

Visco - Plastic Transition and Transfer of Plastic Material with SGF in case of Linear Dry Friction Contact on Steel Surfaces

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Abstract : Often for the laboratory studies, modeling of specific tribological processes raises special problems. One such problem is the modeling of some temperatures and extremely high contact pressures, allowing modeling of temperatures and pressures at which the injection or extrusion processing of thermoplastic materials takes place. Tribological problems occur mainly in thermoplastics materials reinforced with glass fibers. They produce an advanced wear to the barrels and screws of processing machines, in short time. Obtaining temperatures around 210 °C and higher, as well as pressures around 100 MPa is very difficult in the laboratory. This paper reports a simple and convenient solution to get these conditions, using friction sliding couples with linear contact, cylindrical liner plastic filled with glass fibers on plate steel samples, polished and super-finished. C120 steel, which is a steel for moulds and Rp3 steel, high speed steel for tools, were used. Obtaining the pressure was achieved by continuous request of the liner in rotational movement up to its elasticity limits, when the dry friction coefficient reaches or exceeds the hardness value of 0.5 HB. By dissipation of the power lost by friction on flat steel sample, are reached contact temperatures at the metal surface that reach and exceed 230 °C, being placed in the range temperature values of the injection. Contact pressures (in load and materials conditions used) ranging from 16.3-36.4 MPa were obtained depending on the plastic material used and the glass fibers content.

Keywords : plastics with glass fibers, dry friction, linear contact, contact temperature, contact pressure, experimental simulation

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