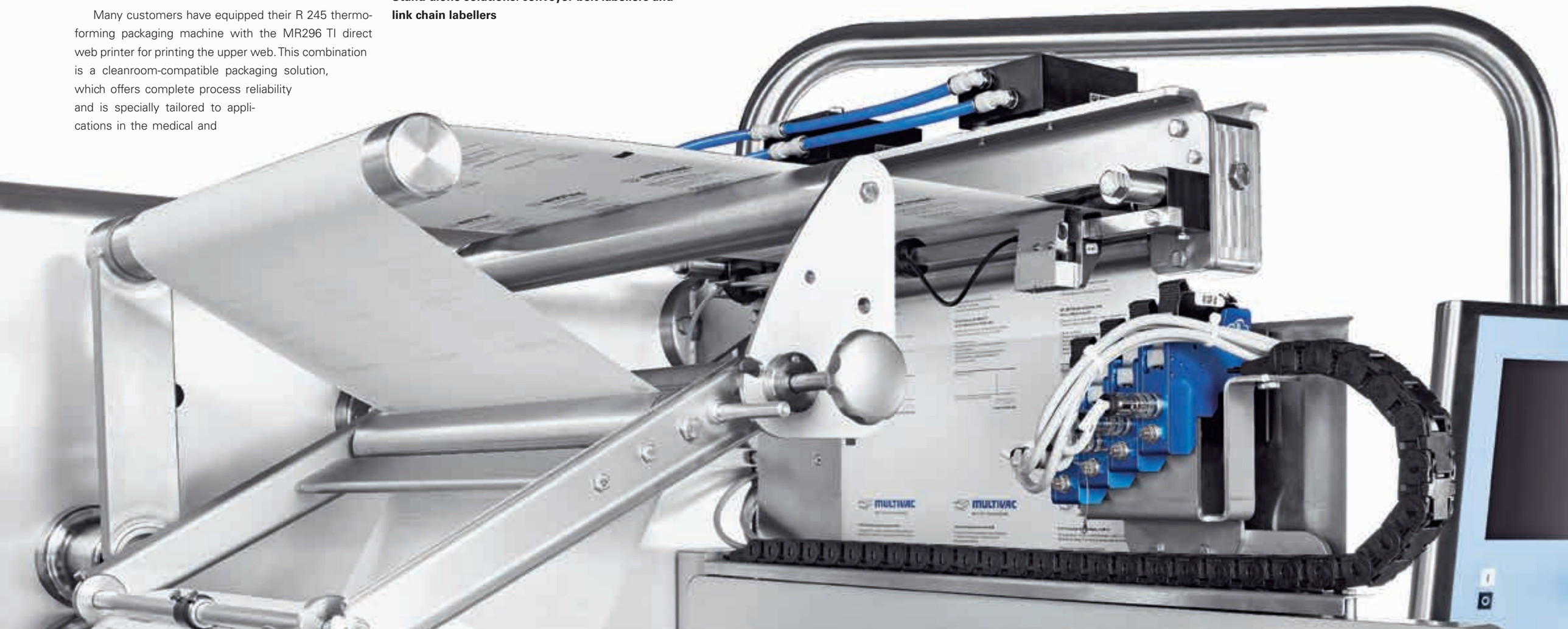
In the case of labelling after the packaging machine, the conveyor belt labellers and link chain labellers from MULTIVAC Marking & Inspection are the ideal choice. The infeed, transport and handling of the products, they are all constructed in a modular way. This means that they are so flexible, that they can label trays, thermoformed packs, cartons, small tubes or instruction leaflets. A wide range of transport solutions, spacing units, applicators and press-on devices ensure that the optimum machine, both technically and cost-effectively, is designed for every product shape and for every material. MULTIVAC conveyor belt labellers offer a high level of flexibility, when it comes to inspection solutions and printing labels. Print monitoring can be integrated, as can printers in all the standard printing processes, together with serialisation and track-and-trace functions as well as pharmaceutical monitoring devices.

The labelling systems for pharmaceutical products in particular are designed in a balcony type of construction, i.e. all the machine components sit on a mounting plate, allowing functions to be operated from the front. This means no niches or recesses, in which products can get lost. The labelling systems can be housed in enclosures to pharmaceutical industry standards.

Machine example 1: folding carton labeller

The folding carton labeller from MULTIVAC Marking & Inspection is one version of the conveyor belt labeller. This labeller is used to seal the closing tabs on folding cartons for medication in a tamper-proof way using sealing labels; in addition to this, the tabs can be printed with serial barcodes, which are being used in more and more countries around the world for authenticity checking and traceability marking. For this purpose, the folding carton labeller is equipped with a Wolke thermal inkjet printer. The top and bottom labelling output is up to 400 cycles per minute.

The presence of the sealing labels is monitored by means of a light barrier. Cartons without sealing labels



are separated out and ejected into a lockable reject bin.

Machine example 2: labeller for sealing closed folding products, e.g. instruction leaflets

The labeller takes the crimped or folded printed items from the upstream folding machine with the closed side leading. A belt conveyor then guides them to the labelling station where a label is applied from above onto the open side of the paper. The protruding half of the label is subsequently folded downwards in a U-shape by means of a press-on unit so the product is sealed closed.

Machine example 3: labeller with driven roller conveyor for labelling horizontal cylindrical products

Horizontal cylindrical products, for example small tablet tubes, are guided on a driven roller conveyor and fully or partially wraparound labelled. A label is first dispensed onto the circumference, then it is rolled around this by means of a driven top roll-on belt.

Machine example 4: link chain labeller for labelling stable bottles

The MULTIVAC link chain labellers are specially designed for the highly precise front and back labelling, or alternatively wraparound labelling, of cylindrical containers such as bottles or tubs. Bottles made of plastic or glass are transported on a link chain, enabling the bottles to move through the labeller, and on which if required they can also be queued. Link chain labellers are constructed in a modular way from a large number of standard components, allowing customised solutions to be ideally matched both technically and cost-effectively to the particular task and are simple to achieve.

The existing thermoforming packaging machine was at full capacity and the requirements of a new packaging line were extremely high. Automatic loading and packing of seven different syringe filters, short conversion times, tight pack tolerances, perfect cutting and, last but not least, reliable handling during the feeding and loading of boxes: these were just some of the challenges awaiting the MULTIVAC specialists at Sartorius.

