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**Temperature development of wall-slipping melts**

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The temperature development in a single screw extruder has an important effect on the quality of the resulting product. Even slight variations in temperature may cause a decrease in quality. Especially while processing heat sensitive polymer melts like PVC high temperatures lead to thermal degradation. So it is important to know about the temperature development of polymer melts in a single screw extruder to predict the feasibility of a process.

While processing polymers on a single screw extruder, wall-slipping materials show lower melt temperatures than wall-adhering materials. Temperature increases with an increasing part of dissipated power. The reason for the lower temperatures of wall slipping melts is the reduced part of dissipated power compared with wall-adhering melts.

Up to now there are no mathematical models existing, which describe the melt temperature of wall-slipping materials in a flow channel of a single screw extruder. In this paper an analytic procedure based on dimensionless analyses of the flow characteristics of wall-slipping melts and the energy equation is presented, that allows a prediction of the melt temperature.

Both the maximum temperature and the melt temperature at the screw root surface are reduced as against the case of wall adherence. The maximum temperature is reached in the upper third of the screw channel. A comparison of the mean temperatures of the results of computer simulation and evolved models shows high correspondence.