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FORMABILITY OF WARM DEEP DRAWING PROCESS FOR AA1050-H18 RECTANGULAR CUPS

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ABSTRACT

In this present work, a statistical approach based on Taguchi Techniques and finite element analysis were adopted to determine the formability of rectangular cup using warm deep drawing process. The process parameters were thickness of blank, temperature, coefficient of friction and strain rate. The experimental results were validated using a finite element software namely D-FORM. The AA1050 –H18 sheets were used for the deep drawing of the rectangular cups. The blank thickness by itself had a significant effect on the effective stress and the height of the rectangular cup drawn. The reduction of the drawing force was perceived with the increase of temperature. The increase in the effective stress was found due to the requirement of high drawing pressures for thick sheets to undergo plastic deformation. The formability of the rectangular cups was outstanding for the surface expansion ratio greater than 3.0. The damage was less in the rectangular cups drawn with the friction coefficient of 0.075. The formability of deep drawn rectangular cups is difficult with blank thickness less than 1mm.

KEYWORDS: AA1050-H18, Warm Deep Drawing, Thickness, Temperature, Coefficient Of Friction, Strain Rate, Finite Element Analysis, Formability