The success story of Sartorius began in 1870 when Florenz Sartorius opened a small, precision-manufacturing workshop in Göttingen. Thanks to his short-beam analytical balance, he revolutionised work at that time in research laboratories. The basis for the industrial production of separation and filter technology at Sartorius was formed half a century later by the diaphragms developed by Richard Zsigmondy. Today the Sartorius Group is a leading international pharmaceutical and laboratory supplier, comprising the two divisions of Bioprocess Solutions and Lab Products & Services. In 2014, the technology company achieved a turnover of 891.2 million euros and currently has over 5,500 employees. The Bioprocess Solutions division comprises the focal areas of filtration, fluid management, fermentation and purification, and it focuses on production processes in the biopharmaceutical industry. The Lab Products & Services division is involved primarily in the manufacture of laboratory instruments and consumables. Sartorius has its own production sites in Europe, Asia and America, as well as sales subsidiaries and local agencies in more than 110 countries.

MAXIMUM PROCESS RELIABILITY AND FLEXIBILITY

SARTORIUS STEDIM BIOTECH GMBH RELIES ON A THERMOFORMING PACKAGING MACHINE IN THE MULTIVAC CLEAN DESIGN™

When it comes to packing its sensitive products, the company has been relying for years on packaging solutions from MULTIVAC. A R 230 thermoforming packaging machine had been used up to then for packing the Minisart® syringe filters, which are available in many different pore sizes and with various hydrophilic or hydrophobic diaphragm materials, and which are used to separate microorganisms and particles reliably from fluids, air and other gases. However, the packaging system was at 100 percent capacity. Lothar Brüggemann, Department Manager at Sartorius Stedim Biotech GmbH, explains more: “The current specifications for pack quality and cutting could no longer be met by the existing machine. It was also not possible to load all the filters automatically. Also the loading of the boxes via a simple filling station did not function properly.”

Sensitive products packaged safely

Before a new packaging solution was procured, there were many demands on MULTIVAC’s consultancy expertise. The new packaging machine had to be able to pack the various different filter sizes reliably and the boxes for the end-of-line packing had to be automatically filled. Lothar Brüggemann describes the requirements as follows: “The individual process stages had to be performed reliably - in other words, thermoforming of the PET lower web, loading of the filters, sealing of the Tyvek® film to the thermoformed lower web, marking of the upper web by an inkjet printer, and finally the placing of the counted products into a box. Process reliability and quality have absolute priority for us when packing, particularly at high throughput.”

Sartorius decided on the R 535 thermoforming packaging machine in the MULTIVAC

Clean Design™. Its GMP-compliant machine design enables it to be cleaned easily, while meeting the highest level of hygiene requirements. In the interests of reliable line clearance, the area for product processing is strictly separated from the area of the machine equipment. Transparent enclosures with large doors protect against environmental influences and, thanks to perfect overview of the process, they increase the security of the packaging procedure against any products being lost.

The thermoforming packaging machine, designed for high output and absolute precision, forms the core of the packaging line: the rigid film is thermoformed in the forming station, and the filters are then loaded automatically into the pack cavities. The lower web is sealed to pre-printed Tyvek®, which is then printed with batch data. The packs are cut into single packs by means of a complete cutter, and they are then placed automatically into boxes by a handling module. The space-saving H 051 stainless steel automation module was completely integrated for this purpose into the enclosure of the packaging machine. The 2-axis propulsion unit, which is equipped with dynamic linear motors, attaches its suction grippers to the packs while they are still in the complete cutter, and it then picks them up and places the complete cycle precisely into the box.

In order to prevent problems with electrostatic charges and contamination of the surfaces, Sartorius uses ion rods and a system for particle suction. This is because the new packaging line is located in a cleanroom to ISO Class 8 with an adjoining low-risk area.

The MULTIVAC machine fulfils all the requirements

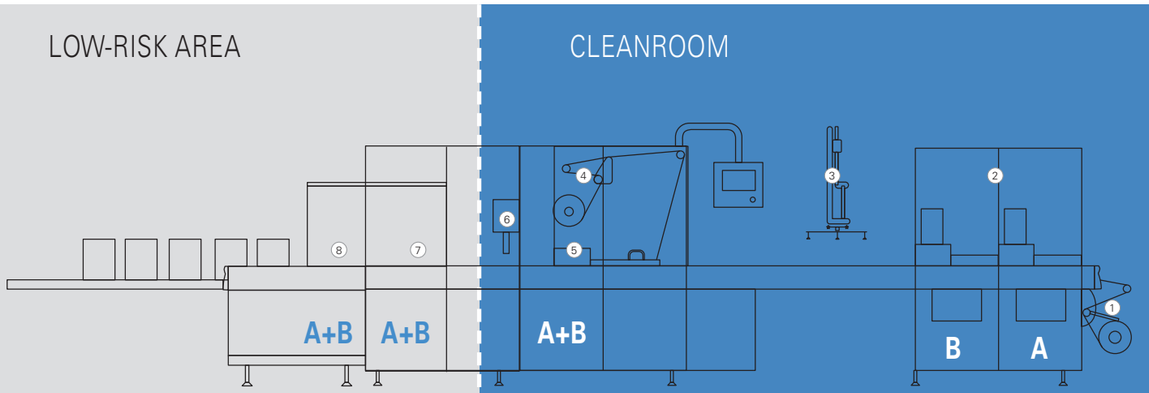
"Mastering the automatic loading and packing of seven different filter sizes with one machine - that is really challenging," summarizes Lothar Brüggemann. "All our products can be packed in just two pack formats with the new machine. Thanks to two permanently installed forming dies, no conversion is required, which means that we save a lot of time when changing batches."

Other requirements of the machine are very tight pack tolerances and a tolerance of +/- 0.1 mm for the print image. The cutting of the film also had to be designed to meet the customer's high requirements, which included a cutting tool in the complete cutter that allowed the packs to be removed from above, as well as a cutting tool for the film skeleton trim. And as if that was not enough: the automatic feeding of the boxes together with the loading and discharge of these were tasks, requiring a great deal of project experience and a long development time.

The project was successfully completed in the autumn of 2014. Lothar Brüggemann is delighted: "The system has run absolutely reliably and without any problems since it was put into service. We are very satisfied, both with the technology and the cooperation. We will of course be working with MULTIVAC again in the future."

Tyvek® is a registered trademark of E. I. du Pont de Nemours and Company.

① Lower web
② Forming station with 2 format sets (A + B)
③ Automated product infeed
④ Upper web
⑤ Sealing station
⑥ Printer
⑦ Cutting unit
⑧ Integrated handling module for loading into boxes



STERILE PACKAGING TAKES CENTRE STAGE

FOR MORE THAN 15 YEARS, CATGUT GMBH HAS RELIED ON MULTIVAC'S TECHNOLOGY FOR THE PACKAGING OF ITS SURGICAL SUTURE MATERIALS.

Surgical suture material must not only be packed in a sterile condition, it also has to be capable of being removed very easily from the pack during an operation. A demanding challenge for the packaging solution.

