



PRESS RELEASE

Robotic test cell for medical products

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Destruction with a purpose

Hoyer Montagetechnik GmbH of Schwarzhausen (Thuringia) has recently built a test cell for medical products that is setting new standards for the industry. Inside a chamber with a footprint of only 3.5 square meters, a Stäubli six-axis robot manages the testing of the various components that make up the Respimat® Soft Inhaler manufactured by Boehringer Ingelheim. Working under cleanroom conditions, it performs a series of destructive tests for tensile strength, compression and high-pressure.

In designing and building the test cell, Hoyer Montagetechnik used its experience in watch and clock manufacture, an industry which is characterized by the use of miniature parts in limited space. The company nowadays has a broad industrial base, with a multiple focus on automotive manufacturing, medical technology, mechatronics and household appliances. The development and construction of machinery takes place exclusively in house. Modern facilities and a highly qualified 50-strong workforce drawn from a range of disciplines ensure workmanship of the highest standard. At Hoyer, the emphasis is on proven quality under optimum development and manufacturing conditions, from 3D CAD models and parts produced on high-precision machining centers through to assembly and finishing in well-illuminated spaces.

Quality that has found favor with Boehringer Ingelheim. The highly reputable pharmaceutical company placed an order with Hoyer for automated plant to test its inhaler sprays. The two major criteria in the design of the system were cleanroom specification and a space-saving layout. Cleanroom spec is expensive, with each additional cubic meter driving production costs up.

The volume of pocket inhalers manufactured by Boehringer Ingelheim under the Respimat® Soft Inhaler brand runs into millions. Typically for the medical manufacturing sector, the most stringent safety and quality standards apply. This requires extensive testing stages during production. Over and above the tests that are already integrated into the process, it is also essential to subject randomly chosen items to destructive testing. This involves various tensile, compression and high pressure procedures. Conducted in parallel to production, these tests deliver continuous feedback on quality. The data compiled also ensures compliance with the prescribed quality documentation.

Stäubli robots first choice for the medical products industry

Testing the working parts of the inhaler takes place 24 hours a day, seven days a week. The handling of the parts to be tested is performed by a centrally mounted Stäubli TX60L six-axis robot (cleanroom version) with a gripper system developed by Boehringer Ingelheim. The system tests the individual parts to destruction. To simulate the forces experienced during normal use, the maximum realistic load is first applied, and this is then increased until the part is destroyed. It is only in this way that the specified safety factor can be checked and 100% operability and safety can be guaranteed to the consumer.

In the construction of the pilot cell (to be followed by others in the near future), Hoyer paid special attention to the robot, as explained by Eberhard Walther, Head of Design at Hoyer: “For medical manufacturing plant of this kind, Stäubli robots are the natural choice because of their fully encapsulated design and outstanding cleanroom suitability. More specifically, we chose the Stäubli TX60L – a compact six-axis machine which offers almost one hundred percent availability, a long reach, high precision and exceptionally long service intervals.”

Sequence of events in the test cell

After the manual filling of the automated palletizer with a trolley bearing individual trays of parts to be tested, the machine sorts and positions the trays at the point of transfer to the test cell. Here, a scanner reads the bar codes on the trays of parts and transmits information about part type, test procedure, station selection and relevant robot program to the Siemens PLC control unit which launches the appropriate test cycle.

This is the point at which the merits become apparent of the gripper specially constructed by Hoyer to perform the entire range of tests for all part types. This means that a change of gripper is not required, thus eliminating costly downtime and elaborate gripper exchange stations – flexibility and productivity at their best.

For example, if the high-pressure spray nozzles are presented, the gripper is positioned according to the information entered and picks the unit from the tray. It then goes into an enclosed test device which grasps the nozzle by its thread. Next, the robot picks up a plunger which it quickly and accurately inserts into the test device. The plunger fills the nozzle with water, steadily increasing pressure up to 2,000 bar until the nozzle bursts. After fragmentation, all residues must be efficiently removed from the test socket. To this end, a variety of innovative ideas were put forward which Hoyer then perfected to industry standard.

The Stäubli TX60L has also proved its worth in the tensile strength and compression tests on the other components of the Respimat inhaler. The compact six-axis robot carries out all handling tasks with equal reliability, precision and speed. For example, the accurate insertion of the cannula into its seating is checked. A further test concerns the quality of the ampoule seal which is placed under mechanical pressure until the cap ruptures. A washing and rinsing unit then prepares the device for the next test.

The automation of testing represents a quantum leap. In addition to a significant increase in productivity, the system ensures compliance with the most stringent quality standards under conditions that are reproducible at all times.

“The design of the test system ensures low cycle times,” says Eberhard Walther. “The cell also scores high marks in terms of service and maintenance as well as low energy consumption. This reliable, precise robot with its universal gripper technology and clever features guarantees test quality that meets the tough requirements of the medical sector.”

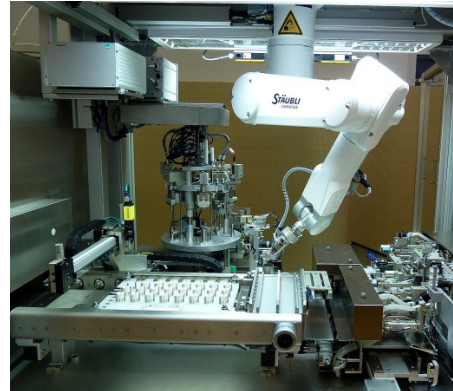
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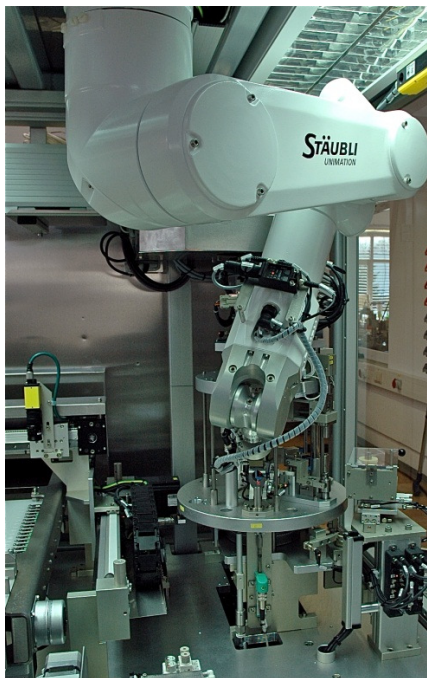
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Destruction on demand: In the test cell a centrally mounted six-axis Stäubli TX60L performs destructive testing 24/7.



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Thanks to its long reach, the ceiling mounted cleanroom robot covers the entire working area.



DSC 0074

The compact six-axis robot carries out all handling tasks with equal reliability, accuracy and speed.



DSC 0058

The fully encapsulated design and outstanding cleanroom suitability of Stäubli robots make them the natural choice for the medical products sector.

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About Stäubli: Textile machinery, connectors and robotics

Stäubli is a mechatronics solution provider with three dedicated divisions: textile machinery, connectors and robotics. Employing more than 4,000 people, Stäubli is an international group based in Pfäffikon (Switzerland) with offices in 25 countries and agency representation in 50 more.

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