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Balancing of Profile Dies Using Three-Dimensional Flow Simulation

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Three-dimensional finite element simulation of the flow in two different profile dies is presented. The dies used are actual production dies currently being used to manufacture TPE glass run seal for window of a car. One of the die is a plate die, whereas the second die a stepped die. The predicted velocity distribution shows that the plate die is highly unbalanced with large velocity variations along the exit profile. The feeder plate in the stepped die was designed to effectively balance the flow at the die exit. The feeder plate has larger opening in the narrow portions of the exit profile and smaller opening for portions with wider exit profile. The predicted velocity distribution at the exit of the stepped die has only minor variations, which are well within an acceptable limit. The predicted temperature in the plate die is not maximum at the center, but in a thin layer near the die walls, whereas, in the stepped die the temperature is maximum near the middle.