Catgut GmbH has been producing absorbable and non-absorbable suture materials in a wide range of forms for over 100 years. Suture sets for specific applications and operations are also manufactured on request. These indication-related sets enable time to be saved during operations and minimise discarding of surplus suture material. The company's product range also comprises special products such as skin staplers, skin adhesives, surgical meshes, vascular loops, cervix sets, hemostyptics, decompression probes for the bowel or intestines, and supporting sutures.

Catgut GmbH delivers its products in Germany within 24 hours, which means that the storage costs in the hospitals can be minimised. The company also places high demands on the quality of the packaging for its suture materials: in order for the sterility of the suture material to be guaranteed, the seal seams of the packs must be tight and unimpaired. At the same time, the packaging must ensure that the thread holder can be removed easily and safely, allowing it to be transferred by the operating room staff without contamination.

In order to guarantee these quality requirements, Catgut GmbH relies on a MULTIVAC thermoforming packaging machine. This was installed in 1997, when Catgut GmbH moved into a Class C cleanroom, and it has been used successfully since. Among the crucial factors in purchasing this R 5200 machine were MULTIVAC's ability to react rapidly and the high level of flexibility of the packaging machine. Today the product portfolio of Catgut GmbH comprises thousands of articles, which have to be produced quickly and flexibly. The MULTIVAC packaging solution has been supporting Catgut GmbH for more than 15 years in meeting the requirements of its customers.

Catgut GmbH is a manufacturer of the most modern surgical suture materials and operates on a worldwide basis. The family company produces suture materials of the highest quality, which are manufactured exclusively at its Markneukirchen site in Germany. The company also owns TNI Chirurgisches Nadelwerk GmbH in Ichtershausen, which produces high-quality surgical needles and atraumatic needles.

RELIABLE AND ECONOMICAL PACKAGING SOLUTION

GREINER BIO-ONE OPTS ONCE MORE FOR MULTIVAC

Greiner Bio-One International GmbH had been packing its VACUETTE® QUICKSHIELD Complete blood collection system for some years on a MULTIVAC thermoforming packaging machine. Since this R 245 had proved itself so effectively in practice, in 2013 the manufacturer from Rainbach im Mühlkreis in Austria invested in a further thermoforming packaging machine of the same type.

Greiner Bio-One International GmbH has specialised in the development and manufacture of quality products from plastic for laboratory requirements. Founded in 1963 in Nürtingen, the company is active in the areas of biotechnology, diagnostic and pharmaceutical products, as well as medical and in-vitro diagnostics. In 2013 Greiner Bio-One International GmbH achieved a turnover of 373 million euros. With over 1,700 employees, 23 of its own subsidiaries and a large number of sales partners, this technology company has a presence in more than 100 countries.

The extensive product range of Greiner Bio-One includes systems for the collection of blood, urine and samples, such as the well-known VACUETTE® line of products. The product family offers several safety benefits for protecting the patient or the person, from whom the collection is being made. These include a special cannula tip for painless puncturing, a safety shield for avoiding puncture injuries, and fill-level marking for precise filling. The customers of Greiner Bio-One include hospitals, laboratories, medical practices and blood donation services throughout the world.

Growing demand

Among the products, which have experienced constantly growing demand in recent years, is the VACUETTE® QUICKSHIELD Complete blood collection system, a combi-product comprising a safety tube holder and multiple collection cannulas.

The blood collection system, which is some five centimetres in height, is packaged in thermoformed packs made of flexible film and medical paper. One pack unit consists of five pack cavities, which can be easily separated by means of perforation. The packs are sterilised by electron-beam technology, after they have been packed into boxes.

Since 2009, Greiner Bio-One had been using a MULTIVAC R 245 thermoforming packaging machine for producing the thermoformed packs for VACUETTE® QUICKSHIELD Complete. The machine was installed at the production site in Rainbach im Mühlkreis in Austria, and the loading area is situated under laminar airflow. Around 1,800 units of the blood collection system are packed per hour on the machine. In view of the forecast for the coming years, it was clear to the company management, production quantity would no longer be sufficient in future.

Doubling capacity

At the end of 2012, Greiner Bio-One decided to expand the packaging capacity and invest in a second packaging line for VACUETTE® QUICKSHIELD Complete, which would be installed parallel to the existing line. The requirements were quickly defined: "The second line had to produce double the output of the existing line with the same consistent quality. It also had to be just as simple to operate", says engineer Wolfgang Pühringer from the department of Injection Moulding Engineering.

There also had to be particular focus with this project on the integration of the upstream infeed system into the control architecture of the packaging machine.

After the requirements had been discussed with MULTIVAC, the selection was again made in favour of the R 245 thermoforming packaging machine. Wolfgang Pühringer explains the reasons for the decision as follows: "The R 245 can be scaled up to a very high degree. By changing the design of the machine, we could simply match the new R 245 to our increased output expectations. The die format was increased in such a way, that we were able to achieve on this machine an output of ten packs per cycle instead of the previous five packs per cycle."

A MR293 direct web printer from MULTIVAC Marking & Inspection is also used on the second machine. The direct web printer, fitted at the film infeed, prints the medical paper upper web. The controls for the printer are integrated in the machine control of the thermoforming packaging machine.

Expectations fulfilled

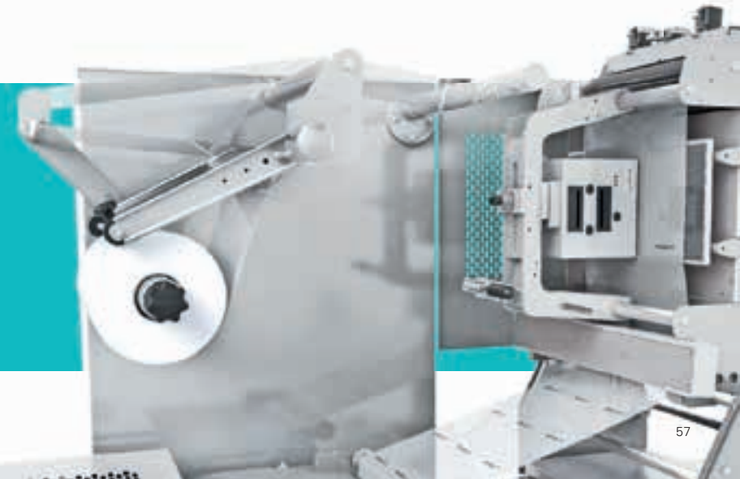
In 2013, the thermoforming packaging machine was put into operation at Greiner Bio-One. It was installed within the planned time frame and without adversely affecting running production in the factory. "As with the previous project, there were no delays on the part of the supplier. The machine was put into operation with the expected quality of pack," praises Wolfgang Pühringer. The combi-product, VACUETTE® QUICKSHIELD Complete, is packed reliably, reproducibly and economically on the MULTIVAC packaging machines. "Should there be further projects where we use a thermoforming packaging machine, we will certainly be putting another MULTIVAC machine at the top of the list," adds Wolfgang Pühringer.

