SUPERFINISHING OF THE ACTIVE PARTS OF THE THERMOPLASTIC MATERIALS INJECTION DIES

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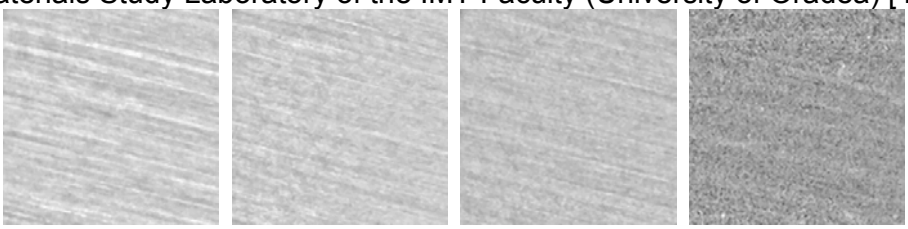
This paper presents classic and nonconventional methods for building the active parts of thermoplastic materials injection dies and their superfinishing, along with the materials and devices used to obtain different qualities of the worked surfaces, according to the role and importance of the part to be made; the paper is based on the experience gathered by the author in the field of nonconventional working of the thermoplastic materials injection dies, during the elaboration of the PhD thesis.

One of the main factors used to establish the technological parameters of the thermoplastic materials injection dies working by both classic and electrical discharge machining is the worked surface roughness, expressed by means of roughness parameters Ra. The surface quality is determined by the micro-geometric aspect (surface roughness) and the physical aspect (structure and properties of the surface layer).

Fig.1 shows superfinished surfaces, magnified 25X by the CITIVAL microscope from the Materials Study Laboratory of the IMT Faculty (University of Oradea) [4].



R_a = 0.2 µm R_a = 0.1 µm R_a = 0.05 µm R_a = 0.025 µm

Fig.1. Superfinished surfaces.

When products are to be made by injection in dies, the quality of the die active parts is very important. Thus, the superfinishing is executed only for some particular parts, with high requirements concerning the outer aspect, which can turn out to be even more important than the dimensional precision in some particular cases. Superfinishing requires largely extended periods of time that may greatly exceed the time to realize the entire injection die itself, which implies also the considerable augmentation of the product price.

The coarse grinding and finishing of the die active parts is achieved on CNC milling and turning machines, at high speed. In this manner, materials thermally treated up to HRC65 can be worked, with surface quality up to Ra = 0.4 µm.

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