



Application of Ultrasonic Vibration in Injection Moulding Process

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Abstract

The idea of using ultrasonic energy in injection moulding process has been proposed in the past. Also none of these earlier concepts became commercially viable. Ultrasonic can be applied to moulding tools or to the polymer. The application of high frequency oscillation to a polymer is known to have an ameliorative effect on the melt flow characteristics. Such an improvement would appear to have particular advantage in injection process. This paper presents the design and fabrication of an ultrasonic system that applies ultrasonic vibration directly to polymer flow. The effect of ultrasonic vibration on the flow characteristics are studied experimentally in a spiral mould.

Keywords: Ultrasonic Vibration, Injection Moulding, Spiral Mould

1 Introduction

Injection moulding field is getting an increasing importance due to the great number of parts manufactured by this means. The wide range of parts that can be produced, the short cycle time, and the low material cost, caused other material parts be redesigned to be manufactured by injection moulding. On the other hand, new non conventional injection technology to reduce cycle time, cost, energy and increase the efficiency have recently arisen.

The idea of using ultrasonic energy in injection and extrusion systems has been proposed in the past. There are some patents in this field that generally have been suggested by companies; however few works have been reported in literatures.

Vibration can be fed into injection and extrusion systems in several ways:

- Using low frequency vibration in injection or extrusion screw for homogenizing and improvement of flow characteristics of material that is known as *Vibration Assisted Injection Moulding (VAIM)* [1].
- Using high-frequency ultrasonic vibration to decrease friction between the polymer and the cavity to facilitate the flow in mould [2].

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