R 245 THERMOFORMING PACKAGING MACHINE

Cut-off length (mm)	< 700
Forming depth (mm)	< 150
Output (cycles/min)	< 25
Hygiene standard	Clean Design™

MR293 DIRECT WEB PRINTER

Printing of	film, paper
Film width (mm)	320 - 720
Printing resolution (dpi)	300
Printing process	Thermal transfer, hot foil printing



INNOVATIVE PACK-AGING CONCEPT PROVIDES SAFE AND DISCREET USE

WELLSPECT HEALTHCARE RELIES ON MULTIVAC

Wellspect HealthCare placed its trust in the expertise of MULTIVAC for the market launch of a catheter product. The packaging specialist supported the Swedish manufacturer in the development of the packaging procedure and installed a packaging line complete with an automatic pack discharge system.

The Swedish company Wellspect HealthCare, whose headquarters are in Mölndal, is one of the leading suppliers of innovative products and services in the sectors of urology, surgery and respiratory therapy. The company was founded in 1948 and is now represented worldwide.

At the end of 2011, Wellspect HealthCare was preparing the market launch of a new catheter product. Project manager, Anders Tennby, relates the background: "LoFric® Origo is a new development of the LoFric® catheter series for men, which is designed for use as self-catheterisation. We wanted to offer our customers a packaging format which enables the product to be used simply and discretely in everyday operation".

Wellspect HealthCare relied on MULTIVAC for the development of the new packaging procedure and the appropriate packaging solution.

Packaging development with MULTIVAC

One of the greatest challenges for Wellspect HealthCare with the new packaging concept was the development of the packaging procedure had to run parallel with the product development. This was due to the need for the launch time to be kept as short as possible. Those responsible for the project at Wellspect HealthCare had the opportunity to see the various options for the packaging design at MULTIVAC's Training and Innovation Center (TIC) in advance of the start of the project. It is here that MULTIVAC offers its customers a complete infrastructure of services, including consultation on packaging development.

Wellspect Healthcare describes the product benefits of LoFric® Origo as follows:

- Can be used instantly. If the closed pack is pressed lightly, the saline solution flows into the catheter pack and surrounds the product with lubricating fluid.
- The pack can be folded to a pocket-sized format.
- The pack is equipped with a self-adhesive label and can therefore be fixed to smooth surfaces.
- An adjustable introduction mechanism prevents the catheter tube from having to be touched.
- The resealable pack serves to ensure that it is disposed of hygienically after use.
- Free of PVC, phthalates and latex.

Efficient concept development

The development of a suitable packaging solution was able to be achieved within the required time frame. In May of 2012, MULTIVAC delivered the complete packaging line. This consists of a thermoforming packaging machine with a cross web labeller and a handling module for the automatic discharge of the packs. "In our view, the high level of customer benefits offered by MULTIVAC was due to the efficient development of the concept. Any smaller problems, which generally arise when equipment with this degree of complexity is put into service, were solved by MULTIVAC flexibly and rapidly", says Anders Tennby with praise.

Regarding the marking of the packs, a pre-printed label is dispensed onto the underside of the formed lower web. In order to ensure that the catheters remain in the pack cavities during the web advance, and that they do not protrude into the sealing area, MULTIVAC developed a system which guides the products securely and monitors this critical area. This ensures the products are not damaged during the sealing process and the packs are sealed without flaws.

The opening label is applied to the upper web to produce the opening aid. An opening contour is punched into the film underneath this. When the consumer pulls on the opening label, the pack opens very easily due to the contour punching, and this enables the pack to be opened without any problems. The label also serves as the reseal closure for the pack.

The separation cutting of the packs from the film is performed by a complete cutter (KPS). The packs are subsequently removed from the complete cutter by a handling module and transferred into cassettes provided by Wellspect HealthCare. The gripper of the robot always turns through 90 degrees - alternately to the left and to the right. This procedure is monitored by sensors. In order to fulfil the high quality requirements, different quality inspection systems were integrated in the packaging line. For example the presence of the individual product components in the pack is monitored by sensors, as is the presence of the opening label. If an inspection system detects a fault, this cycle is "written as reject" and ejected at the end of the machine via a transport conveyor.

Catheter product has been well received

At the beginning of 2013, LoFric® Origo was launched onto the market and the new catheter quickly won positive feedback. "The product has been very well received by our customers, and the sales volume is rising rapidly", reports project manager Anders Tennby, taking stock of the development with the words: "The project has been a complete success. With this installed packaging line, we now have an efficient solution which meets our quality requirements in every respect".

MULTIVAC INNOVATION CENTER (TIC)

The Innovation Center at the Wolfertschwenden site is the center of excellence for packaging consultation and sample production. Here, the pack takes centre stage, and customers have the opportunity to evaluate a wide range of packaging concepts for their products. Prototypes and small batches can also be produced. Confidentiality is guaranteed by test rooms with directly connected meeting rooms, which are only accessible with individual access authorisation.

A highly motivated team of professionals with unique expertise and experience as well as a customised infrastructure, provide the ideal conditions for meaningful packaging consulting and packaging tests.

The Innovation Center in Wolfertschwenden is closely linked with the innovation centers in the countries of the local MULTIVAC subsidiaries.

HIGH LEVEL OF FLEX-IBILITY IS IMPRESSIVE

PRINCE MÉDICAL USES MULTIVAC THERMOFORMING PACKAGING MACHINES

Since 1993, Prince Médical has been producing and selling disposable medical instruments and devices. These instruments are used across a host of industries, including gynaecology, gastroenterology and urology. There are several key factors when packaging these items, including very strict hygiene levels and maximum flexibility. These are two criteria which MULTIVAc is capable of fulfilling completely.

The most important benefits of the Prince Médical products are their faultless quality, very competitive prices and a service which meets the needs of customers. Prince Médical is certified in accordance with ISO 13485 and ISO 9001 and it also has a CE marking. The family business has two production sites, one in France and one in Tunisia. Production of the medical devices in France is carried out in cleanrooms with overpressure in accordance with ISO 7 and ISO 8, in which the working and hygiene conditions are very tightly controlled, allowing the highest level of safety to be guaranteed to patients.

