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Profiling of the flat-tool for manufacturing worms with circular eccentric profile by cold forming

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Abstract. The incremental pumps are encountered in pharmaceutical and cosmetics industries. One of the most representative categories of these pumps is formed by the progressing cavity pumps. The helical surfaces with circular profile, eccentrically positioned relative to worm axis, are frequently used in their rotors construction. In this specific case, the constructive dimensions of the worms allow their manufacturing by cold forming, with flat-tools similar to screwing dies. In this paper, an analytical algorithm for profiling such flat-tool is proposed. The algorithm starts from the analytical definition of the helical cylindrical surface with constant pitch of the generated worm, and it lays on the "Minimum distance method". The equations of the gearing surface between worm and flat-tool are found, and, based on this, the active surface of the tool is determined. A MatLab application developed for implementing the profiling algorithm is presented. The results obtained after running the application in the case of a particular generated surface are also included.

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