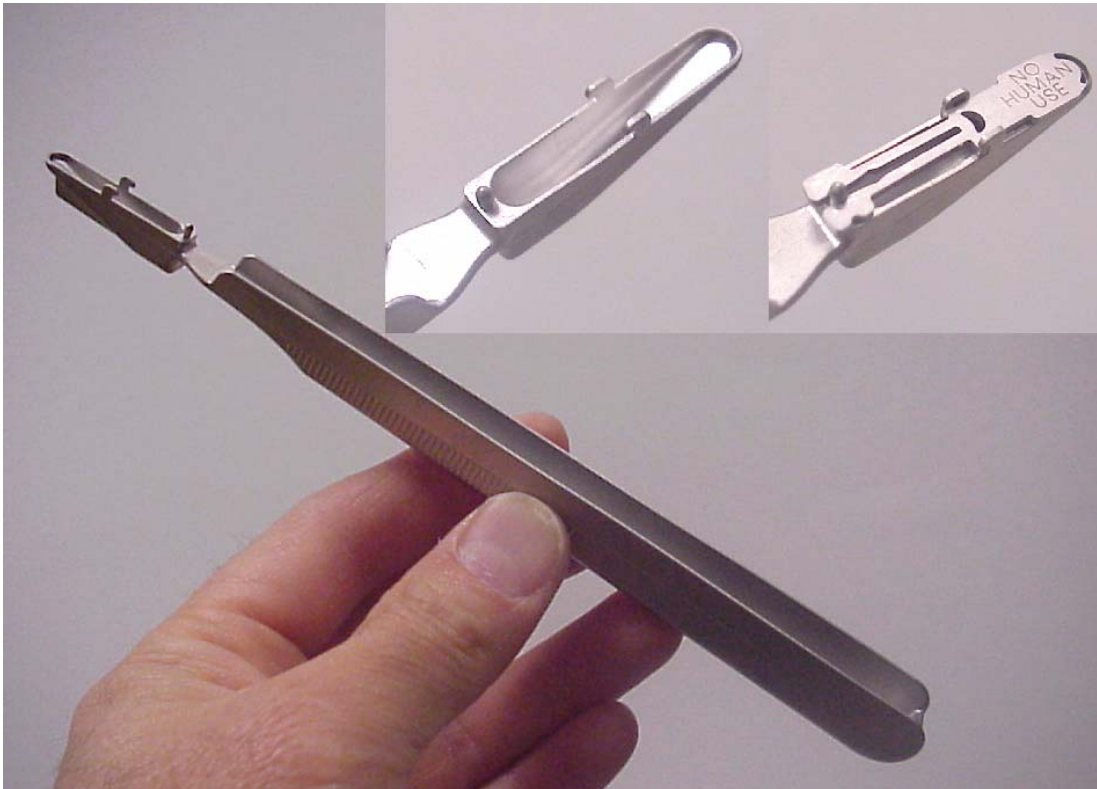


MIM Case Study—Handle

Application: Medical instrument—bone grafter

Functional requirements: mechanical strength, ductility prior to heat treat, corrosion resistance, autoclavable



Competing technologies:
machining, stamping,
forging, die cast

Overall size: L x W x H =
7.09 in. x 0.45 in. x 0.54 in.

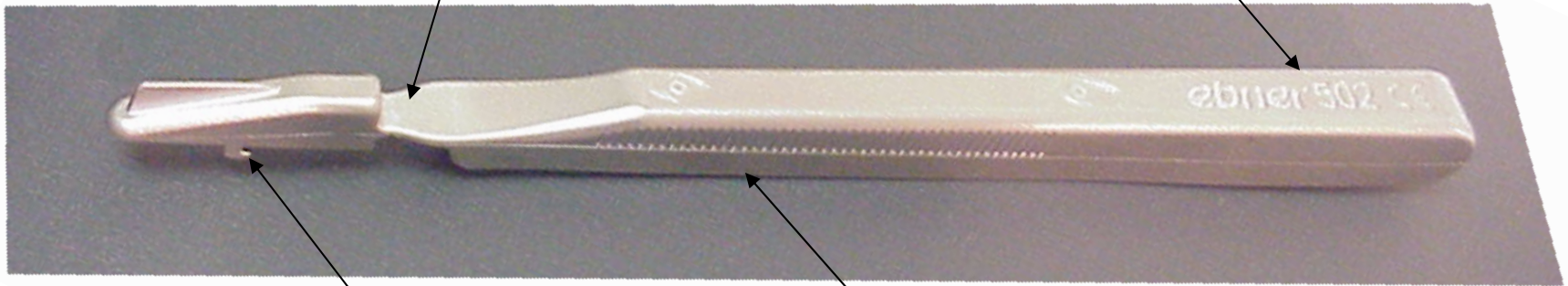
Part weight: 42.6 grams

Material: MIM-17-4 PH

Key Characteristics—Handle

Ductility of neck for creating different angled heads

Product name engraved



Flatness of blade face and width of hooks $\pm.002''$

Ribbing for grip

MIM Case Study—Handle

- Why MIM?
 - Cost savings—30% the cost of a machined part
 - Material selection/properties
 - Sufficient production capability
 - Fewer burr removal problems

MIM Case Study—Handle

- MIM Issues
 - Large Size/Thin Wall
 - Ability to fill mold 8½” length part with .025”–.040” wall thickness
 - Dimensional repeatability
 - Controlling distortion
 - Material usage
 - Sintering Footprint
 - Small lot size due to space consumption in furnace
 - Flatness requirement of sinter setter
 - Large cosmetic surface in contact with setter
 - Long distance for sagger drag
 - Cosmetic and Sterilization Issues
 - Large amount of surface area for contamination, pits, sinks, flow lines, handling damage
 - Handle subject to Class B requirement for sterilization

MIM Case Study—Handle

- Economics
 - Relatively high material and processing costs
 - Yield must be high with small lot sizes
- Conclusion
 - Original design borderline application for MIM
 - Required design changes for manufacturability
 - Functional head and neck portion successful
 - Feasible production part for low volume