

CASE STUDY



2026 Grand Prize winner in the Hardware/Appliances category for conventional PM components

Ring Gear Set

Process:

Conventional Press & Sinter (PM)

Material:

F-0000-15 iron and FD-0205-45 diffusion-alloyed steel

Density:

> 6.5 g/cm³

ISO 1328 Quality Grade 9 helical gear teeth
Three-component set

End Use and Function

The ring gear set converts electric-motor torque into controlled motion for automated locking and unlocking in a smart residential door-lock system. It supports both new installations and retrofit applications.

Fabrication

The set consists of a rotor and two ring gears designed as an integrated PM system. Multi-punch compaction forms the stepped profiles and helical teeth. Critical press-fit and gear-interface tolerances are achieved through sizing, eliminating secondary machining. The components are deburred, sized, washed, and steam treated after sintering.

Results

The PM gear set provides reliable, repeatable, smooth, and quiet actuation. Integrating the three components as a coordinated system and achieving critical tolerances through sizing simplifies production and avoids machining.



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