Prince Médical manufactures all the plastic parts itself for its medical devices on 14 presses and five extruders before these devices are packed and sterilised. This complete control of the manufacturing processes enables all the critical stages of the production cycle of the various products to be monitored. The company has its sales channels in France, Germany and the USA. All the instruments and devices comply therefore - depending on the country of destination - with the relevant European and/or American regulations and standards.

Flexibility of the packaging machine is impressive

Prince Médical has three thermoforming packaging machines for packing its products, two of these machines are from MULTIVAC. As far back as 1996, the company invested in a MULTIVAC M 860, which is still running faultlessly today.

In 2011, the company purchased a R 145 thermoforming packaging machine, equipped with a MR295 direct web printer for printing the film immediately before the sealing operation. Among the crucial factors for Prince Médical in deciding to purchase a further MULTIVAC machine were MULTIVAC's outstanding customer service, its ability to react rapidly and the high level of flexibility of the packaging machines. The die change on the thermoforming packaging machines is very user-friendly and can be performed quickly. This is particularly important since many different pack formats have to be produced. The validation of the procedures is carried out internally for reasons of expediency, and it is monitored by various recognized organisations such as GEMEDE. The R 145 was validated in collaboration with MULTIVAC. This new machine generation, designed specially to meet the requirements of the medical sector and pharmaceutical industry, ensures that packs are produced in compliance with GMP standards. Thanks to its design and construction, there is a large reduction in the number of particles which are emitted by the machine into the environment. The machine also has a central discharge point which collects the exhausted compressed air and feeds it out of the room.

Local after-sales service for rapid service response

The packaged products are all intended for practising medical personnel who wear gloves and perform rapid hand movements. The packs must therefore be absolutely secure and yet at the same time easy to open. Jean-Marc Prince and Hervé Briard consider these essential prerequisites to be met in full with MULTIVAC machines. "The machine stops whenever there is a problem with the sealing pressure or sealing temperature. Every product is subjected to a visual quality control. In addition to this, the seal seam quality of the packs is checked on a random test basis with a methylene blue test", they both add.

The machine is also very user-friendly: the HMI 2.0 user interface provides intuitive operation, graphic user guides and user identification. The company directors of Prince Médical also feel reassured in their choice of MULTIVAC by the fact that they have access to the same local MULTIVAC after-sales service in both France and Tunisia.

The fruitful partnership between MULTIVAC and Prince Médical proves to be of great benefit to the quality of the products and the safety of patients - both are values that have the highest priority for Prince Médical.

R 145 THERMOFORMING PACKAGING MACHINE

Cut-off length (mm)	< 400
Forming depth (mm)	< 110
Output (cycles/min)	< 20
Hygiene standard	Clean Design™

MR295 DIRECT WEB PRINTER

Printing of	film, paper
Film width (mm)	320 - 720
Printing resolution (dpi)	300
Printing process	Thermal transfer, hot foil printing

A SPECIAL SOLUTION WITH FUTURE POTENTIAL

MULTIVAC developed a packaging solution for dialysis bags for Laboratorios PiSA in Mexico. This development will also be able to be used in future for similar projects. Around 2.3 million people worldwide are affected by chronic renal failure. If they are unable to receive replacement organs, they require regular blood purification in the form of hemodialysis or peritoneal dialysis.

The task was clearly defined but very complex, as soon became apparent in the course of the project. As the contractual manufacturer to a supplier of medical products, Laboratorios PiSA had to produce dialysis bags with a sodium chloride solution and a volume of five litres, and it then had to pack these in secondary packaging. It was also necessary to reduce the quality problems with the previous packaging procedure, which had been carried out on chamber machines, as well as increasing the throughput by at least 25 percent. PiSA had just signed a contract for a higher production volume. The starting point for the challenge was therefore to optimise the packaging procedure and to switch this to a MULTIVAC thermoforming packaging machine, while maintaining the same pack properties. The packaging costs also had to be below the previous costs.

A challenging task

Up to that point, the secondary packaging for the dialysis bag had been a large film pouch which could be opened by means of a serrated cut. In order to produce a pack with the same properties on a thermoforming packaging machine, a new pack design had to be developed. The particular geometry of the pack provided a special challenge for MULTIVAC's specialists. The requirement was for an individual pack with a high level of stability and a peel function, ensuring controlled opening could be achieved. The upper and lower webs had to be formed symmetrically and perfectly matched to the shape of the dialysis bag.

Several film suppliers failed during the course of the project due to the technical demands on the packaging material. It had to have high barrier properties, not remain adhered to the dialysis bag, be transparent and easy to form, as well as being suitable for subsequent steam sterilisation.

Grupo PiSA is a leading supplier in the Mexican healthcare market. Experience, infrastructure and technology have helped the company in recent decades to become the largest Mexican manufacturer of pharmaceutical and healthcare products. In addition to this, Grupo PiSA has been successful in gaining entry to markets in the USA and Canada as a contractual manufacturer for sterile, injectable medication and as a supplier of medical products, such as infusion kits. Grupo PiSA is continually investing worldwide in quality assurance, know-how and the latest technology, so it can meet and exceed the expectations of its customers in the future, as well. The company recently opened PiSA BioPharm, a branch office in New York, increasing support for customers in North America even more effectively.

A perfectly suited packaging machine

The R 555 thermoforming packaging machine proved to be the optimum solution for the packaging procedure. This machine is equipped with an upper web forming station. This ensures that the upper web is firmly guided through the additional forming station and right up to the sealing station. "This means the film remains under tension and control during the entire procedure. This enables us to achieve a precisely formed upper web, a high level of process reliability and therefore very good pack quality," explains Michael Theiss, Medical & Industrial Sales Director at MULTIVAC for Mexico and Central America. Following several test runs, the high-output machine was installed in Guadalajara.

The perimeter sealing ensures there is maximum seal seam strength and optimum peelable seal seams. "In the case of dialysis bags with a five litre content, the seal seam has to be very stable, but at the same time it has to be capable of being opened very easily. An additional opening slit, which also enables the pack to be opened easily, was added in case film without a peelable function was run. It proved possible to find a satisfactory solution for this requirement, as well", says Michael Theiss.

In addition to this, the organisational and logistical requirements were by no means trivial. Large quantities of dialysis bags were sent to Germany for the sample productions and then back to Mexico, allowing various tests to be carried out and the samples sterilised before being checked. Today, MULTIVAC Mexico also supplies the packaging material, allowing Laboratorios PiSA to have a complete packaging solution from one source.

"Even if the effort was enormous, it is worth it for us in the long term to invest in such developments," says Michael Theiss with confidence. "The new technical knowledge gained will flow into other projects in the future. When it comes to similar types of dialysis bags, we can now offer, from the start, the same solutions, which include symmetrical forming of the upper and lower webs."

