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## **Velocity, Residence Time and Mixing Efficiency in a Helical Screw Channel**

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We present a new analytical solution for flow of a viscous fluid in a single screw channel, that takes into account the torsion and curvature of the channel. Contrary to common knowledge in polymer processing based on the Parallel Plate Model, we found that, in the case of cross-sections with large aspect ratio, torsion effects can be significant. The implication of the model on velocity field, residence time and mixing efficiency is investigated and compared to the predictions of the classical Parallel Plate Model and to 3D finite elements calculations.