Large-scale pumps fulfill the highest standards as core components in factory projects

Logistical perfection over 150 meters

They are the tireless ‘Hidden Champions’: Large-scale gear metering pumps reliably feed the melt for synthetic fibers through the system under precisely-controlled conditions. Day in, day out – often for decades. And Oerlikon Barmag has just as much experience in constructing these key elements – and is currently the world's only full-range supplier of all direct spinning plant pumps.

From the reactor to the spinning beam, polymerization and polycondensation systems include around 150 meters of pipes. The freshly-produced plastic melt flows along these pipes, navigating the turns within the system through to the individual spinning positions, where it is transformed into filaments. This journey demands logistical perfection, as the ‘passenger’ should arrive in tip-top shape if it is to be further processed into quality yarns. For this, the feed pressure, feed volume, temperature and viscosity of the melt have to remain within the defined parameters at all times.

These demanding tasks are mastered by two large-scale pumps in direct spinning systems: the discharge pump draws the melt from the reactor using vacuum. The booster pump is installed around half-way along the melt pipe, compensating pressure losses occurring up to this point to ensure downstream consumers such as spinning pumps are able to optimally further process the melt. Here, the large-scale pumps supply numerous spinning positions simultaneously. If one of these key components fails, the spinning plant practically comes to a standstill – with a corresponding loss of production.

For this reason, reliability, quality and precision are the decisive factors for success within the pump market. Oerlikon Barmag focused on this early: gear metering pumps from Remscheid have not only been deployed in the textile industry since 1922. On the basis of its decades of experience, the company is also the world's only supplier of the entire product range of all gear metering pumps for modern direct spinning systems – from large discharge and booster pumps with 330 kilogram gears all the way through to more filigree spinning and spin finish pumps with the smallest gears weighing just 1 gram. “Our single-source technology is perfectly harmonized, also with regards to the targeted project planning and the smooth operation of automated factories comprising the polycondensation system, the spinning plant through to the finished package”, states Klaus Lorenz, Head of the Oerlikon Barmag Pump Division.

Discharge pump with 3D-printed element

Here, customers benefit from the latest metering and conveying technology, which is constantly be adapted to the process requirements and optimized. To this end, the interior and gear geometries of the discharge pumps are systematically designed for optimum conveying, filling and heating as well as for the lowest possible power consumption and melt temperature increase. One highlight is the self-developed, maintenance-free POLYVAC seal, which – since recently – has been able to be equipped with a printed cooling ring for active temperature control. The element's additive production enables the utilization of a special material that contributes towards improving function and manufacture. A series of temperature sensors also allows users to determine the condition of the support points and the pump and all times. Oerlikon Barmag discharge pumps convey up to 12 liters of melt per revolution.

And the booster pump's vapor heating system has also been optimized. As a result of the more efficiently-designed construction and manufacturing, it now controls the temperature even more evenly. These pumps generate pressure build-ups of up to 300 bar and also feature a maintenance-free sealing system.

What level of precision the pump technology offers is demonstrated by the spinning pumps, which are manufactured with micrometer precision. “They have to pump the exact same amount of material from each filament outlet of the spin pack, ensuring the filament weight remains absolutely constant”, explains Klaus Lorenz. This extreme metering accuracy characterizes the entire system and is ultimately required by all pumps involved. Therefore, Oerlikon Barmag pumps achieve a volumetric degree of efficiency of more than 99 percent, a peak value within the market. “Our technology caters to the highest quality standards at all levels – from the raw material through to manufacturing”, he states, reassuringly. It is for this reason that Oerlikon Barmag large-scale pumps have been operating for 20 years and longer in many cases. » (tho)