Compared to the pouch pack used previously, significantly better pack quality and a greater number of packs are achieved today with the thermoforming packaging machine. And the cost per pack has also been substantially reduced.

PACKAGING SOLUTIONS FOR MEDICAL AND PHARMACEUTICAL PRODUCTS

"Packaging solutions for medical products were initially just a follow-on market for us," recalls Luc van de Vel, Senior Director of the MCP business unit.

IN 1968 MULTIVAC LAUNCHED ITS FIRST PACKAGING SOLUTION FOR STERILE MEDICAL PRODUCTS ONTO THE MARKET. WHAT AT THAT TIME BEGAN AS AN OFFSHOOT TO THE CORE BUSINESS OF FOOD PACKAGING SOLUTIONS, IS TODAY A HIGHLY SPECIALISED BUSINESS UNIT, WHICH DEVELOPS SOLUTIONS FOR THE AUTOMATED PACKAGING TO GMP STANDARDS OF MEDICAL ITEMS, PHARMACEUTICALS AND BIOTECH PRODUCTS. IN THE EYES OF THEIR CUSTOMERS IN THE LIFE SCIENCE AND HEALTHCARE INDUSTRY, THE STAFF OF THE MCP BUSINESS UNIT (MEDICAL DEVICES, COSMETICS AND PHARMACEUTICALS) ARE EXPERTS, ADVISERS AND PARTNERS ON AN EQUAL FOOTING.

"Packaging solutions for medical products were initially just a follow-on market for us," recalls Luc van de Vel, Senior Director of the MCP business unit. "For decades we dealt with our customers in the medical and food industries on a virtually identical basis."

Since that time, market conditions have changed profoundly: the demands of the life science and healthcare sector, as well as its supply chain, statutory requirements and framework conditions, differ fundamentally from those of other sectors. MULTIVAC has therefore reacted to this with increasing specialisation.

Specialists for life science and healthcare solutions

First, MULTIVAC invested in the infrastructure of skilled staff who worked on the special requirements of the MCP sector. Initially the package comprised services such as calibration, validation and laboratory work. In 2008, the MCP business unit was established, which is based at the headquarters in Wolfertschwenden. In this business unit there are sector specialists who take over the entire management of projects - from the handling of the User Requirement Specification (URS) right up to the factory acceptance of the finished machine. In the course of this specialisation in the life science and healthcare industry, experts were also established in MULTIVAC's sales companies, and these skilled staff locally are engaged solely in attending to MCP customers.

Groundbreaking machine concept

The developments of recent years illustrate how far MULTIVAC's alignment towards the demands of the life science and healthcare industry has progressed in the intervening period. This is shown by the example of the MULTIVAC Clean Design™: this machine concept is designed specially for the requirements of the medical and pharmaceutical sectors. It takes into consideration aspects of the packaging machine such as process reliability, ease of cleaning, cleanroom compatibility and compliance with requirements on cleanliness. The portfolio of machines in the MULTIVAC Clean Design™ also includes a GMP-compliant machine model which features, among other things, preventative measures against cross contamination. In the interests of reliable line clearance, the area for product processing on this model is strictly separated from the area of the machine equipment. Transparent enclosures with large doors protect against environmental influences and, thanks to perfect overview of the process, they improve the security of the packaging procedure against any products being lost.

Wide range of GMP-compliant packaging solutions

Following on from the technological specialisation, which was aimed primarily at the medical and cosmetics sectors at the start, MULTIVAC later also addressed the pharmaceutical industry. Continual expansion of the product portfolio was a constant feature.

Regarding the area of thermoforming packaging machines, there are now many models that can be configured for the requirements of the medical and

pharmaceutical sectors. Each machine is customer-specific and individually tailored to the particular requirements. The packaging solutions extend from compact entry-level models for packing small to medium-sized batches right up to complete automated lines. MULTIVAC can also offer the T 260, a semi-automatic solution in the MULTIVAC Clean Design™, for the packaging of medical products in trays. In addition to this, MULTIVAC has developed a complete portfolio of special chamber machines with temperature controlled sealing bars and these models meet all the requirements of the medical and pharmaceutical industries for packing products in film pouches. The integration of innovative control technology ensures that with all types of machines, there are consistently reliable and reproducible procedures.

Labelling, marking and inspection systems are also being constantly optimised to meet the requirements of the medical and pharmaceutical industries. One example of guaranteed fault-free labelling and marking is the MULTIVAC Track-and-Trace™ function, by which MULTIVAC meets the serialisation and marking requirements of many different countries. MULTIVAC is also able to fulfil the demand for efficiency and cost-effectiveness by offering a high degree of automation, a wide variety of pack types, flexibility with batch sizes, and versatility when producing for different markets.

In recent years, MULTIVAC has also continued to further develop its existing services. These include for example the validation of machines and a variety of solutions for improving the security of packaging procedures. In addition to these, there are customised developments and adaptations for specific projects, among them, line solutions and systems with open interfaces, so that the optimum interaction between equipment in the cleanroom and low-risk area can be organised, or to enable packaging systems to be integrated in a MES or ERP system.

Staff expertise as added value for customers

All the staff in the MCP business unit are fully experienced in the standards and requirements of the life science and healthcare industry. They also have a wealth of technical knowledge about different sterilisation procedures or the integration of packaging solutions in existing third-party production lines.

Our project managers accompany customers throughout the entire course of the project, from clarification of the User Requirement Specification right up to the factory acceptance of the packaging solution (see box). They provide their expertise, based on experience from a wide range of different projects, at every phase of the project.

In many countries there is a specialised sales adviser locally, supported by the project managers in Wolfertschwenden. This process is influenced not only by the expertise and experience within the MCP business unit, but also by the know-how from other areas of the company.

Wide range of GMP-compliant packaging solutions

THERMOFORMING PACKAGING	PACKAGING IN TRAYS	PACKAGING IN FILM POUCHES
R 081	T 260	C 200TC
R 145		C 300TC
R 245*		C 400TC
R 535*		C 700TC
		AGV TC

*available in MULTIVAC Clean Design™

From the specific sector requirement through to the tailored solution

Customers benefit from many years of experience in the sector, as well as from professional support by a specialised sales adviser locally and by a project manager at the company headquarters in Wolfertschwenden.

Definition of requirements

Every project begins with a clarification meeting where the customer describes his particular requirements, states the challenges that are specific to the sector and product, and then defines his expectations - usually in the form of a User Requirement Specification. The MULTIVAC advisors will also, at this stage, put the customer's existing packaging procedures under the microscope.

