CASE STUDY

A 2014 Grand Prize Winner in the Lawn & Garden/Off-Highway category.

Disengagement Mechanism

Process:
Conventional powder metallurgy

Secondary Process:
Carburized and precision shot peened

Hardness:
30 HRC

Tensile Strength:
620 MPa

Density:
6.8 g/cm^3

Yield Strength:
550 MPa

End Use and Function

Copper-steel parts that make up a disengagement mechanism of an intuitive differential snowblower system that allows the user to pivot the unit in place by disengaging one of the wheels.

Fabrication

These two parts combine for 11 pressing levels, requiring precisely timed tool motions at ejection, along with sophisticated robotics, for crack-free removal from the lower punches. Combining punch face details and tool levels results in 18 planar levels on the 2 components. The parts have a density of 6.8 g/cm^3, a typical tensile strength of 620 MPa, a yield strength of 550 MPa, and an apparent hardness of 30 HRC. Despite their tremendous shape complexity, these parts are formed to net shape, and specially developed sintering fixtures ensure that flatness and level-to-level relationships are maintained.

Results

As a new technology in this product category, this intuitive differential is expected to set the standard for tight-turning requirements for machines of this type.