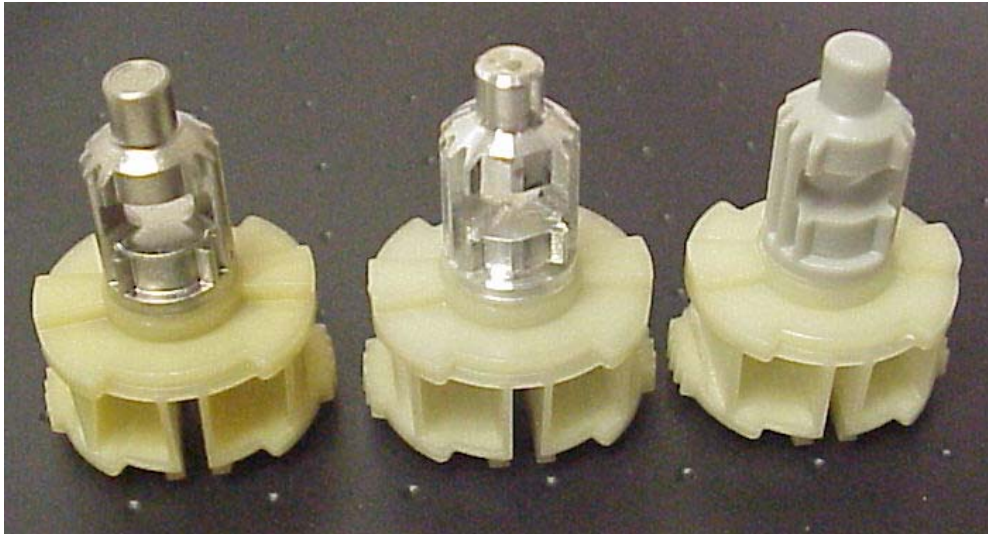


# MIM Case Study—Art Gear



Application: Medical instrument—interior mechanical component

Functional requirements: mechanical strength, precision for overmolding

Competing technologies: plastic injection molding, machining

Overall size: L x W x H = 0.460 in. x 0.386 in. x 0.895 in.

Part weight: 6.1 grams

Material: MIM-17-4 PH

# Key Characteristics—Art Gear

Gear teeth as molded. Strength over plastic, lower cost than machining



Smooth surface, no burrs or sharp edges from machining

Interrupted tooth, window for mating part

Diameter/roundness for overmold shutoff surface  $\pm.0015$

# MIM Case Study—Art Gear

- Why MIM?
  - Cost savings—20% the cost of machined part
  - High production rates. Over 10k per cav/wk
  - Strength over plastic
  - Good surface finish on gear teeth
  - Little material waste
  - Fewer burr removal problems

# MIM Case Study—Art Gear

- MIM Issues
  - Roundness  $<0.003$  in. required for shut-off surface during overmold process
    - Mold flow uniform in area of shut-off diameter
    - Gravity effects negligible and sagger drag isolated away from critical diameter
    - Coining step prepared for but not necessary due to process capability
  - Stability during processing/quality of gear teeth
    - Custom setters
    - Interrupted gear teeth shut-offs

# MIM Case Study—Art Gear

- Economics
  - No individual part handling once stacked from molding
  - No secondary operations
  - Qualified with same material part through processing to allow for smaller lot size until volume increases
- Conclusion
  - Good application for MIM
  - Fast turnaround from release of model to part approval
  - Cost saving for customer and profitable for MIM supplier