

Effect of Punch and Die Profile Radii on the Maximum Drawing Force and the Total Consumed Work in Deep Drawing of a Flat Ended Cylindrical Brass

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Abstract : Deep drawing is considered to be the most widely used sheet metal forming processes among the particularly in automobile and aircraft industries. It is widely used for manufacturing a large number of the body and spare parts. In its simplest form it may be defined as a secondary forming process by which a sheet metal is formed into a cylinder or alike by subjecting the sheet to compressive force through a punch with a flat end of the same geometry as the required shape of the cylinder end while it is held by a blank holder which hinders its movement but does not stop it. The punch and die profile radii play In this paper, the effects of punch and die profile radii on the autographic record, the minimum thickness strain location where the cracks normally start and cause the fracture, the maximum deep drawing force and the total consumed work in the drawing flat ended cylindrical brass cups are investigated. Five punches and five dies each having different profile radii were manufactured for this investigation. Furthermore, their effect on the quality of the drawn cups is also presented and discussed. It was found that the die profile radius has more effect on the maximum drawing force and the total consumed work than the punch profile radius.

Keywords : punch and die profile radii, deep drawing process, maximum drawing force, total consumed work, quality of produced parts, flat ended cylindrical brass cups

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