

CASE STUDY



A 2014 Award of Distinction winner in the Hand Tools & Recreation category.

Bathtub Drain Tool

Process:
Conventional powder metallurgy

Secondary Processes:
Machining

Material:
FN-0405 modified nickel steel

Density:
6.9 g/cm³

Tensile Strength:
> 1,050 MPa

Yield Strength:
> 690 MPa

Hardness:
30 HRC

End Use and Function

This bathtub drain tool is an assembly of five powder metallurgy components—two drain wings, drain top, drain bottom, and drain shaft—created to remove bath tub drains in order to replace with new trim when updating or remodeling bathrooms.

Fabrication

This innovative design maximized the use of powder metallurgy technology by simplifying part complexity in order to facilitate easy assembly. The tool needed to be able to securely grip the smooth inside surface of a plated pipe while withstanding the torque forces on the hex shaft caused from turning the drain tool with a socket wrench.

The two integral cams on the shaft create the action that forces the grippers into the pipe ID. The parts have a density of 6.9 g/cm³, an ultimate tensile strength >1,050 MPa, a yield strength >690 MPa, an elongation >2.0%, and a 30 HRC hardness. The parts are produced to net shape with two machined grooves for the circlips being the only secondary operations needed.

Results

The innovative design maximizes the benefits of powder metallurgy technology while simplifying complexity for easy assembly with two circlips and two dowel pins.

Additionally, this tool can be manufactured from recycled scrap iron and recycled if it is discarded.



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 PickPM.com