

Constant quality in the preform production process

Automatic control of injection pressure

Process control, stable product characteristics and improved energy efficiency: Piovan claims that these aims have now also been achieved in PET treatment thanks to its Automatic Injection Pressure Control (AIPC) Technology.



AIPC is the new Piovan patent-pending technology which enables the injection moulding machine to "guide" the Genesys drying system so that it operates with a constant injection pressure around a customer-defined set point.

In a conventional PET preform production system, the resin drying phase is not connected to injection and preform production: therefore, the pressure does not always fall within a predetermined range of values which could ensure a constant product quality throughout the cycle. On the contrary, the pressure fluctuates continually, causing possible variations in the characteristics of the PET products.

Injection pressure

Injection pressure is a fundamental process parameter, because it is directly dependent on the amount of water left in the PET after the drying process. Keeping it constant ensures that the preforms produced always have the desired properties and physical characteristics.

Prior to the introduction of automatic pressure control, Genesys dryer's performance was optimised using the AECS algorithm, based on measurement of the weight loss of the dried material. Equipped with a state-of-the-art control, Genesys is a "self-adaptive" system: it automatically, continually manages the quantity of air to be introduced into the production process; further, it allows reductions of 35% to 55% in electricity consumption, independently stabilises the air flow in the

drying hopper and recovers energy for sieve regeneration, creating additional savings compared to the conventional systems currently used for PET processing.

Although precise, injection pressure monitoring is one-way and takes place on a feedback basis; in addition, the graph of this essential parameter shows significant variations. Now, Piovan has researched and with AIPC developed an innovative system for minimising them.

With AIPC, the IMM itself supplies the data necessary for process management, ensuring that the degree of drying is really suitable for the type of preform to be produced. With the aid of a signal transducer, the injection pressure is continually measured at the extruder and sent to the Genesys dryer. The dryer continually adapts its operation even more effectively in order to keep it within a working range suitable for the type of production, with variations not exceeding ± 2 bar throughout the cycle.

Equipped with automatic pressure control as well as with self-adaptation functions, Genesys gains the capacity to operate constantly in line with the IMM. The machine supplies continuous reading of the injection pressure and the dryer adapts its action on the basis of this uninterrupted data exchange. The result is shown on the control screen: the graph remains stable within ± 2 bar of the operator's chosen set point.

The advantages claimed for the system include: the injection pres-

sure remains stable: rejects are reduced. The cycle time is improved thereby increasing efficiency and electricity consumption is optimised.

Advantages

- The injection pressure remains stable around the optimal value set on the basis of the product's required characteristics.
- AIPC Technology allows to determine, in a precise and accurate way, the preform properties that depend on the injection pressure value. Keeping this value constant ensures that the intrinsic viscosity (IV) and acetaldehyde (AA) values do not vary during the production process: the quality of the result remains unchanged.
- Reduction of rejects
- The total synchronisation between dryer and IMM during the production of the actual preform improves the cycle time and increases the productivity of the whole system.
- The dryer's electricity consumption is optimised, maximising the energy efficiency of the entire system and reducing waste and costs.

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