

Sustainability – All the Way to End of Line

Application Report from Nordson in the Kleve Phönix Plant of Unilever

Sustainability plays an important role at all locations of the British/Dutch Unilever Group, and the Kleve Phönix plant is no exception. That applies to many different areas of the German production site – the company's smallest with 84 employees, but also the most modern – which produces almost exclusively Rama Cremefine in many varieties. The attention to resource sustainability and environmental compatibility are even reflected in the final packaging.

by Bernd Neumann

Starting with the existing alternative to cream and crème fraîche, based on a composition of milk powder and vegetable oils, only vegetable oils from sustainable agriculture are used. A modern boiler house constructed in 2014 is achieving significant savings in energy. As the latest initiative, two especially energy- and material-efficient Freedom tankless hotmelt application systems from Nordson were installed this summer at

Dirk Rütten (left), Technical Director of Maintenance/Improvement of the Kleve Phönix Unilever plant, and Ralf Rütter, Service Engineer from Nordson Deutschland both played significant roles in the conversion of the end-of-line adhesive technology



the end of one (initially) of the total of seven production lines.

They are used with a vacuum packaging machine purchased from Gerhard Schubert GmbH (Crailsheim, Germany) in 2001, where they replace the components of another adhesive technology manufacturer. The system, designed for an output of 550 bottles per minute, takes care of pregluing and final gluing for two different wrap-around carton formats with final dimensions of 375 x 250 x 180 mm (L x W x H) or with half that width. 12 or 24 containers are brought in from above between these work step with two robot gripper arms. Most of the PET bottles, which have previously been aseptically filled, have an internal volume of 250 ml (also 300 ml in special sizes).

In the first section the flat blanks are erected and the bottom part is closed

One of the two new Freedom systems was positioned overhead, centred to the packaging machine. The other, for bottom gluing – installed at floor level at the rear of the system in the production infeed area – is not visible in the picture



using two adhesive beads about 30 mm long. One of the two Freedom melters was used for this purpose. With the automatic supply of hotmelt from a large-volume storage drum and a venturi pump, it forms an enclosed system. After the cartons are filled they are transferred via transport slide to the third station where the cover is glued with a longitudinal bead by the second hotmelt application system. The outside packaging has a tear-open flap integrated into the front, which makes it possible to use in retail as a shelf-ready tray.

Preparing only the hotmelt actually needed

One of the special features of the Freedom System is the innovative process for preparing adhesive. The central unit consists of the mechanical melter including an electronic control unit, which – requires no conventional tank – and only keeps the hot melt quantity

actually required at the processing temperature. It works in a similar manner to instantaneous water heaters, with a melting capacity of up to 12 kg per hour, and only requires a short warm-up time of around 15 minutes. Melting only what is actually required in a reservoir with reduced volume makes it possible to significantly reduce energy consumption.

Considerable savings can also be achieved in adhesive consumption. Immaculate gluing quality is also ensured because the hotmelt is not exposed to any environmental influences, while contamination and carbonisation are practically eliminated. Overfilling or spilling hotmelt are now also relegated to the past.

Flexible installation

Another advantage of the melter, a compact model weighing only about 45 kg with dimensions of 838 x 533 x 279 mm (W x H x D), is that unlike conventional tank devices, it can be adapted individually to specific operating and machine conditions. This is made possible by a special fastening adapter that can be used to mount the melter higher to save space, for example, or even "overhead" in the system – or in the immediate vicinity of the dispensing guns.

Unilever engineers took advantage of this option and installed one of the two new devices (the one responsible for cover gluing) on top of the packaging machine. The other configuration for bottom gluing of trays is located on the floor level (as is



Detail view of cover gluing

conventionally the case) at the product infeed of the system.

The melters are supplied centrally from a 240-liter tank to which as many as four supply hoses can be connected. The multiple supply is controlled by an integrated sensor, which determines the order for pumping adhesive based on below-full signals.

Self-cleaning applicator heads

Nordson MiniBlue series II pneumatic applicators (SureBead version) are used to apply hotmelt beads. This is the latest version of the heads which are often referred to as "endurance sprinters". The assemblies work with a minimum switching time of 2 ms. Depending on which hotmelt is used, a service life of

more than 100 million switching cycles can be achieved.

The SureBead application heads are equipped with a patented, self-cleaning needle seat module. They guarantee precise adhesive separation and neat application patterns. The special technology almost completely eliminates clogged nozzles, which reduces maintenance overhead considerably.