Planning and project management

Based on all the information collected, MULTIVAC then issues a proposal and quotation in close collaboration with the customer, as well as producing the necessary machine and format drawings. In many cases a number of possible solutions will be developed, and these will then be discussed in depth with the customer as part of a presentation.

Conducting tests

Customers can test the feasibility of the proposed solution at MULTIVAC's Training & Innovation Center in Wolfertschwenden, where they can also take many other aspects into consideration. As part of this process, they can bring their own products and produce a wide variety of packs. If required, MULTIVAC will also produce packaging designs to the customer's particular specification.

Design

As soon as the purchase order has been received, the internal production procedure starts and the project manager, as the central person within the procedure, clarifies the final interface configurations. He undertakes the communication with the customer and determines the machine design in so-called "Design review meetings".

Factory Acceptance Test (FAT)

When final assembly and calibration have been completed, and the agreed Qualification Documents have been produced in Wolfertschwenden, the project is ready for the Factory Acceptance Test (FAT), where the machine is accepted by the customer.

Installation

As soon as the machine has been delivered to the customer, the team begins the process of installation and putting the machine into service, as well as conducting a Site Acceptance Test (SAT) if required and performing additional validation services. Instruction and training on the machine take place at the same time.

After-sales service

In the course of subsequent discussions, the customer can conclude an agreement with MULTIVAC for the servicing of the machine, or for regular recalibration and revalidation if necessary. MULTIVAC's worldwide after-sales service is always available locally in the event of problems, and it can supply genuine spare parts within a very short period of time.

FOR A RESILIENT AND REPRODUCIBLE PROCESS SEQUENCE:

CALIBRATION, QUALIFICATION, VALIDATION

MULTIVAC offers manufacturers of life science and healthcare products a comprehensive package from one source. In addition to customer-specific packaging machines and solutions for automation, labelling and marking, this also includes services such as calibration and qualification of packaging machines, as well as validation of packaging procedures.

As a machine manufacturer, MULTIVAC knows the packaging equipment of its customers and can therefore offer them an individual calibration service, as well as tailored qualification and validation.

Calibration of packaging machines

In the medical and pharmaceutical sector, to ensure the prcoess sequence is resilient and reproducible and that packs achieve a consistently high quality standard, all the monitoring sensors in a packaging machine that are relevant to the procedure must be calibrated at specified time intervals for complete traceability. This requirement is laid down in the EU-GMP and FDA guidelines, which apply generally within the industry, and in the quality management system in accordance with DIN EN ISO 9001.

In the case of recalibration, this is a process of retrospective calibration. The generally established recalibration interval is twelve months, although the responsibility for specifying the intervals lies with the operating company. When it comes to defining the recalibration intervals, MULTIVAC is always available with advice for its customers.

The package from MULTIVAC comprises cost-effective ISO calibration, which has the DIN EN ISO 10012 standard as its basis. The evaluation of the results is based on manufacturer specifications that are established by MULTIVAC. The ISO calibration can be related back seamlessly to national standards.

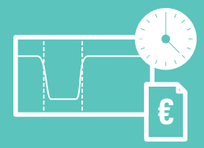
Calibration can be carried out on the following sensors:

- Temperatures (e.g. forming / sealing temperature)
- Pressure transducer 0-7 bar (e.g. sealing pressure)
- Pressure transducer 0-1 bar (e.g. product vacuum)
- Manometer (e.g. sealing pressure regulator)
- Time basis in the machine control (e.g. sealing time)

The MULTIVAC machines, which are specially designed for the life science and healthcare industry, have easily accessible calibration connections. MULTIVAC also offers calibration services for third-party equipment.

BENEFITS OF MULTIVAC CALIBRATION

Checking the process capability of equipment (at MULTIVAC or on-site at the customer location)



Brief loss of production time during the calibration

Advice and, if necessary, adjustment after completion of calibration

Calibration documentation that is specific to the equipment

Many years of experienced based knowledge

Agreement on dates at short notice

Low-cost quotations

Qualification & validation

The GMP guidelines were produced as far back as 1962 by the FDA as a compilation of directives and regulations for production in the pharmaceutical sector. These and other regulations, such as the Pharmaceutical Products Act, the PIC (Pharmaceutical Inspection Convention), the ISO 9000 ff standards and the CFR (Code of Federal Regulations) by the US FDA regulatory authority, specify that all the procedures relevant to product quality must be validated. In the case of the EU-GMP guidelines, qualification of the equipment is a pre-condition for the validation of the procedures.

Qualification of equipment is designed to bring forward documented proof, that the equipment operates in a reproducible and reliable way, and that the result meets the expected requirements. Validation is the documented proof, that the procedures lead reliably and reproducibly to the expected result. This includes validation of procedures, cleaning and methods.

Starting with a process risk analysis of the equipment, qualification can be carried out by means of design, installation and functional qualification. MULTIVAC has the required knowledge and experience to carry out qualification that is both time- and cost-effective. This service can also be used for third-party equipment.

Qualification and validation services from MULTIVAC

All qualification and validation services from MULTIVAC can be performed to the requirements of the customer, either individually or in combination with each other.

- **Process risk analysis (P-FMEA, Process Failure Mode Effective Analysis):**
  Related to the packaging procedure
- **Design qualification documents:**
  Functional description of the machine with its individual modules (FS); software design specification (SDS) and hardware design specification (HDS) with categorisation of the software and electronic components used in accordance with GAMP (Good Automated Manufacturing Practice)
- **Installation qualification (IQ):**
  Documented checking of the machine for the presence of all the constituent parts, as specified in the User Requirement Specification or Job Order Card
- **Operational qualification (OQ):**
  Documented checking of all the functions and procedures
- **FDA - 21 CFR, Part 11:**
  Integration of the software module in the PLC (machine control) and documented checking, whether user administration and the audit trail meet the requirements of FDA - 21 CFR, Part 11
- **Qualification reports:**
  Collation of the results of the individual qualification stages in one report
- **Pack tests, inspection and validation of the packs in accordance with:**
  - AS™ F 1886 (visual inspection)
  - AS™ F 2096 (bubble test)
  - DIN EN 868-5 (peel test)

DID YOU KNOW,

MACHINE ACCEPTANCES AND INITIAL SAMPLE PRODUCTIONS CAN BE CARRIED OUT AT MULTIVAC UNDER CLEANROOM CONDITIONS?

Several years ago, at its headquarters in Wolfertschwenden, MULTIVAC built a cleanroom in which customers can carry out machine acceptances (so-called Factory Acceptance Tests, FATs) and initial sample productions, and which can also be used for testing and optimising new packaging solutions. This arouses great interest among manufacturers and packers of sterile medical products which are usually packed in cleanrooms that are Class 7 or higher.

