



# MORE PRODUCT EFFICIENCY BY FULLY AUTOMATED PRODUCTION PROCESSES

In this article, Harry Pruner, Freelance Journalist, Pruner Marketing Services, gives a run-down of the machines and production lines manufactured by ZAHORANSKY for the production of ready-to-fill, prefillable syringes.

Downtime costs money. This is why ZAHORANSKY Automation & Molds GmbH from Freiburg has always developed machines with high uptime. A good example of the implementation of high requirements such as these is the unmanned, fully automated production of drug delivery systems. The in-house machine and mould construction by ZAHORANSKY connects the various upstream and downstream machine assembly groups of plastics processing into one fully automated process chain. ZAHORANSKY thereby offers the complete production process and the entire process chain of added value from a single source. This means that the complete control of the peripheral devices runs via the central, user-friendly system control which is also programmable from memory.

## Z.BLIZZARD SYSTEM FOR GLUELESS PRODUCTION OF STAKED-NEEDLE SYRINGES

The process of the complete system starts with a Needle Feeding system and the Z.BLIZZARD system (Figure 1) for the glueless production of staked-needle syringes (Figure 2). Z.BLIZZARD is an integrated automation solution in a modular design, allowing the isolation and glueless overmoulding of cannulas. The Z.BLIZZARD system features both a needle feeding system (Z.NFS) and the injection moulding machine with mould (Figure 3) to produce hybrid components.

The integrated Z.NFS is also modular in structure, with the effect that different design variations of cannulas can be processed

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within the specification. The Z.NFS is capable of handling needles, cannulas and lancet devices in various lengths and diameters. Optionally, even needles and cannulas with ground or shaped sections can thus be aligned automatically and then carried to downstream processing.

ZAHORANSKY offers needle isolation systems capable of singularising between four and currently 32 needles or cannulas with as much as 12 cycles per minute. Diameters range from 0.2 mm upwards, lengths of as much as 40 mm are readily handled and there are plans for more model sizes to enlarge the delivery range.

## PATENTED STACK MOULD SYSTEM

Medical engineering makes very specific and high demands on the design

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Figure 1: Z.BLIZZARD automation solution for the glueless productions of staked-needle, ready-to-fill prefillable syringes.



Figure 2: Staked needle syringes produced by the Z.BLIZZARD system.

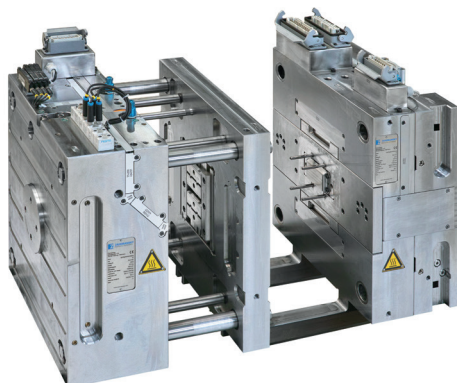


Figure 3: Injection mould for staked-needle syringes.

and construction of injection moulds. The preferred systems involve full hot runners with needle valves. For long, thin and tubular injection mouldings – for instance for syringes – a gating solution has its limits. For side gating, there are

the commercial open systems, or gating to the moulding must be made via a cold runner as a compromise. In the needle valve technique, the limits of the feasible are quickly reached, however.

In order to exclude the disadvantages of side gating systems completely, ZAHORANSKY decided on a different and brilliantly simple solution. A specially developed hot runner nozzle injects the thin-walled medical part directly at the flange. This surprisingly easy solution enables the creation of the perfect injection point.

The cavity inserts are heated, while the rest of the mould is cooled normally. To do so, the inserts are thermally separated

from the mould in order to minimise energy loss and quickly accomplish a thermal equilibrium in the system. The material used is a high-grade technical polymer, mostly cyclo-olefin copolymer (COC) or cyclo-olefin polymer (COP).

The closing needle and/or the closing mechanism can be controlled pneumatically or via servomotor depending on the application. In turn, needle control is integrated in the control of the complete system. This offers significant advantages in particular for medical items which are produced in clean-room conditions.

#### MOBILE EXTENSION UNIT FOR AUTOMATED EXTRACTION

“In the near future, intelligent production will become standard in the industry. This includes the close interconnection between IT and production technologies. The people, machines, production means and products thereby closely communicate with one another.”

The mobile extension unit Z.SIROC (Figure 4) is the heart for the integration of all upstream and downstream processing. This is a standardised unit for the automatic feed-in, assembly and removal directly at the injection moulding machine, used exactly where it is necessary for part removal. This module including its safety housing can be easily moved by hand lift truck and be adapted to any appropriately equipped injection moulding machine.

The take-out unit is currently available in three different versions: the overhead or vertical unit fitted with a six-axis robot made by Kuka (Augsburg, Germany), and the unit with sideload using a linear robot.



Figure 4: Z.SIROC module mobile extension unit, the heart for the integration of all upstream and downstream processing.

### UNIVERSAL LOADING & UNLOADING SOLUTION FOR INTELLIGENT PALLETISING

The produced injection moulded parts are removed by a tray loading and unloading unit with linear pass of the trays. The downstream palletising system

Z.LODOS (Figure 5) automatically stacks the trays including the parts for further production steps. A six-axis robot removes the finished parts from either a tray-unloader or a side conveyor.

