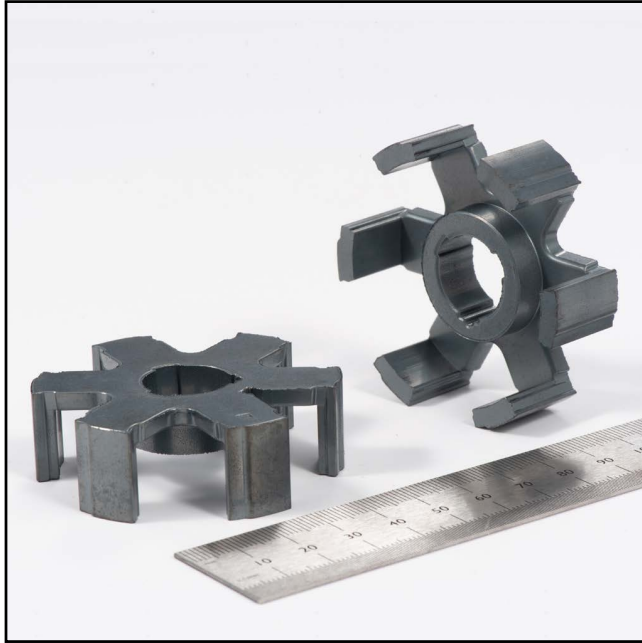


CASE STUDY



A 2021 Grand Prize Winner in the Hardware/Appliances category for Conventional PM Components

Stator Superior and Inferior

Process:
Conventional powder metallurgy

Material:
Soft-magnetic composite

Density:
7.4 g/cm³

End Use and Function

This soft-magnetic composite superior and inferior stator is used in a mono-phase induction ceiling fan motor. The component was specifically designed for the PM process to take advantage of the 3-D magnetic flux.

Fabrication

The parts are made using an iron powder coated with an insulating inorganic material that has high resistivity, and the parts have excellent magnetic permeability. A high compacting pressure of 800 MPa (60 tsi) was required to achieve the 7.4 g/cm³ minimum density. During engineering, the proper tooling material was identified, resulting in reduced tool wear and increased tool life. The parts are cured rather than sintered, and a special fixture was required to check the strength of the cured component.

Results

The use of an axial flux motor resulted in a change from 152 mm (6 in.) to 80 millimeter (3.1 in) in the outer diameter, less copper wiring, a 76% reduction in the mass of the motor, and 35% less energy consumption with less noise in service.



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