

# Tolerance Planning Guide

A practical framework for assigning tolerances according to function rather than applying unnecessary precision to every dimension.

## Start with function

- Identify interfaces that locate, seal, rotate, slide, align, clamp or transfer load.
- Record the acceptable functional variation before assigning a drawing tolerance.
- Separate assembly clearance, performance and appearance requirements.
- Check the full tolerance stack across mating parts rather than treating each component alone.

## Build a clear datum strategy

- Choose datums that represent how the component is assembled, located and inspected.
- Avoid dimension chains where position relative to a functional origin matters.
- Use geometric controls only when they describe the functional requirement more clearly.
- Confirm that the proposed datum surfaces can be manufactured and measured reliably.

## Match precision to process

- Compare tolerance requirements with normal capability for the selected manufacturing process.
- Allow for coating, heat treatment, mould shrinkage or post-processing where relevant.
- Reserve tight tolerances for characteristics that materially affect function.
- Agree inspection method and measurement uncertainty for critical characteristics.

## Release review

- General tolerances and drawing units are clearly stated.
- The CAD model and drawing dimensions do not conflict.
- Critical characteristics are traceable to a functional reason.
- Supplier questions and concessions are captured in the controlled revision.

### Final check

A tolerance should earn its manufacturing and inspection cost. If the functional consequence of variation is unknown, investigate that before tightening the number.