

ENERGY SAVINGS THROUGH OPTIMIZATION OF INJECTION CONTROL VALVE

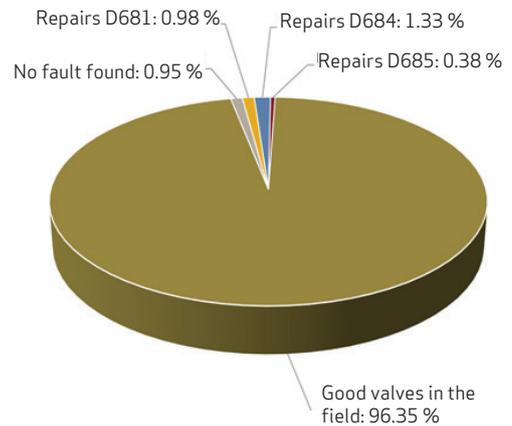


SUMITOMO (SHI) DEMAG

Moog and injection molding machine manufacturer Sumitomo (SHI) Demag have enjoyed a good partnership for many years. With the introduction of the El-Exis SP series 10 years ago, valves of the D68x series were used for the ejector and the injection axis, which enabled outstanding dynamics and precise control. To this day, they continue to deliver with their impressive performance in thin-wall molding - even compared to machines with electric injection units.

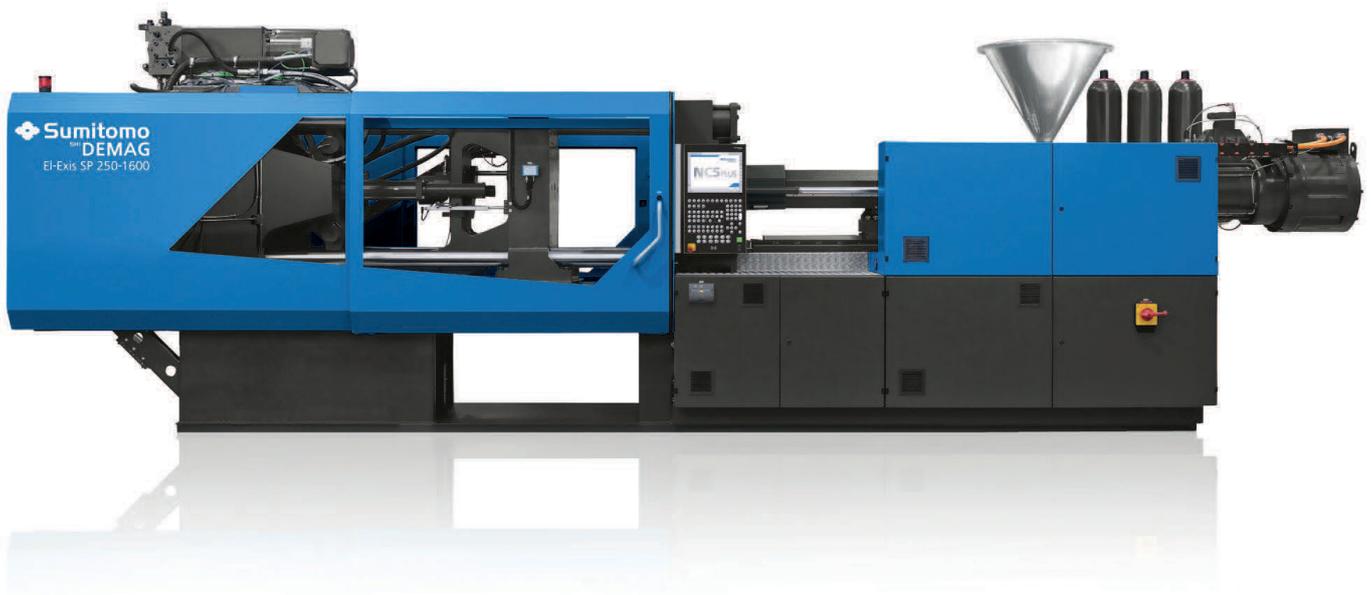
Moog valves also contribute to the success story of the El-Exis SP through their high reliability, which can be seen in the steadily growing market share of the hybrid high-performance machine for closure and packaging applications over the years.

A comparison of all valves supplied over the years with the number of field returns proves the high reliability of Moog valves. More than 96 % of the valves have survived in the injection moulding machine without complaint - even in 24/7 continuous operation under the highest loads. The few complaints are mainly due to externally caused faults, such as contamination or mechanically damaged plugs. If the valves that could be reused after the inspection are taken into account, the rate of reliable valves rises to over 97 %.



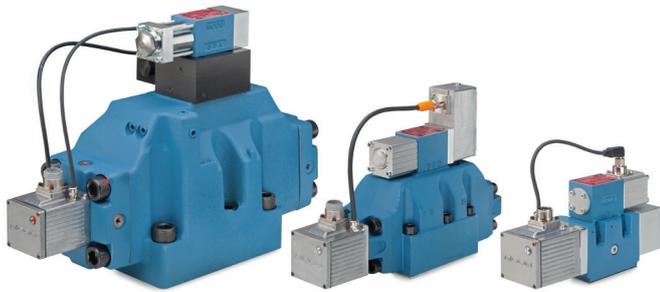
Field returns vs. good valves

Sumitomo (SHI) Demag continues the development and presents a revised and optimized El-Exis generation with regard to energy savings (while maintaining the same performance) at FAKUMA 2021.



El-Exis SP 250-1600 (with courtesy of Sumitomo (SHI) Demag Plastics Machinery GmbH)

Today more than ever, the topic of energy savings is the focus of every machine optimization. Particularly in the case of high-speed machines that produce around the clock, even small annual savings add up to a significant amount and not only reduce energy costs, but also protect the environment. Simulation expert Dr. Alexander Kühnlein from Sumitomo-Demag had therefore developed measures for modifying a valve in order to achieve appropriate energy savings.



Moog D68x Series

Cooperation with Moog Experts

Moog's application engineering department has gained extensive experience over many decades in a wide range of industries, including injection molding. Individual motion control and valve solutions are developed together with the customer and tailored precisely to their needs. In the case described here, the spool of the injection control valve was optimized in close consultation with simulation experts from Sumitomo (SHI) Demag so that the characteristic curve met the requirements from the simulation. Moog was able to use its extensive knowledge of characteristic optimization to assess the feasibility and technical implementation in advance.

"High flexibility and fast delivery times for prototypes have always been a strength of Moog. The modular design of our control valves helps to meet special customer requirements in a timely manner," says Thorsten Köhler, Senior Applications Engineer at Moog.

Energy Savings in the Kilowatt Range

Just a few weeks after the inquiry, Sumitomo (SHI) Demag was able to check in its own test center how the optimized spool cut behaves in reality. In the end, it was confirmed that the adapted geometry can reduce electrical power consumption without any restrictions in the metering or injection behavior of the machine.

For a thin-wall production cycle with a cycle time of 7 s, a reduction in average power consumption of up to 3 kW was demonstrated. Assuming a realistic operating time of the packaging machines of 7,000 h per year, this results in annual savings of €4,200 at an electricity price of 20 ct/kWh. With a machine operating time of 15 years, the total saving is €63,000, without any loss in performance or reliability.

This example impressively demonstrates that there is still enormous potential for optimization and savings in classic valve technology, which can be realized through computer-aided simulation and consistent implementation - in this case through the modification of a single component.

On the new EI-Exis SP, the proven D68x Series with directly driven pilot valve, which is well established in the injection molding industry, is used. With its low leakage volume flow, it makes a further contribution to energy efficiency.

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