"We are able to draw on the years of experience gained and are constantly increasing in our own company's cleanroom," says Heinz Wegmann, Project Manager and specialist for cleanroom applications in the MCP business unit at MULTIVAC. "Our customers can carry out initial sample productions, certified tests and FAT machine acceptances in our cleanroom under genuine production conditions. In addition to this, customers are also able to test complementary systems and components of their packaging solutions, such as printing systems, for their cleanroom compatibility." The experienced MULTIVAC specialists perform detailed measurements and evaluation, from which the solutions can be assessed and optimised, if necessary.

The cleanroom meets the requirements of ISO Class 5. "Cleanroom Class 5 means that one cubic metre of air contains a maximum of 832 particles with a size of one micron," explains Heinz Wegmann. When packing medical products, cleanroom Class 7 or 8, where a 100 or 1000 times higher particle count per cubic metre of air is permitted, is generally sufficient.

Initial sample productions and FATs in the cleanroom

When carrying out the tests, MULTIVAC brings the relevant machine into the cleanroom and measures the emissions during the packaging procedure. The measurements are taken under production conditions, in other words the same materials and dies are used, which are also used later in the production environment. "The assessment of cleanroom compatibility relates not only to the machine but also to the packaging procedure. It is equally important in this regard, that emissions during packing also remain low," adds Heinz Wegmann, explaining the background to the procedure. As soon as the products, packaging materials and machine parts start to move, friction forces arise that inevitably release particles.

During the tests, MULTIVAC and the customer check a wide range of parameters in different machine operating statuses so that the influence of the packaging materials and various process stages can be described more accurately. Based on these results, the packaging solution can be optimised if required.

Cleanroom-compliant packaging machines

MULTIVAC uses the cleanroom for the investigation of particle formation and emissions in machines and lines that have been recently developed. MULTIVAC's portfolio includes several cleanroom-compliant models where the results of measurements in the cleanroom have flowed into the development of the machines: various thermoforming packaging machines can be designed for cleanroom conditions, and the T 260 traysealer and the TC series of chamber machines with permanently heated sealing bars are suitable for use in cleanroom conditions. The results of these tests not only serve to improve the further development and optimisation of all packaging solutions, but this comprehensive know-how also flows into the configuration of machines specially tailored to customer requirements.

In order to meet the individual requirements of customers efficiently and reliably, our team of experts also offer a wide spectrum of support services and technical assistance. This includes a qualification and validation package, which complies with the GMP, GAMP5 and ISO guidelines. If requested, MULTIVAC can also support qualification and validation procedures on site, or help with the creation of special validation or retrospective validation for packaging solutions, which have already been installed. In addition to cleanroom tests, the range of services also includes comprehensive project management and worldwide customer service, as well as training courses at the Training & Innovation Center in Wolfertschwenden or on site at the customer.

CLEANROOM CLASSIFICATIONS IN ACCORDANCE WITH ISO 14644-1

Particles per m³ (highest limit)						
Class	0.1 µm	0.2 µm	0.3 µm	0.5 µm	1.0 µm	5.0 µm
ISO 1	10	2				
ISO 2	100	24	10	4		
ISO 3	1,000	237	102	35	8	
ISO 4	10,000	2,370	1,020	352	83	
ISO 5	100,000	23,700	10,200	3,520	832	29
ISO 6	1,000,000	237,000	102,000	35,200	8,320	293
ISO 7				352,000	83,200	2,930
ISO 8				3,520,000	832,000	29,300
ISO 9				35,200,000	8,320,000	293,000

CLEANROOM CLASSIFICATIONS IN ACCORDANCE WITH EU-GMP

Idle status			Operating status	
Particles per m³ (highest limit)				
Class	0.5 µm	5.0 µm	0.5 µm	5.0 µm
A	3,520	20	3,520	20
B	3,520	29	352,000	2,900
C	352,000	2,900	3,520,000	29,000
D	3,520,000	29,000		

*1 in idle status
*2 in operation

COMPARISON

DIN EN ISO 14644-1 <-> EU-GMP		
ISO class	EU-GMP*1	EU-GMP*2
1		
2		
3		
4		
5	A / B	A
6		
7	C	B
8	D	C
9		

2015

2015

Trade fairs	from	to	City	Country	
EPMT / EPHJ / SMT	02.06.15	05.06.15	Geneva	Switzerland	JUNE
EastPack	15.06.09	15.06.11	New York	USA	
ACHEMA	15.06.15	15.06.19	Frankfurt	Germany	
Expo Pack	15.06.16	15.06.19	México D.F.	Mexico	
RosUpack	15.06.16	15.06.19	Moscow	Russia	
ProPak Asia	15.06.17	15.06.20	Bangkok	Thailand	
SAPPORO PACK 2015	15.06.17	15.06.19	Sapporo	Japan	
Fispal Tecnologia	15.06.23	15.06.26	São Paulo	Brazil	
TAIPEI Pack	15.06.24	15.06.27	Taipei	Taiwan	
28th INTERPHEX JAPAN	15.07.01	15.07.03	Tokyo	Japan	JULY
Envase / Alimentek 2015	15.08.04	15.08.07	Buenos Aires	Argentina	AUG.

Trade fairs	from	to	City	Country	
MULTIVAC Academy	15.09.01	15.09.02	Sofia	Bulgaria	SEPTEMBER
PROCESS EXPO	15.09.15	15.09.18	Chicago	USA	
Verpackungssymposium 2015	15.09.17	15.09.18	Kempten	Germany	
Pharma EXPO	15.09.28	15.09.30	Las Vegas	USA	
PACK EXPO (PMMI)	15.09.28	15.09.30	Las Vegas	USA	
FachPack	15.09.29	15.10.01	Nuremberg	Germany	
PPMA	15.09.29	15.10.01	NEC, Birmingham	UK	
AllPack Indonesia	15.09.30	15.10.03	Jakarta	Indonesia	
JAPAN PACK 2015	15.10.13	15.10.16	Tokyo	Japan	OCTOBER
Scanpack	15.10.20	15.10.23	Gothenburg	Sweden	
Andina-Pack 2015	15.11.10	15.11.13	Bogotá	Colombia	NOVEMBER
COMPAMED	15.11.16	15.11.19	Düsseldorf	Germany	
Pharmtech	15.11.24	15.11.27	Moscow	Russia	
EMPACK	15.11.25	15.11.26	Brussels	Belgium	

Legal notice
UPDATE – a magazine from MULTIVAC
Sepp Haggenmüller GmbH & Co. KG
Bahnhofstr. 4, 87787 Wolfertschwenden, Germany
Tel. +49 8334 601-0, Fax +49 8334 601-199
muwo@multivac.de, www.multivac.com

www.multivac.com