

# RAPID CNC PARTS.COM

SPEED MEETS PRECISION IN EVERY PART.

## CNC Machining Design Guidelines

At Rapid CNC Parts.com, our design guidelines are the foundation of a faster, smarter CNC experience. By applying these best practices, your parts are optimized for our AI-powered quoting and programming system — designed specifically for efficient aluminum machining. Standardized tooling, automated workflows, and intelligent checks reduce cost, eliminate delays, and accelerate production. The result? Precision aluminum parts, made fast, and made in the USA.

## AI-Friendly Features Checklist

- ☐ Internal fillets  $\geq 0.0625"$  (larger fillets recommended for deeper pockets)
- ☐ Hole depths  $\leq 6 \times$  diameter, using standard drill sizes
- ☐ Threaded holes modeled as pilot holes in 3D, with callouts in 2D
- ☐ Flat surfaces with clear, unobstructed tool access
- ☐ All features visible from standard angles (avoid deep recesses or obstructed geometry)
- ☐ Features located on accessible, orthogonal faces (X, Y, Z planes)
- ☐ Wall thickness  $> 0.040"$  for aluminum
- ☐ Minimal undercuts or full 5-axis geometry

## Tool Access

Our CNC tools need a clear line of sight to cut your part. If a pocket, hole, or feature is blocked by another wall or undercut, it may require special setups or be unmachinable. Design features so they're reachable from above or a simple rotated angle.

## Deeper Pockets = Bigger Fillets

In deeper pockets, use larger internal radii —  $0.125"$  or more — to match longer tools with larger diameters. Smaller fillets at depth force the use of fragile, extended-length cutters, which increase machining time and reduce surface quality.

Rule of thumb:

- Pocket depth  $\leq 0.5"$  → Fillet  $\geq 0.0625"$
- Pocket depth  $0.5\text{--}1.0"$  → Fillet  $\geq 0.09375"$
- Pocket depth  $> 1.0"$  → Fillet  $\geq 0.125"$  or more