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Development of a concept for the use of low-temperature emulsion in drilling of Inconel 718

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Abstract

Due to their low thermal conductivity, nickel-based alloys can cause an increased thermal energy flow to the cutting tool during machining. This may result in intensive tool wear and a poor bore quality. In order to increase the process cooling during drilling, a new concept has been developed to supply a cooled emulsion at temperatures of $T \approx -20$ °C to the process under high pressure. Therefore, a low-temperature emulsion itself and a circuit for the supply of the emulsion were developed. This should enable a higher productivity as well as component quality.

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