

## CASE STUDY

### Copper-Steel Spacer



*A 2018 Award of Distinction winner in the Lawn & Garden/Off-Highway category*

**Process:**

Conventional powder metallurgy

**Material:**

FC-0208 copper steel

**Secondary Operations:**

Resin impregnation and zinc plating

**End Use and Function**

Initially intended to be a machined wrought part, this conventional press-and-sintered component is used in a tilt steering mechanism as a pivot on the ATV/SSV application. It is over-molded with plastic and sees very little stress in the application.

**Fabrication**

The design process and open dialogue between end user and powder metallurgy fabricator played a critical role in the successful development of this component. The part required some development time on a specific conventional press on one bottom punch and a stepped core rod. There is a straight wall die and a face-detailed top punch. Care was exercised to maintain a strict die table float and specific stop to ensure good density from top to bottom with a well-centered lower density region. A variety of materials were tested to ensure the least amount of variation and reduced tonnage. The parts are molded and sintered to net shape. They are tumbled part on

part at the end of the furnace. Secondary operations are resin impregnation and zinc plating.

**Results**

Specifying the best material decreased the cost 30%. Overall, the PM component cost significantly less than the wrought component. This product is used in one of the end-user's fastest growing and most competitive product lines. While in PM terms the parts appear relatively simple, PM had not initially been considered by the end user design group. This transition helped convince this particular end user design group of the value and flexibility of powder metallurgy. This component has now been in production for multiple years without a quality or performance concern or rejection, confirming just how repeatable the process is. This success has opened more doors for PM components in their steering systems.



PickPM is a resource created by the Metal Powder Industries Federation, a trade association for the metal powder industry, for the benefit of the metal powder industry. To learn more about powder metallurgy, or to find a part fabricator, visit us at [www.PickPM.com](http://www.PickPM.com)