

## CASE STUDY

### Door Lock Parts



*A 2021 Award of Distinction Winner in the Hardware/Appliances category for metal injection molded PM components*

**Process:**  
Metal injection molding (MIM)

**Material:**  
MIM-17-4 PH stainless steel age hardened to H900 specification

**Density:**  
7.6 g/cm<sup>3</sup>

**Tensile Strength:**  
1,190 MPa (172,000 psi)

#### End Use and Function

These parts (knob shaft, clutch, knob shield, core plug, core body, and control sleeve actuator) are used in the assembly of high-end digital door locks and other security devices.

#### Fabrication

The precipitation hardening stainless steel was selected due to the high strength, hardness, and better corrosion resistance. The intricate profiles of the parts have tight tolerances and all threads were produced during the molding process. Multi-cavity tooling was utilized to increase productivity, reducing per piece cost. Failure modes and effects analysis (FMEA) was performed prior to tooling manufacture to ensure proper alignment of the finished locking mechanism.

#### Results

MIM technology was selected to reduce the required machining from bar stock. This cost-effective move saved the customer over 40% while reducing lead-time and inventory. Freedom of design with the MIM process, as compared with machining, allowed a smaller footprint for many of the parts. The customer reports better performance in the field.



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