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“CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD”

Cleaner Machining Through a Toolholder with Internal Cooling

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Abstract

This work treats of a cooling system for cutting tool in turning based in a toolholder with cooling fluid flowing inside its body being that this fluid must necessarily be able to phase change due to heat generated from machining processes. In this way the fluid evaporates just under the cutting tool allowing a heat transfer more efficient than if were used a fluid without phase change once the latent heat of evaporation is beneficial for removal heat. Following, the cooling fluid evaporated passes through a condenser located out of the toolholder where it is condensated and returns to the toolholder again and a new cycle is started. In this study the R-123, a hydrochlorofluorocarbon (HCFC) fluid, was selected for the turning of a Cr-Ni-Nb-Mn-N austenitic steel of hard machinability. As result, the developed system allows a tool life equal to or better than the conventional cutting fluid method, moreover there are environmental and economics advantages once the cooling fluid is maintained in a loop circuit. .

Keywords: *Turning; Internal cooling; Dry machining; Tool life; Coolant fluid*

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