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EFFICIENCY AND QUALITY CAPABILITY OF DISCONTINUOUS COOLING TECHNIQUES

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In recent years the efficient performance of so called “discontinuous” cooling strategieswas advertised repeatedly with the help of selected success stories. Nevertheless, the advantages and limitations of this cooling technique are still a matter of controversial debate. It is typical of these systems that the coolant flow in the mold is not kept up throughout the cycle but rather initiated for a limited cooling impulse. A heat flux from the mold to the coolant will only occur during a defined fraction of the cycle. Thus, regardless of the set-point mold temperature cold water can be used instead of tempered coolant.This comparatively simple design of these cooling units promises a cost-effective coolingespecially when a large number of temperature control units per mold is installed.et independent information on whether or not the results presented in recent publications are universally valid and can be transferred to any other part geometry is not available. It is still unclear, in which way a cold water impulse influences the part quality and the reproducibility of the process. It is likely that the efficiency of discontinuous cooling techniques depends very much on the level of the required mold temperature. However, neither such correlations nor the realizable range of mold temperatures itself have yet been investigated. Thus, the performance of a discontinuous cooling system was systematically analyzed with a focus on the controllability and reproducibility of the process. For the investigations the wall thickness of the part was varied to ensure the transferability of the results. It became clear that shorter cycle times can be realized compared to conventional cooling techniques. But the number of cycles before an equilibrium of the mold temperatures is reached is large, especially for high mold temperatures