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Benchmarking

Fibre reinforced plastics in load bearing applications

Process integration for the sealing of plastic parts

Mould and seal on a space-saving 24m²

In collaboration with Engel, Sonderhoff presented, at this year's symposium in St Valentin, Austria, Mold'n Seal, a particularly sophisticated integration solution, which in terms of efficiency and product quality combines the two previously separate processes of injection moulding and foam gasketing (see also polymotive 7+8/2012). Thus pre-produced injection moulded parts and intermediate storage can be eliminated.

On an Engel victory 1350/300 tech series hydraulic injection moulding machine, housings for moisture-proof luminaires from Zumtobel Lighting were injected and then provided with a Sonderhoff polyurethane (PU) sealing bead immediately thereafter. Short curing times of 2 to 3min for the gasketing material supplied by Sonderhoff Chemicals enable faster further processing of the components. Only one robot is required for the parts handling of both procedures: injection moulding and foam gasketing. This results in a reduced space requirement of just 24m².

Foam gasketing within the injection moulding cycle

In the injection moulding process, the application of foam gaskets is determined by the injection moulding cycle or cycle time. Within a 55s per injection moulding cycle, in an 8h uninterrupted shift, a total of 523 luminaire housings could be injection moulded, removed from the mould, foamed and placed on a discharge belt for curing and further processing. In this specific application, the Mold'n Seal process was appropriately adapted to the injection moulded part as follows: the housing of the moisture-proof luminaires is taken out of the injection moulding system by an Engel "Easix" robot and placed in a waiting and cooling position. Then the robot arm grasps an already cooled component, guides it past an ionising station to the MK 600 mixing head of the Sonderhoff mixing and dosing system, and positions the groove of the luminaire housing directly below the mixing head dosing needle. The multi-axis robot is programmed so that it moves the mixing head, accurately tracking the groove contour of the component; the dosing needle of the MK 600 precisely applies the gasketing material on the base of the groove which is only a few millimetres thick. The output rate of the mixing head is 0.45g/s. After placement on the discharge belt the injection moulded part cools and the foam gasket hardens within 2 to 3min. Thus, further processing is possible after just a short time. The specially developed fast reacting, two-component gasket material from the Fermapor K31 product line of Sonderhoff Chemicals can bridge a mixing head standby time of 25s. Within this time, the robot arm takes a new part out of the injection mould, places it in the cooling position, removes a part that has already been placed there, guides it past the ionising station, and when the part is positioned under the mixing head, starts the sealing application again.

For Sonderhoff, the challenge in developing the procedure was to formulate a gasket material with which the reaction of the two material components can be adapted to each specified injection moulding cycle, and with which the sealed part can be quickly further processed. So the sealing specialist, Sonderhoff Chemicals in Cologne, Germany, developed new formulations for fast-reacting foam gasket systems, the so-called Fast-Cure gaskets from the Fermapor K31 product line that are said to enable in-line processing in the injection moulding cycle.

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Mold'n seal inline processing (photo: Sonderhoff)