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DIPLOMA IN
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TOPIC:

DESIGN OF A PRODUCT BY
COLD FORGING

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INTRODUCTION

Cold extrusion is a special type of forging process wherein cold metal is forced to flow plastically under compressive force into a variety of shapes. These shapes are usually axisymmetric with relatively small nonsymmetrical features, and unlike impression die forging, the process does not generate flash.

The terms “cold forging” and “cold extrusion” are often used interchangeably and refer to well-known forming operations such as extrusion, upsetting or heading, coining, ironing and swaging. These operations are usually performed in mechanical or hydraulic presses, several forming steps are used to produce a final part of relatively complex geometry, starting with a slug or billet of simple shape. Through a combination of these techniques, a very large number of parts can be produced.

In warm forging, the billet is heated to temperatures below the recrystallization temperature, for example up to 700°C to 800°C for steels, in order to lower the flow stress and the forging pressures. In cold forging, the billet or the slug is at room temperature when deformation starts.

Cold and warm forging are extremely important and economical processes, especially for producing round or nearly round parts in large quantities. Some of the advantages provided by these processes are :

- (i) High production rate
- (ii) Excellent dimensional tolerances and surface finish for forged parts.
- (iii) Significant savings in material and machining.

- (iv) Higher tensile strengths in the forged part than in the original material, because of strain hardening.
- (v) Favorable grain flow to improve strength.

By far the largest area of application of cold and warm forging is the automobile industry. However, cold forged parts are also used in manufacturing bicycles, motorcycles, farm machinery, off-highway, equipment, and nuts and bolts. In the cold forging, process development and die costs are relatively high. Therefore, cold is, in general, a high production volume process. The weights of parts produced by cold forging range from five grams to fifty kilograms. As a general rule, the economic minimum production volume depends on part weight.