

New Processing Technology for Polymers: Electromagnetic Dynamic

Injection Molding

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ABSTRACT

In this paper, a new concept of the enhancing polymer injection molding with vibration force field is introduced, based on the analysis of the conventional injection molding machine. Furthermore, the electromagnetic dynamic injection molding machine for polymer is also introduced including the principle, structure and application. With the new injection machine, a dynamic vibration field is adopted into the whole procedure of polymer plasticizing and injection process. The new machines have been in practical application. Some experimental studies also have been made on the molding processing and the properties of the moldings. The test results and practices show that the new type of machine has many advantages over general injection molding machine, such as reducing energy consumption by over 50%, lowering melt temperature by over 20°C and lowering injection pressure by over 10%. And in the meantime, the mechanical properties of moldings can be improved by over 15%. In particular, the commingling and dispersing effect of inorganic fills in a multi component system is enhanced markedly. There are evidences that the dynamic vibration field could change the flow pattern of polymer melt filling into mold. The new injection molding technology is of great significance to the development of polymer processing industry.

Keywords: polymer, dynamic plasticating injection, vibration force field and electromagnetic dynamic injection molding machine