CASE STUDY

A 2018 Award of Distinction winner in the Electronic/Electrical Components category.

Upper Beam Handle

Process:
Metal injection molding

Material:
MIM-17-4 PH stainless steel

Density:
7.5 g/cc minimum

Yield Strength:
730 MPa

Finish:
Aluminum oxide abrasive blast

Hardness:
36–42 HRC

End Use and Function

This award-winning component is a metal injection molded (MIM) stainless steel upper beam handle. The part goes into a removable brush holder assembly used in turbine generators in the nuclear, gas, coal, wind, and hydro industries. The component features complex geometry with reduced cost savings.

Fabrication

Redesigned from a previously 100%-machined component, this component uses innovative fabrication techniques to achieve its many intricate details. One of the more advanced techniques for this part is the use of a custom-designed tray for staging the parts in sintering. This special design minimized distortion in the parts during the sintering operation and minimized the need for post-secondary operations. Only a cold-work coining step and a single post-machined operation was required for a single dimension in order to bring the part to within specification.

Results

The redesign from a machined component to a MIM component reduced the per part cost by 60%. The redesign reduced the need for machining down to a single feature post-sinter. Functional and industry-standard testing was performed by the customer in conjunction with the mating assemblies. The parts manufacturer used in-process CMM verification during the final machining operation.