

# Size-Effects in Micro-Metal Sheet Forming of Unalloyed Copper and Brass

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**Abstract.** Micro-metal forming technologies are mass production methods, net shape forming, low-cost procedures and quality controlled processes. Its scale region is in the range of the margin area between conventional precision manufacturing and silicon-based technology. The first paper to study the field of micro metal forming was written in 1989. Up to now, there have been many papers in this field but the results of the experiments do not reach the same conclusions. It should be noted that it is not possible to apply the know-how of conventional forming processes to the field of micro-metal forming due to the so-called size effects. In this study, two kinds of sheet materials such as C12000 and C26000 copper alloys are used to do a micro-upsetting experiment and micro-tensile experiment. It can be found that the size effects of micro-metal forming in C12000 agree with the description in previously published papers. However, the C26000 alloy has high matrix strength and significant fine grain strengthening that produce different size-effects of micro-metal forming. In this paper, we compare these two materials and suggest explanations for this problem. Therefore, the result can provide a general solution and discussion of micro-metal forming processes in unalloyed copper and brass.