



Injection Molding Critical-to-Quality Inspection

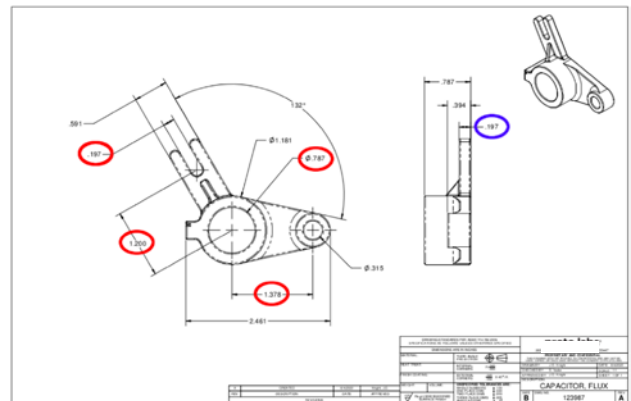
You know the parts you need better than anyone. There are always certain features that are more important than others and require very close inspection. These Critical-to-Quality (CTQ) features are the ones you can't live without.

We've developed a system that lets you call out these critical-to-quality dimensions on your parts to help you qualify them faster by providing insights into dimensional accuracy and consistency.

1. SUBMITTING YOUR DESIGN

Submit a print of your model and use a red circle to indicate the dimensions and tolerances for between one and five of the most critical features. If we can't solve issues involving tolerances for any of these without affecting your experience or lead time, we will reach out and let you know of other options available to meet your needs.

You can also use a blue circle to indicate features that are for reference only—not as critical to your parts, but you still want to flag. As always, we will put our best foot forward to meet the tolerances for the feature. Unlike red-circled specifications, however, if we can't meet that feature's specifications precisely, we will move ahead with manufacturing, rather than delay the order.

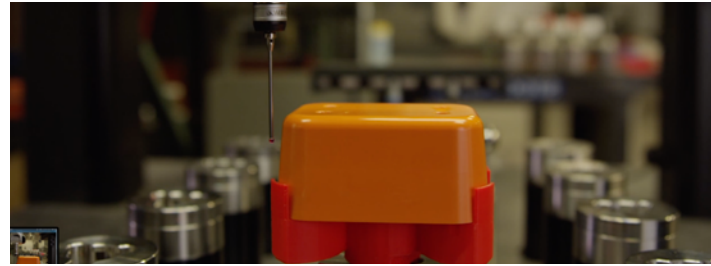


2. REVIEWING YOUR INSPECTION STATEMENT OF WORK

Our applications engineering team will review your model and email you an Inspection Statement of Work (ISOW), which lets you know if any features you circled have issues with tolerances and moldability. Once we send the ISOW, we manufacture and inspect your order at Protolabs speeds. Please reach out immediately if there are any concerns with the information in the ISOW. Contact one of our applications engineers at 877-479-3680, or send an email to customerservice@protolabs.com

3. REPORTING ON YOUR FINAL PARTS

Once we have completed molding process development, which ensures we have a consistent, and repeatable process to produce quality parts, we will inspect the first three shots from the tool, using a Coordinate-measuring Machine (CMM), and provide you with a First Article Inspection (FAI) report. The CTQ FAI will measure all critical and reference dimensions. Leveraging the same CMM, we will inspect another 30 parts from the order and produce the CTQ Capability Report. Parts will be measured at an equidistant cadence of $n/30$ where n = total part order quantity. Along with the measurement data from each part, the Capability Report will also provide the average measurement, standard deviation, and a Cpk value for all critical dimensions.



ADVANTAGES

- ▶ In-process quality feedback at the press with no impact to lead time
- ▶ Reduction in cost and time by eliminating in-house measurements
- ▶ Receive a dimensional report to validate samples
- ▶ Gain critical design and material performance learnings for current and future iterations
- ▶ Improved part accuracy and dimensional adherence on customer-specified critical dimension(s)

We are continuously expanding our capabilities. If you have specific questions regarding these capabilities, please contact your account representative at **877-479-3680**.