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Calculation of Process Capability Before Series Production as Precondition for the Design of Multi Component Injection Moulded Parts

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Multi component injection moulding processes like the Sandwich Technique and the Gas Injection Technique have been applied in a large number of areas particularly over the last few years. Especially in automotive industry these processes have been employed increasingly. The actual shape of a moulded part results from the requirements placed on the part design and function. This makes it necessary for the process employed to incorporate due consideration to design guidelines and be adaptable to the properties desired in the moulded part being produced. In conjunction with the structural layout of the moulded part, it must be stated that the position of the melt injection points is of particular importance, in addition to general design guidelines. The position of the melt gate must be optimised concerning the melt flow to get an appropriate melt front advancement in the mould. This is of major importance especially because an unfavourable melt front advancement as a result of the design of the part and the melt injection point(s) leads to a very sensible process by means of faults in the filling and packing phase of the moulding process. To take this into account statistical methods, derived from well known SPC- index C_p combined with Design of Experiments (DoE), have been developed for the evaluation of process capability before series production. The presentation explains the benefits of the method and how to draw advantages from it for mould design and process layout.