

The Two Great Myths of Micromolding

The Information Vacuum That Can Lead to Costly “Micro-Misconceptions”

Background

Many design engineers express interesting, but incorrect, perspectives relating to Micromolded parts. Because Micromolding is an emerging technology with a shortage of accurate information in existence, this information vacuum creates fertile ground for myths and misconceptions. Most myths relate to the designers’ prior experience with “normal” or sometimes called, “macro” injection molding.

Identifying the Problem

MYTH #1: You can be successful molding micro-sized parts on standard sized molding machines.

The above assumption is that with a little adjustment and some fine refinements to make closer tolerance tools, most smaller injection molding machines should be able to make Micromolded parts.

Myth #1 is perhaps the single most dangerous myth of all because this statement is completely untrue and it impacts the customers’ supplier selection and sets the unprepared supplier up for failure. 20% of MTD’s new business each year comes from “rescuing” projects such as this, so the problem is well-known.

Notwithstanding the highly specialized ability to create a mold capable of producing the micro-sized plastic geometries and tolerances, the entire Micromolding system must be designed to operate differently from a “macro-system.”

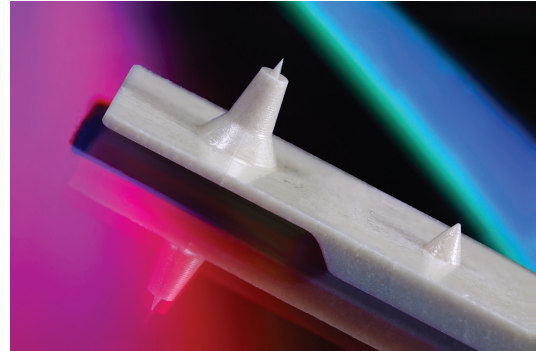


FIG. 1: The above LCP test specimen illustrates the difference between an MTD high precision molded micro needle (left) with a 5μ radius on the tip, which was created with Sarix EDM technology, and an industry standard needle point with a $.003$ " radius tip (right).

The source of the problem is failing to understand that miniature volumes of any material, plastic resin or even steel, behave differently than larger, normal volumes.

Every variable in the system behaves differently in micro including thermal transfer rates, mechanical strengths, flow characteristics, and so forth. The differences are all driven by differences in material volumes. The result is that Micromolding may look like “normal” molding, but it is a very different process that requires closer precision molds and real-time process monitoring.

MYTH #2: The part needs to be microscopic to be considered a “micro part.”

MTD produces parts as large as 1" square, however, the parts have some other compelling reason to be Micromolded, such as critical tolerances (i.e. $<.005$ ") or micro-sized features. It is common for these larger parts to be designed with small diameter holes, such as $.003$ " diameter.

As a working definition of Micro-sized parts, MTD suggests the following criteria:

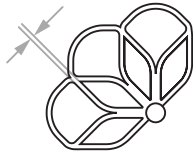
1. Does your part fit in here?



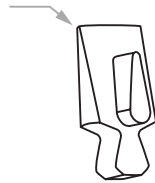
1" x 1"
APPROX. MAX PART SIZE

2. Does your design require one or more of these features?

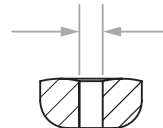
.004"
(.102mm)
WALLS



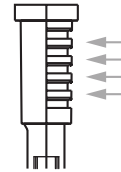
R.001"
(.025mm)
EDGES/CORNERS



Ø.002"
(.051mm)
HOLES



R.0002"
(5μ)
RADII



3. Have other molders said "No" to your designs? **Come talk to MTD.**

Expanding the Edge of Science in Micromolding