### HOLISTIC SAFETY ASSESSMENT

Safety technology is an aspect which is often neglected during the setup of integrated facilities. Laying out the individual components of a facility according to the applicable machine guidelines



Figure 5: Z.LODOS downstream palletising module for tray handling.

is not sufficient. It is essential for the operators of such plants to ensure that a uniform safety guarantee in the form of CE conformity is applied to the entire plant. Professional generation of an overall CE marking on the basis of years of system technology experience is given upon customer request. In this case, a specialist department not only tests the CE conformity of in-house components, but it also tests and secures the facility components applied by other manufacturers.

In the near future, intelligent production will become standard in the industry. This includes the close interconnection between IT and production technologies. The people, machines, production means and products thereby closely communicate with one another. The major advantages of this data connection are:

- Quick adaptation of capacities to machine variations
- Short-term adaptation of production to various product variants.

With the implementation of a fully automated procedure for the complete process chain, ZAHORANSKY has come one step closer to the vision of Industry 4.0.

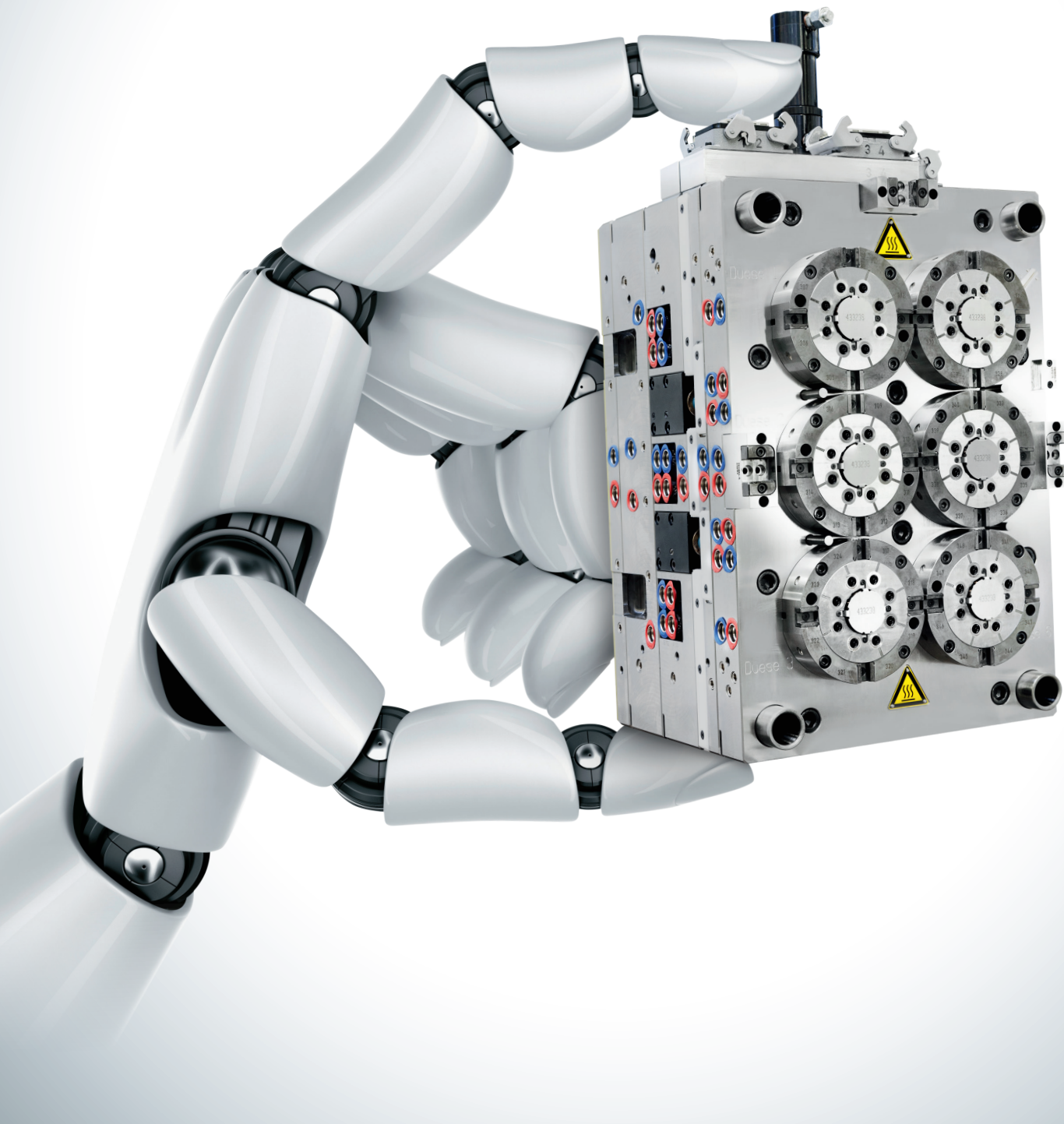
### ADDED VALUE FROM ONE SINGLE SOURCE

System technology offers across-system solutions for the injection related automation. These systems are based on injection moulds by ZAHORANSKY and on established systems from different modules of automation. Intelligent and injection-related automation solutions can be composed with these modules. ZAHORANSKY serves the areas industrial automation and medical devices, with pre-configured solutions provided for medical engineering.

### ABOUT THE COMPANY

ZAHORANSKY AG is a full-range supplier of machinery and production lines, sophisticated, innovative injection moulds and automation equipment. The company operates with over 700 associates at production sites in Germany, Spain, China, India and the US.

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