Recently developed RediFlex hoses are used to connect the dispensing guns with the melting section in a splash water-protected version. Because of their significantly reduced diameter, they are considerably more pliant. They also feature a patented chlorine-free



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Photos: Kimberly Wittlieb

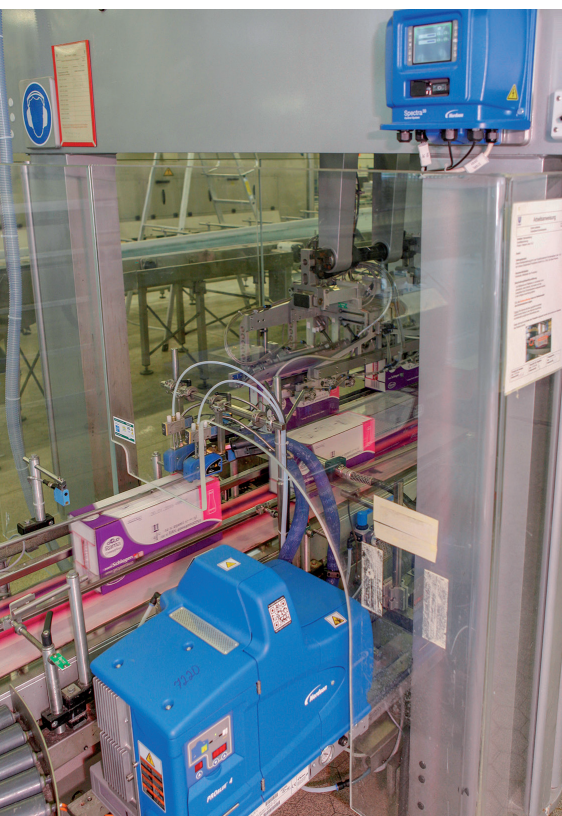


The various Rama Cremefine varieties come in packages of 12 or 24 for retail business

insulation. Special movable brackets are available for flexible assembly.

The Optix electronic control unit is also especially worth mentioning. It has been

As the final step of the packaging process, two longitudinal beads are applied to secure the packages for pallet transport. Application of the beads is monitored by the new Spectra 30 control unit for adhesive application patterns, which is seen – at the top right in the picture



fitted with a clearly laid-out 7" color touch screen display for simple operation and continuous process monitoring. The display not only provides detailed diagnostics of the entire processing sequence, including error messages, it also features component detection which includes the corresponding part numbers for use when purchasing spare parts. It is also possible to assign passwords to prevent unauthorized entry of data.

Initial positive experiences

The end-of-line gluing technology is considered a pilot project and initially involved only one packaging machine. Dirk Rütten, Technical Director of Maintenance/Improvement of the Kleve Phönix Unilever plant, explains the reasons and motivations for modernisation, summarising the numerous advantages derived from installing the tankless Freedom systems from Nordson. "One of our highest-priority goals was to improve the quality of gluing. There were often complaints from customers in the past. Now those problems have been solved in an optimum manner. It was especially important for us to improve machine availability and system efficiency. The two components that were used previously caused dirt to get into the machine, which is no longer acceptable. Now impurities have been reduced to an absolute minimum."

He also emphasises the flexible installation options of Freedom systems:

"As the system is continuously being cleaned, it is very helpful to be able to position one of the devices on top of the machine and for it to be protected against splashed water." An experienced specialist who has been with the company since 1992, he also recognises the great importance of workplace safety. "There were unfortunately various accidents due to burns in the past. Now this risk is completely eliminated by automatic filling." Dirk Rütten also has praise for the excellent service provided by the American adhesive technology specialist with German headquarters in Erkrath. This was also an important factor contributing to the decision. There are plans to convert another one of the seven packaging machines with the tankless systems in the near future.

Additional securing for packages on the pallet

Another Nordson configuration is used at the very end of the line, where it applies two additional thin beads of hotmelt along the entire cover length of the ready-to-ship cartons to provide greater stability during transport. This task is accomplished by a combination of one conventional ProBlue 4 tank device and two MiniBlue II SureBead heads.

One point worth special attention is that this system includes the new Spectra 30 control unit for application patterns, introduced to the market in late October 2014. This device, also equipped with the intuitively operable Optix graphical user interface, enables line speeds of up to 300 m per minute. That makes it ideally suited to high-performance cardboard packaging machines. The greatest possible flexibility is ensured by four control inputs, four sample channel outputs, eight bead sequences per channel, many different adhesive application patterns and storage capacity for 50 programs.

A special attachable mounting device to the VESA standard also allows for customer-specific installation in this case. A USB port is available on the front of the device as a communication interface for data backup or uncomplicated software upgrades.

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